Broadford Bridge-1 Exploratory Well Site

Environmental Statement:
Main Statement

July 2012

Volume 1

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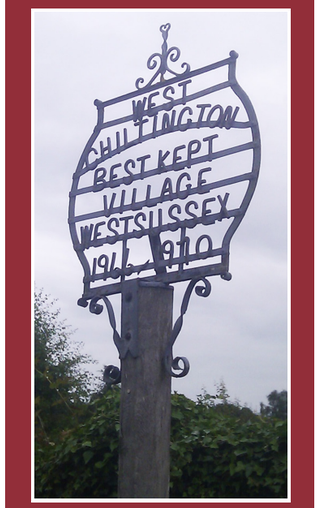

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1.0 INTRODUCTION

1.1 This Environmental Statement (ES) has been prepared on behalf of Celtique Energie Weald Limited (hereafter referred to as the "Applicant") to accompany a full planning application submitted to West Sussex County Council (WSCC), as the County Planning Authority (CPA) under the Town and Country Planning Act 1990, as amended by the Planning and Compulsory Purchase Act 2004 (Ref. 1.1), for the development of land at Wood Barn Farm (the "Application Site"). The development (hereafter referred to as the "Proposed Development") comprises of the siting and construction of a temporary well site including access track and ancillary infrastructure, for the exploration, testing and evaluation of hydrocarbons in the Willow Prospect.

1.2 Drilling of the borehole will extend to the north west of the Application Site but will not affect the surface of the land. Therefore other than Chapter 11 of the ES which considers Ground and Groundwater Protection, the ES focuses on the Application Site as shown in **Figures 1.1** and **1.2**, with the extent of the borehole and Application Site presented in **Figure 1.3**.

1.3 It is anticipated that construction will commence in the first quarter of 2013, subject to gaining planning permission.

Environmental Impact Assessment (EIA)

1.4 The Proposed Development does not fall within 'Schedule 1' of the 'Town and Country Planning (Environment Impact Assessment) England Regulations 2011' (Ref. 1.2). It may possibly be considered to constitute 'Schedule 2' development, if judged to qualify as a 'deep drilling' or 'surface industrial installation for the extraction of petroleum' in accordance with Sections 2(d) or 2(e) respectively of Schedule 2 of the Regulations. The threshold for a 'deep drilling' is an area exceeding 1ha whilst the threshold for a 'surface industrial installation' is an area exceeding 0.5ha. If a development is considered to fall within Schedule 2, EIA is only required if the proposal would be likely to generate significant environmental effects.

1.5 Having referred to the EIA Regulations including Figure 1 of Circular 02/99: Environmental Impact Assessment (Ref. 1.3), the Proposed Development is not considered to be within a 'sensitive area'. However, Circular 02/99 states that in certain cases other statutory and non-statutory designations – not included in the formal definition of "sensitive areas" in the Regulations, but which are nonetheless

environmentally sensitive may be relevant in determining whether significant environmental effects are likely, and therefore whether EIA is required.

1.6 The Application Site is 2.12 hectares (5.23 acres) comprising an access road and well site which will encompass all associated infrastructure. Although neither the Application Site nor the adjoining land is classified as a 'sensitive area' the site is surrounded by woodland, some of which consists of ancient woodland that is likely to have ecological value. There are also watercourses and ponds near the proposed Application Site, and Broadford Bridge Farmhouse (a Grade II Listed Building) and Brook House Farmhouse (a Grade II Listed Building) are also situated near the proposed Application Site.

1.7 For the reasons outlined above, the Applicant has chosen to prepare and submit an ES with the planning application to allow the likely significant effects of the Proposed Development to be determined.

1.8 EIA is the process of collection, publication and consideration of environmental information in the determination of a planning application. Consequently information on the likely significant effects of the Proposed Development has been gathered and is presented in this document, the ES. The ES will inform the decision-maker (in this case WSCC) of the likely significant environmental effects of the Proposed Development both during construction and once completed, and proposes mitigation measures to prevent, reduce and offset any significant adverse effects on the environment.

Planning Policy

1.9 The EIA Regulations do not require assessment of planning policy or guidance, however where appropriate, national and development plan policies of relevance to the Proposed Development have been considered under each of the technical chapters of this ES.

ES Structure

1.10 Reg. 2(1) of the EIA Regulations state that an ES should include:

> **"…information referred to in Part I of Schedule 4 as is reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile".**

1.11 An outline of this information in respect of the Proposed Development and where it can be found in the ES is presented in **Table 1.1**.

Table 1.1: Location of Information within the ES Required by Part I and Part II of the EIA Regulations

Specified Information		Location within ES
1	Description of the development, including in particular –	
(a)	a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases.	Chapter 4 (Project Description), Chapter 6 (Construction Programme)
(b)	a description of the main characteristics of the production processes, for instance, nature and quantity of materials used.	Chapter 4 (Project Description), Chapter 6 (Construction Programme)
(c)	an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the Proposed Development.	All technical chapters (7-13)
2	An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for its choice, taking into account the environmental effects.	Chapter 5 (Need and Alternative Sites)
3	A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and inter-relationship between the above factors.	All technical chapters (7 – 13)
4	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:	All technical chapters (7 – 13)
(a)	the existence of the development;	Chapter 15 (Statement of Significance)
(b)	the use of natural resources;	Chapter 7 (Ecology), and Chapter 8 (Landscape and Visual Effects)

Specified Information		Location within ES
(c)	the emission of pollutants, the creation of nuisances and the elimination of waste; and	Chapter 9 (Noise), Chapter 10 (Transport and Access), Chapter 11 (Ground and Groundwater Protection), and Chapter 12 (Lighting)
d)	the description by the applicant of the forecasting methods used to assess the effects on the environment.	Chapter 2 (EIA Methodology) and all technical chapters (7 – 13)
5	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	All technical chapters (7 - 13)
6	A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	Non Technical Summary (provided as a separate document)
7	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Chapter 2 (EIA Methodology) and in technical chapters where appropriate

1.12 The ES comprises three separate volumes, namely:

- The ES Main Text: The full text of the ES which comprises a total of 15 chapters, illustrated throughout by tables and figures;
- The ES Figures, Plans and Technical Appendices: A complete set of the figures, plans and technical documents undertaken as part of, or in support of, the ES. The figures, plans and technical appendices are provided in a separate volume to limit the size of the ES main text; and
- The Non-Technical Summary (NTS): The NTS provides a concise and straightforward summary of the Proposed Development, its likely significant environmental effects and the measures proposed to mitigate or to avoid these effects.

Project Team

1.13 The ES has been coordinated by Barton Willmore and presents the results of technical studies carried out in conjunction with a number of specialist consultants appointed by the Applicant. The project team is listed in **Table 1.2** along with their respective disciplines and contributions to the ES.

Table 1.2: Project Team

Organisation	ES Input
Richard Elliott Associates Limited	Construction Programme
Barton Willmore LLP	Town Planning; ES Coordination; Need and Alternative Sites Assessment and Socio Economic Assessment
Royal Haskoning	Transport and Access; Noise; and Lighting
Terra Firma Consulting	Landscape and Visual Impact
Hydrock	Ground and Groundwater Protection
URS	Ecology

Other Documents

1.14 A number of other documents have been submitted to WSCC as part of the planning application including:

- Planning, Need and Sustainability Statement;
- Alternative Sites Assessment;
- Statement of Community Involvement;
- Heritage Statement;
- Flood Risk Technical Note;
- Groundwater Risk Assessment; and
- Road Safety Audit (Stage 1).

ES Availability and Comments

1.15 Additional paper copies of the ES and the Technical Appendices can be purchased at a cost of £125. The Non-Technical Summary can be obtained free of charge. Copies of the ES, Technical Appendices and NTS can be obtained on CD at a cost of £25. All documents are available from:

Jenny Massingham
Barton Willmore LLP
Elizabeth House
1 High Street
Chesterton
Cambridge
CB4 1WB
sue.overhill@bartonwillmore.co.uk (01223 345 555)

1.16 Additional copies of this ES are also available for viewing by the public during normal office hours in the planning department of WSCC. Comments on the planning application should be forwarded to:

Jane Moseley
County Development
West Sussex County Council
2nd Floor
County Hall
Chichester
PO19 1RQ
strategic.planning@westsussex.gov.uk

References (Ref)

1.1 Town and Country Planning Act (1990) as amended by the Planning and Compulsory Purchase Act (2004)

1.2 Town and Country Planning (Environment Impact Assessment) England Regulations (2011)

1.3 Environmental Impact Assessment, DETR Circular 02/99 (1999)

2.0 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

Introduction

2.1 This chapter explains the EIA methodology and describes the ES structure and content. In particular, it details the process of identifying and assessing the likely significant environmental effects of the Proposed Development.

2.2 The content and conclusions of the ES are based on an assessment of the Proposed Development plans, as set out in Chapter 4 of this ES, baseline surveys and a series of technical studies.

General Approach

2.3 The ES has been prepared in accordance with the EIA Regulations which implement European Council Directive No. 2011/92/EU. Reference has also been made to currently available good practice guidance on EIA, including:

- Environmental Impact Assessment – A Guide to Procedures, Department of the Environment, Transport and Regions (DETR) 2000 (Ref. 2.1);
- Environmental Impact Assessment, DETR Circular 02/99 (Ref. 2.2);
- Guidelines for Environmental Impact Assessment, Institute of Environmental Management and Assessment (IEMA) 2004 (Ref 2.3);
- Amended Circular on Environmental Impact Assessment – A Consultation Paper, Department for Communities and Local Government (DCLG) (June 2006) (Ref. 2.4);
- Environmental Impact Assessment: A Guide to Good Practice and Procedures, A Consultation Paper, DCLG (June 2006) (Ref. 2.5).

Scoping

2.4 Scoping involves focusing the content of the ES on those issues of greatest potential significance. It is an important tool for identifying the likely significant effects of a proposed development through its design, construction and completed phases and ensures that appropriate mitigation options are considered, where necessary.

2.5 An ES Scoping Report was submitted to WSCC and received on the 15th May 2012 (**Appendix 2.1**) which was informed by the following sources:

- Review of the current situation through existing information, including data and reports;
- Desk-top studies;
- Consideration of relevant national and development plan policies; and
- Use of technical guidance and best practice.

2.6 The Scoping Report concluded that the following environmental issues should be addressed within the ES:

- Landscape and Visual Impact;
- Ecology;
- Transport and Access;
- Noise;
- Ground and Groundwater Protection;
- Lighting; and
- Socio-Economics.

2.7 The Scoping Report also concluded that the following environmental issues should be scoped out of the ES:

- Air Quality;
- Vibration;
- Flood Risk, Hydrology and Drainage;
- Archaeology (Heritage Statement to accompany the planning documents);
- Agricultural Land and Soils; and
- Waste.

2.8 WSCC adopted a scoping opinion on 13th June 2012 (**Appendix 2.2**) which agreed with the scope set out above. The issues raised by WSCC during the EIA Scoping are outlined in **Table 2.1** below.

Table 2.1: Comments on the Scoping Report

Consultee	Matters Raised	Chapter(s) where addressed
WSCC	• A desk-based assessment of the ecological potential of the site to be undertaken, along with a Phase 1 habitat survey and assessment of habitat suitability for protected and notable flora and fauna. • Direct and indirect impacts to be considered for all phases of the development, including	Chapter 7 Ecology

Consultee	Matters Raised	Chapter(s) where addressed
	restoration, along with the potential interaction with other topics/impacts. • If initial studies indicate potential risks to ecological features, more detailed studies should be undertaken. • Supporting assessments to include detailed ecological surveys and mitigation/compensation measures in order to avoid any negative impact during all phases of development, and to investigate the opportunities to maintain and improve the biodiversity of the site and surroundings	

WSCC	• A Landscape and Visual Impact Assessment (LVIA) should be carried out taking into account, in particular:
	  • the WSCC Land Management Guidance Sheet LW5 – Southern Low Weald;
	  • the WSCC Landscape Strategy (in particular guidelines for conserving historic landscapes and features; guidelines for commercial and industrial development including rural diversification; and guidelines for protecting the character of rural roads and lanes); and
	  • the Horsham District Council Landscape Character Assessment. Ref Character Areas J1 &2
	• 'Zone of theoretical visibility/zone of visual influence' mapping is recommended to take account of the height of the proposed temporary rig.
	• A Tree Survey and Arboricultural Impact Assessment should be prepared in accordance with BS5837 (Trees in Relation to Construction) to accompany the application, taking into account, in particular, the potential impact on existing hedgerows and wooded boundaries.
	• The WSCC Historic Landscape Character Analysis should also be considered.
	• The LVIA should take into account the interaction with other topics/impacts such as road safety (e.g. the impact of visibility splays, highway improvements, signage and road markings), ecological surveys, security requirements and the outcome of the tree survey/arboricultural impact assessment.
	• The findings of the LVIA should be presented in the ES.
		Chapter 6 Construction Programme; and Chapter 8 Landscape and Visual Effects

Consultee	Matters Raised	Chapter(s) where addressed
WSCC/Horsham District Council	• It is considered that in preparing noise assessments, the adoption of the threshold criterion of 65dBA in Annex E to BS5228:2009 may represent a significant impact even at some distance from the site. It should be noted that Annex E is informative only and that the assessment protocol is based on noise levels at exposed dwellings. • Noise levels at sensitive receptors, the location of which should be agreed with WSCC, should be assessed in accordance with the methodology set out in BS5228:2009. The calculations should include noise from all operations on the site, including vehicles making use of the access road, as well as a generalised assessment of the noise impact of additional traffic on the affected road network, in accordance with the relevant criteria set out in the Design Manual for Roads and Bridges	Chapter 9 Noise
WSCC	• A separate Transport Assessment should be undertaken, reviewing the highway safety and capacity consequences of the proposal in accordance with the current Department for Transport 'Transport Assessment Guidance' and the WSCC Transport Assessment local guidance note1. • The applicant should agree the scope of the Transport Assessment with WSCC, along with the need for any other supporting highway information, notably a Stage One Safety Audit to review the proposed access. • The outcome of the Transport Assessment should feed into the Environmental Statement which should consider the potential transport and access impacts, in accordance with the Guidelines for the Environmental Assessment of Road Traffic (Guidance Note 1) and the Design Manual for Roads and Bridges.	Chapter 10 Transport and Access
WSCC	• A source-pathway-receptor analysis should be undertaken for each stage of the proposed development to identify the potential for ground and groundwater contamination. The potential for the development to generate polluted run-off with resulting adverse effects on both water quality and surface water movements should be assessed together with measures to mitigate such effects during all stages of the development	Chapter 11 Ground and Groundwater Protection

Consultee	Matters Raised	Chapter(s) where addressed
WSCC	• An assessment of the potential impact of the lighting elements of the development should be undertaken, in accordance with Defra's document 'Lighting in the Countryside: Towards Good Practice.	Chapter 12 Lighting
WSCC	• This should take into account the potential impact of the development on the health and well-being of the local community including an appraisal of the likely changes to employment, income, demand for local services, community demographics, and the aesthetic quality of the community.	Chapter 13 Socio Economics

Consultation Process

2.9 The following organisations were approached as part of the EIA process to identify baseline information and to enable the Proposed Development to be refined in relation to environmental issues raised, where appropriate:

- WSCC - transport, landscaping, archaeology, and other departments;
- Horsham District Council (HDC), environmental health, arboriculture and other departments;
- Environment Agency;
- Natural England; and
- West Sussex Biological Record Centre.

2.10 Consultation has also been undertaken with the landowner and all the landowners under which the drill will pass. To enable the exploration of the Willow Prospect, the Applicant has identified a 'bottom hole target' (i.e. the calculated depth to which the borehole will drill that will hopefully lead into the "target" oil or gas reservoir). The target is located approximately 800m to the north of the Application Site and the Applicant proposes to use deviated drilling from the Application Site to the bottom hole target.

Public Exhibition

2.11 A comprehensive programme of public consultation was undertaken to inform the Proposed Development. An information brochure was produced and provided to residents in the vicinity of the proposed site and press packs issued to the local media. In addition, the Applicant has launched a dedicated website regarding the Proposed Development and a two day public exhibition was held in the vicinity of the site in on

22nd and 23rd June 2012. Further details on the consultation process and the feedback received are contained within the Statement of Community Involvement that accompanies the Planning Application.

2.12 Involvement with the local community will continue throughout the planning process and during the construction and operational phases of the Proposed Development.

Assessment Methodology

2.13 The EIA Regulations stipulate that an ES should, where possible, identify, describe and assess the likely significant effects of a development on the environment. Therefore, this ES identifies and assesses the likely significant effects of the Proposed Development in relation to both the construction and the completed phases. Environmental effects have been evaluated with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgement. Where uncertainty exists, this has been noted in the relevant assessment chapter.

Determining Significance

2.14 Guidance on significance has been mainly of a generic nature (e.g. DETR Circular 02/99 (Ref. 2.2) and DCLG draft Amended EIA Circular (Ref. 2.4), and practitioners have been obliged to develop definitions for specific topics and projects. It is broadly accepted, however, that significance reflects the relationship between two factors:

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

2.15 The magnitude of an effect is often quantifiable in terms of, for example, extent of land take, or predicted change in noise levels. The sensitivity, importance or value of the resource or receptor is normally derived from:

- Legislative controls;
- Designated status within the land use planning system;
- The number of individual receptors such as residents;
- An empirical assessment on the basis of characteristics such as rarity or

condition; and/or

- Ability of the receptor to absorb change.

2.16 Determination of significance also includes consideration of:

- Extent and magnitude of the effect;
- Type of effect (beneficial or adverse);
- Duration of effect (whether short, medium or long term; permanent or temporary);
- Nature of effect (whether direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation, is cumulative or interactive;
- Performance against environmental quality standards or other relevant pollution control thresholds; and
- Compatibility with environmental policies.

2.17 Significant effects occur where valuable or sensitive resources, or numerous receptors, are subject to effects of considerable magnitude. Effects are unlikely to be significant where low value or non-sensitive resources, or a small number of receptors, are subject to minor effects. Allocation of significant effects in intermediate situations will be a matter for professional judgement in each topic area.

2.18 Where an effect is considered to be significant, this significance will generally be classified as major, moderate or minor (with these descriptions again being based on precedent or current guidance). Within this ES, the significance matrix in **Table 2.2** has been used to define the level of significance of effects. In some cases analogous matrices for the various specialist topics are used, and where these use different assessment criteria this is clearly stated within the relevant chapter.

Table 2.2: Significance Matrix

Sensitivity /Value of Receptor	Magnitude of Effect		
	High	**Medium**	**Low**
High (England, UK, International)	Major	Major/Moderate	Moderate
Medium (County, Regional)	Major/Moderate	Moderate	Moderate/Minor
Low (Local, Borough)	Moderate	Moderate/Minor	Minor

2.19 The three levels of significance defined by the generic matrix are:

- Major – an effect which in isolation could have a material influence on the

decision making process;

- Moderate – an effect which on its own could have moderate influence on decision making, particularly when combined with other similar effects; or

- Minor – an effect which on its own is likely to have a minor influence only on decision making but when combined with other effects could have a more material influence.

2.20 Effects are also described as:

- Adverse – detrimental or negative effects to an environmental resource or receptor; or
- Beneficial – advantageous or positive effect to an environmental resource or receptor.

2.21 Where an effect is considered to be not significant or have no influence, irrespective of other effects, this is classified as "negligible".

2.22 Each of the technical chapters or accompanying technical appendices provides the criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria, together with the use of value judgements and expert interpretations to establish to what extent an effect is likely to be environmentally significant.

2.23 In the context of the Proposed Development, short term effects are considered to be those associated with the initial three Phases of the Proposed Development including construction, mobilisation, and drilling and appraisal operations. Medium and long term effects are those associated with the final Phase of development - retention, should the Application Site be retained whilst further planning permission for production is pending. Local effects are those which affect receptors within and close to the Proposed Development including residents within Billingshurst and Broadford Bridge. Effects upon receptors in the rest of Horsham District are considered to be at a District level. Effects on West Sussex that are not within or adjoining the Proposed Development are considered to be at a County level whilst effects on the rest of South East region are considered to be at a Regional level. Effects on England or the UK are considered to be at an England and UK level respectively. Any effects that can be considered in relation

to different countries are at an International level. No effects at an International, UK, or England level have been identified in the ES.

Baseline Conditions

2.24 The ES includes a description of the prevailing environmental conditions, the 'Baseline Conditions', against which the likely significant environmental effects of the Proposed Development have been assessed. These are taken to be the conditions at the time or immediately prior to the submission of the planning application in 2012. Each technical assessment has also identified the Future Baseline conditions in the absence of the Proposed Development.

Cumulative and Interactive Effects

Cumulative Effects

2.25 There are no schemes in the area with the potential for cumulative effects, and no potential schemes were identified in the WSCC Scoping Opinion, therefore no further cumulative assessment has been undertaken in this ES.

Interactive Effects

2.26 Interactive effects are also considered in the ES. Interactive effects arise where effects from one environmental element bring about changes in another environmental element. These effects are also reviewed in each of the technical chapters of this ES. Examples of the main potential types of interactive effects are as follows:

- effects of traffic on noise;
- effects of lighting on ecology; and
- effects of landscaping on ecology.

Structure of Technical Chapters

2.27 Through the EIA process, the likely significant environmental effects of the Proposed Development will be assessed. Each key environmental topic has been assigned a separate chapter in the ES (Chapters 7 - 13), and within each of these chapters the information that will inform the EIA process has been set out in the following way:

- **Introduction** – a brief summary of what is considered in the chapter.

- **Planning Policy Context** – a review of relevant National and Development Plan policies related to the technical issues;

- **Assessment Methodology** – an outline of the methods used to undertake the technical studies with reference to legislation, published standards, guidelines, best practice and any relevant significance criteria;

- **Baseline Conditions** – a description of the environmental conditions against which the likely significant environmental effects of the Proposed Development have been assessed;

- **Likely Significant Effects** – identification and assessment of the likely significant environmental effects of the Proposed Development during each of the four stages of the project:

    - Phase 1: The construction of the drill site, the associated access and drainage ditches around the perimeter of the drilling area (6 weeks);
    - Phase 2: The mobilisation and placement of drilling equipment at the site, and the drilling of an exploratory borehole (up to 8 weeks);
    - Phase 3: (only applicable if hydrocarbons are discovered);

        - Phase 3a (gas): a short term drill stem test is carried out for up to 2 weeks;
        - Phase 3b (oil): a short term drill stem test is carried out for up to 14 weeks;

    - Phase 4: dependent upon the outcome of previous Phases;

        - Phase 4a: Restoration of the well site (6 weeks)
        - Phase 4b: Retention of the well site whilst the long term future of the site is considered and an application for production is prepared (up to 30 months).

- **Mitigation Measures** – development of measures to avoid, offset or reduce any significant adverse effects of the Proposed Development. These measures can relate to any of the phases of the project. Where any significant adverse

environmental effects have been identified, a commitment is made by the Applicant to implement mitigation measures, either during the construction works or the operational phase;

- **Residual Effects** – identification of the remaining effects of the Proposed Development, assuming implementation of available mitigation measures, and includes an assessment of the significance of those effects in accordance with the criteria set out in paragraphs 2.13 – 2.22; and

- **Summary** – a summary of the key finding of the ES chapter.

Assumptions and Limitations

2.28 The principal assumptions that have been made and any limitations that have been identified, in preparing this ES are set out below. Assumptions relevant to specific topics have been made in the appropriate chapter:

- All of the principal existing land uses adjoining the Application Site remain;
- Information received by third parties is complete and up to date;
- The design, construction and operational stages of the Proposed Development will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge;
- Significant environmental effects have been assessed using the Proposed Development Scheme Plans (see Chapter 4 of this ES).

References (Ref)

2.1 Environmental Impact Assessment – A Guide to Procedures, Department of the Environment, Transport and Regions (DETR) (2000)

2.2 Environmental Impact Assessment, DETR Circular 02/99 (1999)

2.3 Guidelines for Environmental Impact Assessment, Institute of Environmental Management and Assessment (IEMA) 2004

2.4 Amended Circular on Environmental Impact Assessment – A Consultation Paper, Department for Communities and Local Government (DCLG) (2006);

2.5 Environmental Impact Assessment: A Guide to Good Practice and Procedures, A Consultation Paper, DCLG (2006)

3.0 APPLICATION SITE AND SURROUNDINGS

3.1 The aim of this Chapter is to describe the baseline characteristics of the Application Site and its surroundings.

Application Site

3.2 The Application Site lies in the County of West Sussex and the District of Horsham, approximately 7km to the south east of Horsham and 3km to the south of Billingshurst. The Application Site lies within the Parish of West Chiltington.

3.3 At present, the Application Site consists of Grade 3 agricultural land which forms part of a larger field in pastoral use. With the exception of the field's northern boundary, the Application Site is enclosed from the surrounding countryside by existing woodland blocks. The most significant areas of woodland consist of Pocock's Wood to the north west and Prince's Wood approximately 150m to the east, the latter of which is designated as Ancient Woodland. These areas of woodland can be seen on **Figure 1.2**.

3.4 Access to the Application Site is obtained via an existing agricultural track which passes north along the eastern extent of Pocock's Wood before diverting north east towards the main farm yard associated with Wood Barn Farm and joining the B2133. An alternative access point off the B2133, lies approximately 340m to the north east of the Application Site and 280m to the south of Wood Barn Farm.

Surroundings

3.5 The local area forms part of the Low Weald and lies approximately 5.5km east of the South Downs National Park. The area is generally characterised by gently undulating farmland enclosed by mature hedgerows and scattered woodland blocks. The settlement pattern of the Low Weald comprises a network of farmsteads and associated agricultural workings alongside smaller villages, groups of residential properties and individual cottages and homes.

3.6 There are a number of Listed Buildings in the vicinity of the Application Site including Broadford Bridge Farmhouse 500m to the south east, and Brook House Farmhouse 600m east, both of which are Grade II Listed. The Listed Buildings in the vicinity of the Application Site can be seen on **Figure 3.1**. There is an area approximately 950m west of the Application Site which is identified as being an "Archaeological Site" in Horsham

District Council's adopted Core Strategy (2007), and is also adjacent to areas of Ancient Woodland - Beedings Copse. However, there are no Scheduled Monuments within the vicinity of the Application Site.

3.7 The Application Site forms part of a working farm with the closest area of development being approximately 300m to the south east, consisting of a number of poultry houses at Homefield Farm. The main farmhouse lies 500m to the south east along with other detached properties associated with the hamlet of Broadford Bridge (**Figure 3.2**).

3.8 With the exception of Broadford Bridge to the east, and Adversane to the north west, the most significant area of development is the village of Billingshurst which lies approximately 3km to the north of the Application Site. There are a number of roads through the area including the A29 Stane Street, A272 West Chiltington Lane and B2133 Adversane Lane as well as numerous small farm roads and tracks. The Pulborough to Parbrook railway line is located just under 2km to the west of the Application Site with the A29 Stane Street running in parallel, a further 250m west from the railway line.

3.9 In addition to the areas of woodland immediately surrounding the Application Site, there are a number of large areas of Ancient Woodland within the locality including, Steepwood Copse 1.3km north west of the Application Site, and Marringdean Wood a further 450m north west. Notwithstanding the areas of Ancient Woodland, there is also extensive non-ancient woodland and tree coverage throughout the local vicinity.

3.10 Due to the rural nature of the area and the working farms, there is a network of public footpaths and bridleways which run through Billingshurst and offer access to farmed fields, residential properties and the countryside for visitors and residents. There are no Public Rights of Way crossing the Application Site with the closest footpath passing approximately 320m to the north west between Wood Barn Farm and Gay Street Farm.

3.11 The River Adur runs in the vicinity of Broadford Bridge and a north-east flowing tributary brook of the Adur (marked as a "drain" on **Figure 1.2**) is located on lower ground some 400m south east of the Application Site, and flows through Broadford Bridge. In addition there is a small pond 250m east of the Application Site, located in Prince's Wood with a drainage outflow to the north that connects with another tributary of the River Adur. Another small pond is located 200m north west of the Application Site, on the south western edge of Pocock's Wood, with a further pond located 320m south of the Application Site in Gatewick Copse.

4.0 PROJECT DESCRIPTION

4.1 The Proposed Development involves the construction of a temporary well site within an enclosed compound to drill an exploratory well. Should hydrocarbons (oil or gas) be encountered, short term well testing may be undertaken to assess economic viability. Should no hydrocarbons be encountered or the drill stem tests prove negative, all structures, buildings and enclosures will be removed and the site restored. However, if suitable quantities of oil or gas are encountered, the well will be suspended and access and hardstanding will be retained whilst an application is prepared and submitted to WSCC for production.

4.2 The Proposed Development consists of the following elements:

i) Site clearance involving the excavation and storage of top soil;
ii) Construction of temporary earth bunds on the northern and eastern boundaries of the well site compound to store excavated topsoil and subsoil;
iii) Construction of the access track using crushed stone delivered by HGVs;
iv) Delivery of a drilling rig, most likely the MR7000 or similar, and ancillary drilling equipment for construction of an exploratory well;
v) Mobilisation of ancillary testing equipment;
vi) Creation of a staff car park to provide up to 12 spaces within the compound but outside of the drilling area;
vii) Construction of a concrete chamber sunk into the ground (the "cellar") to include large diameter (18⅝") conductor pipe which will be pre set using an augur rig to a depth of around 65 ft. The drilling rig will be placed over the cellar, and the well will be drilled through the conductor pipe.
viii) Purpose built tanks for the storage of drilling mud and rock cuttings;
ix) External lighting to the drilling rig illuminating the rig floor, mud tanks and pumps, catwalk, doghouse and site cabins;
x) On-site water storage tanks and a portable skip for on-site refuse collection;
xi) Erection of five portable cabins providing temporary office accommodation, living accommodation for 2 key personnel who need to be on-site in case of emergency response, plus canteen, toilet and shower facilities for the crews; and
xii) Noise attenuation and dust control procedures will operate on site including effective silencers and damping down the wellsite and access roads as the weather dictates.

4.3 The Proposed Development comprises four phases – construction, drilling, testing and

retention or restoration, as detailed in **Table 4.1** below. These phases might not be carried out consecutively depending on for example, the availability of equipment or personnel, the need for site maintenance or off site laboratory testing, and the applicability of the phases are also dependent upon whether oil or gas, or neither is encountered. Moreover, the technical constraints associated with the drilling and maintenance of an exploratory well means that until operations begin on site, it is difficult to anticipate how long it will take to complete the Proposed Development. Therefore both the best case and worst case scenarios have been illustrated in **Table 4.1**.

Table 4.1: Timescales and Phasing of the Proposed Development

Phase	Best Case Scenario	Worst Case Scenario
Phase 1 Construction	6 weeks	6 weeks
Phase 2 Mobilisation and Drilling	6 weeks	10 weeks (includes a 4 week contingency)
Phase 3a Testing (gas)	1 week (includes mobilisation, 1 wk test with rig and flaring)	2 weeks (includes mobilisation, 2 weeks test with rig and flaring)
Phase 3b Testing (oil)	2 weeks – (1 week mobilisation, 1 week testing with rig and flaring)	14 weeks (2 weeks mobilisation, 12 weeks testing, but rig will not be at site during an extended test such as this)
Phase 4a Restoration	6 weeks	6 weeks
Phase 4b Retention	1 month	30 months

4.4 It is anticipated that the best case scenario will apply but the worst case scenario allows for any contingencies required during the operation of the Proposed Development. As a worst case scenario, a 4 week contingency has been included during mobilisation and drilling in case maintenance of the drilling rig or other ancillary equipment is required. Should planning permission be granted for a period of three years and the discharge of conditions, development of the Application Site, drilling and testing undertaken within 6 months, the worst case scenario is that the site would be retained for a period of up to 30 months whilst an application for production is prepared and submitted.

4.5 Based on the above, it is the worst case scenario which will be assessed in the ES although it should be noted that the impacts are anticipated to be considerably less than those detailed in this ES, as the best case scenario is the likely development programme.

4.6 The main elements of the Proposed Development and the associated processes are described in more detail below. This Chapter should also be read in conjunction with Chapter 6 which has been prepared by Richard Elliott Associates Ltd and describes the construction programme for the Proposed Development.

Phase 1: Construction of the Access Road and Well Site (6 Weeks)

4.7 Phase 1 will last for up to 6 weeks and involves the construction of the highway entrance, new access track and the well site.

Site Clearance and Top Soil Removal

4.8 Where practicable, site clearance operations will take place outside of the bird breeding season and would be carried out between September and February. If it is necessary to undertake any activities between mid-May and late August, the Application Site will be checked by a suitably qualified ecologist for the presence of nesting birds.

4.9 In terms of topography, the Application Site generally rises in a north easterly direction between 25-30m AOD. At the main well site area this change in land form results in a height difference of just over 1m from corner to corner. As a result of the existing site levels, surplus soil will be excavated from the higher corner and moved to the opposite corner to level the site in a 'cut and fill' operation.

4.10 All excavated soils will be retained on site for future reinstatement of the Application Site and access road. The topsoil will be stripped off using an excavator and placed in a stockpile as close as possible to the point of excavation. This limits the disturbance of the soil structure and the amount of tracking over both the topsoil and the exposed site formation.

4.11 Topsoil removed from the main well site will be placed as a bund along the eastern boundary of the well site compound as illustrated in **Figure 4.1**. The topsoil removed from the access road will be placed in a strip alongside the northern extent of the access road and near to the entrance off the B2133. The positioning of the proposed bunds adjacent to the access road is shown in **Figures 4.2** and **4.3**. The height of bunds along the access road and enclosing the well site compound will not exceed 4.5m. A more detailed description of the ground works associated with the site clearance and top soil removal is contained within Chapter 6.

Site Entrance and Access Track

4.12 The Application Site entrance is situated off the B2133 and utilises an existing field access located between two mature Oak trees, as shown in **Figure 4.2**. The access to the Application Site from the B2133 has been designed to allow for "right turn in/left turn out" only, so that neither of the Oak trees need to be removed (**Figure 4.4**).To allow sufficient width for vehicles to enter the Application Site it is proposed that a section of hedgerow, shown on **Figure 4.2** will be removed. The value of this section of hedgerow has been surveyed as part of the ecology assessment contained at Chapter 7 of this ES. Notwithstanding the fact that this section of hedgerow is considered to be species poor, as part of the proposed mitigation measures it will be replaced. The replacement hedgerow will be species-rich, enhancing the existing species-poor hedgerow. A comprehensive assessment of the potential ecological impact of the Proposed Development and a full description of all the proposed mitigation measures is presented at Chapter 7 and 14 of this ES.

4.13 As illustrated in **Figure 4.2** and **Figure 4.3**, the route of the proposed access track passes west along an existing agricultural track before deviating in a south westerly direction at Pocock's Wood towards the entrance of the main drill site. Passing places have been incorporated every 350m along the route of the access track to ensure there are safe opportunities for vehicles to pass.

Well Site Compound

4.14 The compound layout as it will be constructed is illustrated in **Figure 4.5**, and the compound during drilling operations is illustrated in **Figure 4.1** with cross sectional views illustrated in **Figure 4.6**. The compound is largely rectangular with a width (west to east) of approximately 55m and a length (north to south) of approximately 78m. An interceptor ditch and small retaining bund will be constructed around the compound to collect rain water runoff and contain any potential contaminants such as fuel and oils used in operating the site preparation and drilling machinery. The contents of the ditches will be removed from the Application Site by a tanker and will be taken to a registered disposal site. Due to the contours of the land, some soil moving operations would be required to create a level platform. As stated at paragraph 4.11, and illustrated on **Figure 4.5**, the existing top-soil would be stripped and stored as temporary bunds along the eastern boundary.

4.15 The internal site surface would be formed with crushed stone compacted on top of a geotextile layer with a nominal fall to a perimeter interceptor ditch. The interceptor

ditch would be 600mm deep and 1.2m wide and lined with Bentomat geomembrane or similar, falling to a corner sump area.

4.16 A number of the activities during the construction phase, such as the laying of crushed stone for the access road and the internal well site surface, require transportation. A detailed description of the anticipated traffic movements associated with this Phase and the potential impact on the local highway network is presented in the transport assessment at Chapter 10 of this ES.

Phase 2: Mobilisation of the Drilling rig and Drilling Operations (6-10 Weeks)

Mobilisation

4.17 Transporting (to site) and erecting the drilling rig is termed 'mobilisation' and takes place over a period of up to three days. A detailed description of the traffic movements associated with the mobilisation and drilling phase is contained at Chapter 10 of this ES.

4.18 The precise specification of the drilling rig will not be known until a contractor has been selected, although the Applicant is likely to use the MR7000 drilling rig (or similar) which is a typical rig used for onshore UK drilling. The maximum height of the rig mast would be no more than 36m above ground level. An example of the MR7000 rig is contained at **Appendix 4.1.**

4.19 All of the major components associated with the drilling rig including the on-site water tanks, pipe store, mud and fuel tanks and essential 24 hour staff living accommodation including mess, shower and WC, are contained within the main drilling compound, as shown in **Figure 4.1**. The mass and scale of the proposed well site compound is determined by the size and layout of the drilling rig including the associated equipment and infrastructure, and the processes which need to be undertaken to evaluate the well in a safe, sensitive and satisfactory manner.

Drilling Operations

4.20 Once commenced, drilling and associated operations would be on a 24 hours per day basis and based on a worst case scenario could last for up to 10 weeks. The drilling and casing programmes would be designed in accordance with standard petroleum industry practice established and managed by the Department for Energy and Climate Change (DECC), taking into account the anticipated geology, pressures and objectives of the well.

4.21 The drill string consists of drill pipe, a bottom hole assembly (BHA) and a drilling bit. The drilling bit sits at the bottom of the drill string below the bottom hole assembly, consisting of drill collars and stabilisers. The stabilisers assist with drilling a straight hole and the drill collars provide the weight on the drilling bit. The BHA is run in on drill pipe which is rotated by a motor at surface or a downhole motor if drilling directionally. The drill bit is designed to drill using a crushing/shearing motion. The weight required on the bit is up to 5000 lbs per inch of diameter, so an 8½" diameter bit will have up to 20 tons weight on it, provided by the drill collars, to drill. The drill pipe and collars are generally around 30 ft in length and have special tapered threads so they can be screwed together. The entire drill string is hollow to allow drilling mud to be circulated while the pipe is rotated during the drilling process. As the hole gets deeper additional lengths of drill pipe are added to the drill string

4.22 The drilling mud provides a number of key functions, it:

- Cleans the bit face and the hole and transports the cuttings away from the bit.
- Controls the fluid pressures in the formations being drilled;
- Maintains wellbore stability;
- Lubricates and cools the drill string and bit;
- Minimises impact on the environment.

4.23 The drilling mud controls fluid pressures in the formations being drilled and maintains wellbore stability simply by the weight of the drilling mud in the well, which exerts a pressure on the formation. The weight of the drilling mud is carefully controlled by the Mud Engineer.

4.24 The drilling mud is circulated by the mud pumps down the drill pipe and through nozzles in the bit. After the mud passes through the nozzles in the bit it picks up the drilled cuttings and transports them up the annulus between the hole and the drill pipe to the surface.

4.25 At surface, the drilling mud is passed over the shale shakers consisting of a series of vibrating mesh screens which allow the drilling mud to pass through, but the drill cuttings are retained and discharged to a tank for removal to a waste disposal facility.

4.26 Modern drilling mud is environmentally compatible and consists of freshwater with additives (predominantly polymers) to provide viscosity, gel strength and minimise filtration to the formations drilled. The mud is totally self contained in tanks, and does not utilise pits dug in the ground. When drilling through near surface aquifers,

freshwater is usually used as a drilling mud with bentonite gel sweeps to clean the hole as freshwater doesn't have sufficient gel strength to lift the cuttings from the bottom of the well. The use of freshwater and natural, non-organic thickening agents minimises the impact on the aquifer.

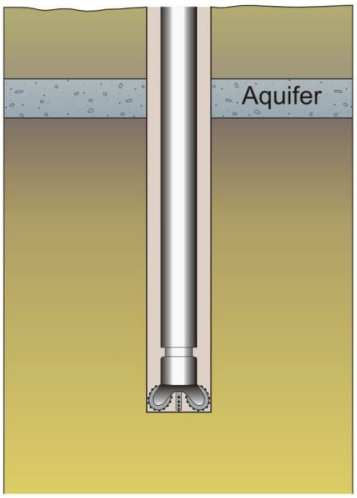
4.27 Due to the need to protect aquifers and isolate difficult hole sections it is not possible to drill the entire well in one hole size. Concentric strings of casing have to be run to provide the necessary isolation and require a smaller bit size after each casing string is run (Casing is large diameter steel pipe with threaded connectors which allows it to be screwed together). In Broadford Bridge 1 the 18⅝" conductor is preset using a small augur rig before the drilling rig is moved onto location. This conductor is required to provide mud returns to the cellar while drilling the surface hole and prevent the cellar being washed out underneath the drilling rig. A 16" hole is then drilled down to the Wadhurst Clay at which point 13⅜" casing is run and cemented in place to surface to isolate and protect the Upper and Lower Tunbridge Wells Sand Aquifers. Then the 12¼" hole is drilled to the top of the Upper Lias at which point 9⅝" casing is then run and cemented to surface to isolate the Kimmeridge, Corallian and Oxford Clays. Next, an 8½" hole is drilled to the top of the Sherwood Sandstone. A 7" liner (essentially 7" casing not run to surface) will then be run from 150 ft inside the 9⅝" and cemented in place; a packer above the 7" liner hanger will ensure isolation between the 7" and 9⅝" casings. Finally a 6⅛" hole is drilled into the target Sherwood Sandstone.

4.28 24 hour drilling operations are necessary for a number of reasons:

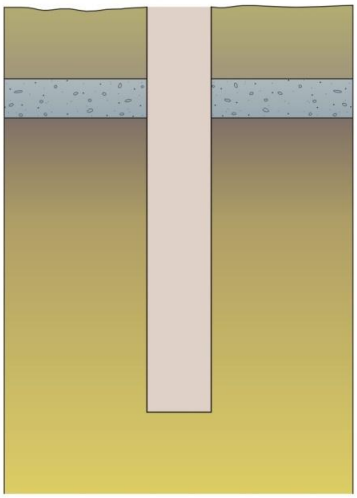
- Firstly, the hole can cave-in in places because of swelling clays and porous formations, so the sooner the hole section is drilled, the sooner the casing can be run which prevents these problems. 24 hour operations keeps the duration to a minimum and reduces the risk of these kind of problems.
- If mud circulation is stopped for extended periods of time the drill cuttings settle to the bottom of the well and pack-off around the drill string. This results in the drill string becoming stuck, which can take many hours to free-up. This could be avoided by removing the drill string from the hole, but this is an operation that can take several hours and would then take several more hours to re-run back into the hole.
- It can be seen that this would become highly inefficient with the majority of the working day simply pulling out and re-running the drill string. The result would be long periods of time in deeper hole sections, which risk becoming less stable and having cave-ins which then require re-drilling.

Schematic of Casing Running and Cementing

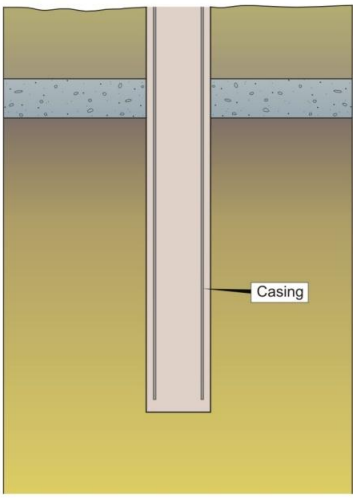
1. DRILL HOLE SECTION



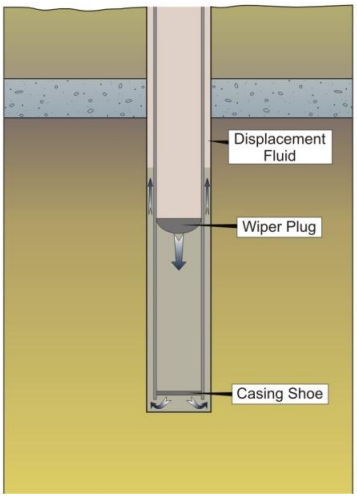
2. REMOVE BIT AND DRILL STRING



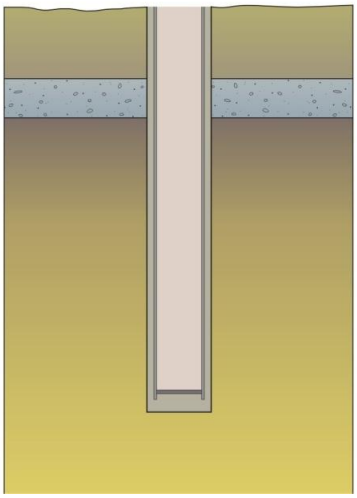
3. RUN CASING



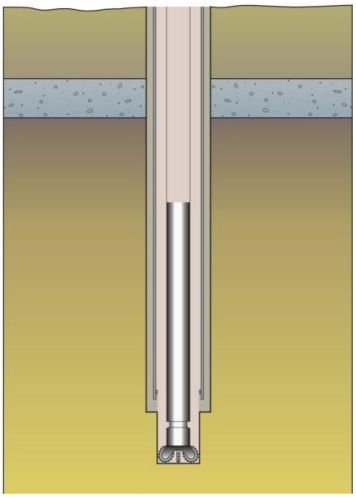
4. CEMENT CASING IN PLACE



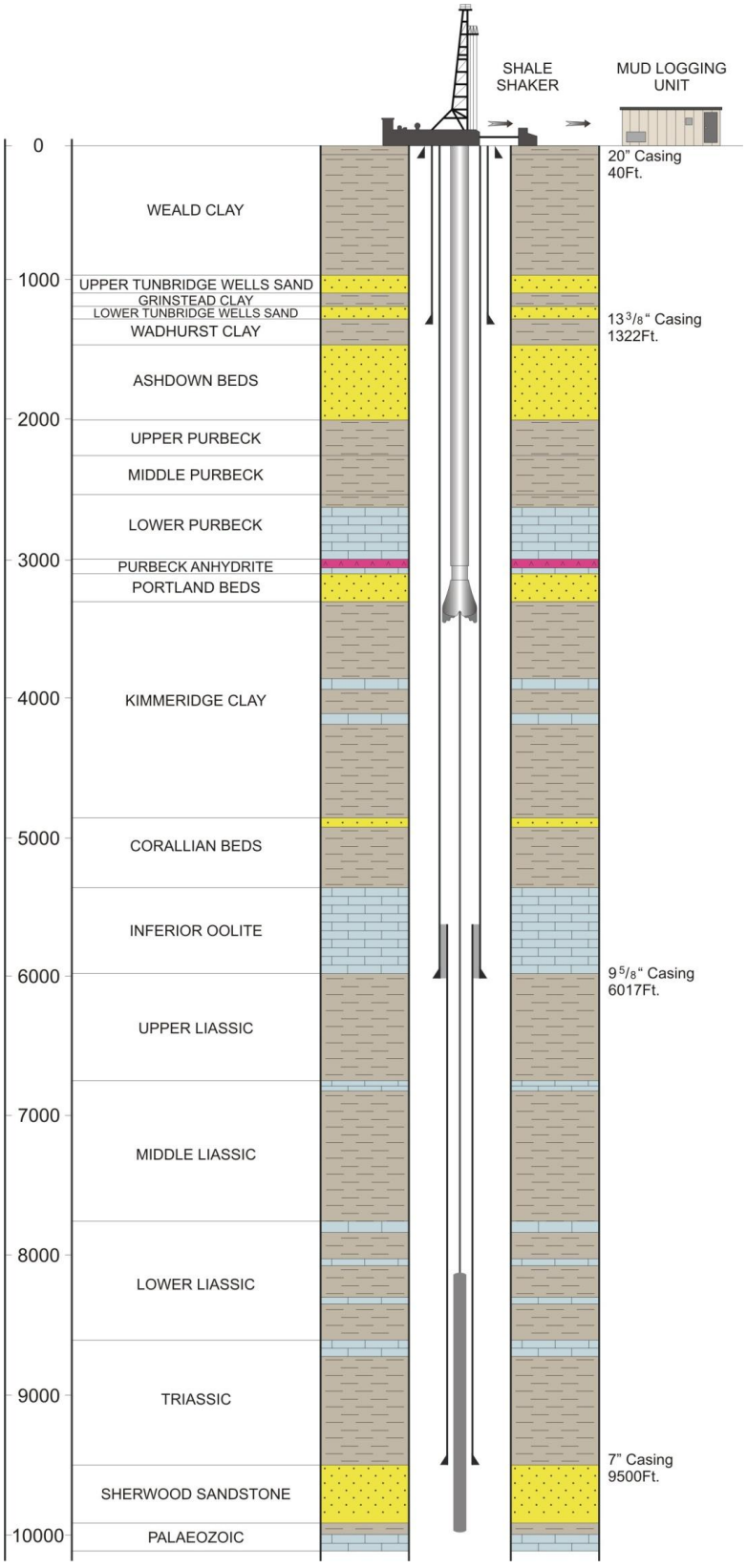
5. CEMENT IS ALLOWED TO SET



6. DRILL OUT CASING SHOE & DRILL AHEAD



Schematic of the Broadford Bridge Well showing Geological Formations and Casing Points



Water Supply

4.29 Water would be required to make up the drilling mud used to drill the well, and for emergency fire-fighting contingencies. The supply of water would be delivered by 23 m^3 capacity tankers to two on-site storage tanks. It is estimated there would be an initial requirement of up to 165 m^3 per day (8 tanker loads) for the first three days of drilling reducing to 45 m^3 per day (two tanker loads) thereafter. Total water requirement for the drilling operation is anticipated to be around 3000 m^3, which is re-circulated during the operations to minimise the volumes needed and then disposed of at the end of the well at an approved site.

Waste Disposal

4.30 Drilling mud and rock cuttings would be collected in purpose built tanks which would be located on either a concrete pad or in skips and transported from the Application Site by road for disposal at an authorised waste disposal facility in proximity to the Application Site. The contents of the portable toilets would also be removed periodically to an approved disposal site. The contents of the surface water collection ditch and compound sump would be emptied as necessary and transported by road tanker for disposal at an approved location. A portable skip for refuse collection would be provided and its contents disposed of periodically to a Licensed waste disposal site in proximity to the Application Site.

Personnel

4.31 Approximately 15 staff will be required during the construction of the well site and access road and normally, 12 staff will be on-site during drilling operations. Staff car parking will be made available within the Application Site, as shown in **Figure 4.1.**

Lighting

4.32 As discussed above, to prevent the well from collapse the operation would be carried out for 24 hours per day. In order to operate 24 hours a day, lighting would be required during the hours of darkness. The position of the lights within the Application Site and on the drilling rig can be seen on **Figure 4.7**. Lights will consist of the following:

- Five freestanding 3 metre high fluorescent lights facing inwards and downwards

towards the Application Site;

- Six Tungsten filament bulkhead lights located on site cabins;
- Two horizontal strip lights at cabin level adjacent to the rig; and
- Inward facing lighting within the derrick of the drilling rig.

4.33 A comprehensive assessment of the proposed lighting scheme is presented at Chapter 12 of this ES.

Environmental Safety

4.34 Site specific Emergency Response Procedures will be put in place in consultation with the emergency services. Drilling and any subsequent testing operations will be conducted in accordance with good oilfield practice and all relevant controlling bodies and British Standards. Should any emergency situation occur the well would be instantaneously "closed in" by means of the fitted Blowout Preventer. The adoption of normal emergency procedures applicable to oilfield operations would ensure compliance with the U.K. onshore environmental safety control regime.

Health and Safety

4.35 Drilling operations would be undertaken as required by the Borehole Sites & Regulations 1995 (Ref. 4.1), the Management of Health & Safety at Work Regulations 1992 (Ref. 4.2), the Construction (Design & Management) Regulations 2007 (Ref. 4.3), the Offshore Installations & Wells (Design & Construction etc) Regulations 1996 (Ref. 4.4) and the Applicant's Health & Safety Manual. All construction, drilling, possible testing and restoration activities would be carried out in accordance with DECC procedures.

Phase 3a: Short Term Testing and Evaluation - Gas (1-2 weeks)

4.36 The Applicant plans to drill to the target formations, log the well and if hydrocarbons are found, run a short duration Well Test. A well test is a procedure for isolating and testing a potentially hydrocarbon bearing formation using a temporary well completion and production system. The test is designed to evaluate flowrates, deliverability and obtain fluid samples. The testing programme would begin with a short clean-up flow of the oil and/or gas. The flowstream will be passed through a separator, where it is split into oil, water and gas. The oil and water are stored in tanks prior to transportation to a refinery or water disposal facility and the gas is vented and flared. The gas has to be vented and flared because there is no practical way to store it or introduce it to the gas

distribution system (**Figure 4.8**).

4.37 A routine well test programme involves flowing the well to assess the flowrate and acquire samples of the produced fluids. In addition, memory pressure gauges are run into the well and they record pressure and temperature data adjacent to the producing formation. The test is not continuous, but follows a sequence of flow and shut-in periods. It is likely that a series of tests will be run but these are likely to last for no longer than two weeks in total. This process requires a small amount of gas to be burnt off by the burners rather than released untreated into the atmosphere. There are three potential gas flaring systems which could be used on the site and are categorised as;

1. A basic flare;
2. A shielded flare; or
3. A Clean Enclosed Burner (CEB).

4.38 A basic flare consists of an open flame in an excavated pit surrounded by a bunded area on three sides with a designated safety exclusion zone, as shown in **Figure 4.8**. The flare pipe enters the pit on the open side and is laid horizontally at ground level to minimise the height of the flare above the bund. This method will create minimal noise or vibration, and will have limited visual impact due to the surrounding bunds. A shielded flare is similar to a basic flare but includes an external protective covering to provide a shield to the flames and heat. Both of these processes cause a slight rumbling noise. A CEB, is a fully enclosed burner which completely encloses the flare so flames are not visible. In the flaring process itself, inside a CEB the gas is mixed with air in a diffuser and burned to achieve total combustion. This process does produce some noise, and a CEB is normally only used if high volumes of gas are discovered.

4.39 As illustrated in **Figure 4.1**, the flare pit is located in the south east corner of the proposed well site compound and is enclosed by soil bunds to limit radiated heat. This flare area is constructed during the site construction phase to avoid disruption when the drilling rig is on site, and uses subsoil excavated from the Application Site to add screening to the flare.

4.40 Noise during testing will be no worse than the levels provided for the CEBs which is measured at 65dB at 200 yards for CEB model 4500 (**Appendix 4.2**). Noise levels will be limited due to the short term nature of a routine gas flare programme. A comprehensive description of the anticipated noise levels associated with this testing phase and the potential impacts on local receptors is presented within the noise assessment at Chapter 11 of this ES.

Phase 3b: Short Term Testing and Evaluation - Oil (2-14 weeks)

4.41 If oil is detected in the cores and cuttings samples recovered whilst drilling the well, and subsequent analysis confirms the presence of oil, the well will be tested to see if the oil will flow freely and in sufficient quantities to justify further appraisal. The duration for well testing of oil typically takes approximately two weeks to complete. If, as indicated in **Table 4.1,** the testing phase is extended to 14 weeks, the well would be completed; the drilling rig would be dismantled and taken off site. The rig demobilisation is the reverse process to the earlier mobilisation, leaving the wellhead in place and a cabin on the Application Site for monitoring staff.

4.42 Flaring during testing will be at the same noise level as those identified above in Phase 3a. A generator would be required on-site for power and this is likely to be the P165E1 generator or similar which is stated as being 70dBA at 7m. Further details on noise can be found in Chapter 9.

Phase 4a: Restoration (6 weeks)

4.43 Should no hydrocarbons be encountered or upon completion of the DST, the well would be abandoned by plugging the well in accordance with DECC's normal procedures. This involves setting cement plugs at various points within the wellbore to provide isolation, cutting the steel casing approximately 2.5m below the surface and capping the well with a steel plate. Rigging down and demobilisation of the drilling rig would take approximately three days. All structures including welfare and support buildings, the drilling rig, storage tanks, the well cellar and sump-lining would be removed. Any remaining drilling mud and cutting waste would be removed from the site along with the pit liner and perimeter ditch-lining and disposed of at an approved waste disposal facility.

4.44 In restoring the site all stone is removed, and the soil which has been stored in the on-site bunds, is replaced. Where the hedge has been removed, this section of hedgerows will be replanted with young whips of native variety hedgerow plants that are protected by wooden post and rail fences with rabbit netting to deter rodents.

4.45 The post and wire fences would be left up to protect the freshly worked soils from livestock and the farmer would usually take them down at his own convenience. The aftercare of the site is also sub-contracted to the farmer so he can time the work to suit his own operations.

4.46 Stored subsoil and top soil would be loosely spread over the re-graded ground to relieve compaction. The Application Site would be re-contoured and allowed to regenerate naturally without the use of grass seed or planting and possibly replanted with trees in the future.

4.47 The proposed reinstatement programme would be agreed with West Sussex County Council in writing prior to commencement of the works.

Phase 4b: Retention (1-30 Months)

4.48 If commercially viable deposits of oil or gas are located and tests prove positive, the Application Site may be retained whilst future options are considered. These options are outside the scope of this assessment but may involve further testing or re-appraisal of seismic data and re-drilling to reach a different target underground.

4.49 In the event of retention, the well would be suspended with two permanent barriers to flow; the Application Site would be cleaned as for restoration but the stone surface, drainage ditches and the cellar would be left in place. A safety cage would be built around the wellhead assembly and all valves closed, pending a decision either to plug and abandon the well or to carry out further works.

4.50 All fence lines would be retained and maintained, and gates across the entrance would be locked to deter unauthorised access.

References (Ref)

4.1 Borehole Sites & Regulations (1995)

4.2 Management of Health & Safety at Work Regulations (1992)

4.3 Construction (Design & Management) Regulations (2007)

4.4 Offshore Installations & Wells (Design & Construction etc) Regulations (1996)

5.0 NEED AND ALTERNATIVE SITES

Introduction

5.1 The first part of this Chapter assesses the need for the Proposed Development which primarily arises from:

- Depleting domestic reserves of oil and gas and a growing dependency on foreign imports; and
- A national energy strategy which seeks to maximise the economic production of the UK's domestic energy sources.

5.2 The demand for, and supply of hydrocarbons in the UK and the increasingly important contribution that onshore oil and gas production makes to the national energy market is also addressed.

5.3 The second part of the Chapter describes the main alternatives to the Proposed Development which have been considered by the Applicant. Under the EIA Regulations, an ES is required to provide "**an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice, taking into account the environmental effects**." A detailed and freestanding Alternative Sites Assessment Report has also been prepared as part of the planning application for the Proposed Development, and can be read for a more in depth review of the alternative sites considered.

Need Assessment

National Energy Policy

5.4 There are a number of specific references that have been made in national energy policy on the need for additional oil and gas supply infrastructure in the UK in improving energy security and market efficiency. Gas and oil supply also plays a role in supporting the development of renewable energy sources, and in particular wind power. The need for additional gas supply infrastructure is recognised in the following national policy documents.

The Energy White Paper: "Meeting the Energy Challenge" (2007)

5.5 The Energy White Paper (Ref. 5.1) was published by the former DTI, now the Department for Business, Innovation and Skills (BIS), in May 2007. It sets out the Government's international and domestic energy strategy in response to growing evidence of the impact of climate change and the need to cut greenhouse gases, rising fuel prices, a growing awareness of the risks of relying upon oil and gas imports from a small concentration of countries, and the need for the market to make substantial new investment in power stations, the electricity grid and gas infrastructure.

5.6 The need to reduce carbon emissions whilst ensuring secure energy supplies means that for now, the UK cannot rely on renewable energy sources alone. In terms of promoting a diverse energy mix it is stressed by the White Paper that fossil fuels will continue to play an essential role in the UK's energy system for the foreseeable future. To ensure 'security of the supply' a crucial element of the Government's energy strategy is to maximise the economic production of our domestic energy sources which, together with the UK's energy saving measures, will help reduce our dependence on energy imports.

Overarching National Policy Statement for Energy (EN-1) (2011)

5.7 On 18th July 2011 the House of Commons debated and approved the six National Policy Statements for Energy (NPS) (Ref. 5.2). The energy NPSs set out national policy against which proposals for major energy projects will be assessed.

5.8 In terms of future energy supply the Government states that fossil fuel plays a vital role in providing reliable electricity supplies and

> **"….provides diversity in our energy mix. They will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy, and Government policy is that they must be constructed, and operate, in line with increasingly demanding climate change goals".**

5.9 In regard to the need for further infrastructure, in particular gas related development, EN-1 states that:

> **"whilst the gas market is largely robust to a range of adverse events, the risk of shortfalls in supply cannot be**

> **ruled out, nor the risk that there may need to be significant rises in wholesale gas prices in order to balance the market. Further infrastructure – beyond that which exists or is under construction at present – will be needed in future in order to reduce supply or price risks to consumers".**

The Energy Act (2011)

5.10 On 18 October 2011, the Energy Bill received Royal Ascent and became the Energy Act 2011 (Ref. 5.3). The Energy Act is part of a step change from the Coalition Government to make energy more efficient for homes and businesses, and improve our energy framework to enable energy supplies from secure low carbon technology, and fair competition in energy markets.

5.11 Part 2 of the Act is entitled "Security of Energy Supplies" and Chapter 1, Part 79 sets out legislation for the Office of the Gas and Electricity Markets (Ofgem), to provide an Annual Report on "future demand for, and supply of, electricity in Great Britain" and under Part 80 what "electricity supply capacity is required". The first of these Annual Reports was published in 2010 and is considered below. Chapter 3 deals with "Upstream Petroleum Infrastructure" and in supporting the acquisition of rights to use upstream petroleum infrastructure, Part 82 also acknowledges that the Secretary of State should take into consideration "(f) the need to maintain security and regularity of supplies of petroleum".

Annual Energy Statement (2010)

5.12 The Annual Energy Statement (AES) published in 2010 acknowledges the mission of the Government to "support the transition to a secure, safe, low-carbon, affordable energy system in the UK" (Ref. 5.4). The AES acknowledges the following;

> **"Demand for fossil fuels is set to increase with the huge rise in population and wealth of emerging economies. In parallel, as recent events in the Gulf of Mexico have shown, the costs and risks of extracting fossil fuels from more remote locations are rising. With the UK's own oil and gas resources declining, unless we act now, we will become more vulnerable to high and volatile oil and gas prices" (page 2).**

5.13 The AES states that recent gas disputes in Europe only underline the importance of the need to improve our energy security, develop low carbon sources of supply while also reducing energy consumption. The AES notes that the UK's own indigenous supplies of oil and gas remain important and "we must maximise economic production while applying effective environmental and safety regulations".

5.14 As a point of action (Action 11) the AES states that the forthcoming Energy Security and Green Economy Bill will seek to ensure that access to UK oil and gas infrastructure is available to all companies. "**This will help the exploitation of smaller and more difficult oil and gas fields, allowing us to make the most of our natural resources**".

The Annual Energy Statement (2011)

5.15 The Annual Energy Statement (AES) was delivered by the former energy minister Chris Huhne, to Parliament on 23rd November 2011, and describes the progress of the Coalition Government on their energy policies and emerging initiatives including the 'Green Deal' (Ref. 5.5). The AES reflects a crucial part of DECC's strategy to reduce the amount of energy we use. In respect of electricity, DECC are "**working to secure Britain's energy supplies**" and the AES notes that the UK needs "**significant new investment in power plants and infrastructure to meet future demand**". The 2011 White Paper on electricity market reforms aims to attract infrastructure investment for a diverse mix of energy sources including "**renewables, new nuclear, and fossil fuels – including carbon capture and storage**". Each of these energy sources are considered as being "important" and over the past year, the Government has "**introduced a range of policies to support them**".

5.16 In respect of technologies, the AES highlights that "**fossil fuels will remain important**" and that "**gas will continue to feature strongly in our energy mix**" with Government policies being "**designed to allow new gas plant to be built**". The AES also recognises that between 2001 – 2009, fuel poverty doubled due to the increasing cost of fuel. The AES states that the energy sector also makes a significant contribution to employment and the economy, providing more than half of our industrial development. The AES concludes that the UK "**must secure huge investment in our energy sector**" to build the power plants that will fuel our prosperity and the infrastructure that will deliver it.

The National Planning Policy Framework (2012)

5.17 The National Planning Policy Framework (NPPF) was published in March 2012 and recognises that minerals "**are essential to support sustainable economic growth and our quality of life**" (Ref. 5.6). In this regard, the NPPF also states that;

> **"…it is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs" (para 142).**

5.18 At a national level, the need for modern energy infrastructure and the development of indigenous supplies is clearly supported through policy. This is further evidenced by a number of Government reports and research on security of supply and demand which are considered below.

Assessment of Alternatives

5.19 Having established a need for the development of hydrocarbon supplies in order to meet growing demands, this part of the Chapter provides an overview of the Alternative Sites which were assessed as part of the site selection process. A freestanding Alternative Sites Assessment accompanies this planning application submission and provides a more comprehensive review of the process undertaken.

Search Area

5.20 The search area is defined following the collection and evaluation of geological and seismic data, and the identification of a structure or "target reservoir" within the geological basin. This target reservoir is the area the drilling company will seek to explore and appraise. Having undertaken a review of the data within Petroleum Exploration Development Licence (PEDL) 234, the Applicant identified a target reservoir – referred to as the Willow Prospect, and using seismic and geological data, defined a search area around the reservoir from which it would be technically possible to drill. The Prospect can be seen in **Figure 5.1** and the extent of the search area in **Figure 5.2.**

Geographical Location

5.21 The search area is located south of Billingshurst and lies approximately 13km south-west of Horsham and 9km north east of Pulborough. It extends more than 7km east to west from Toat Wood to Saucelands Farm and 3km north to south from Broadford

Bridge to Little Gillmans Farm in Billingshurst, West Sussex. The search area predominantly falls within the parishes of Billingshurst and West Chiltington and also covers small parts of Shipley and Thakeham. The River Adur runs in a predominantly north to south direction either side of Billingshurst with several tributaries running through the search area.

Methodology

5.22 The following Site Selection Methodology is commonly used by Barton Willmore LLP in identifying potential sites for the development of hydrocarbon well sites. This part of the Site Selection process is a purely desk based exercise in which a "Constraints Plan" is developed, with site visits being undertaken following the selection of potentially suitable sites.

5.23 The identification of potential sites begins by marking out the primary and secondary target search areas as shown on **Figure 5.3** which are based on geological and seismic data, using Geographical Information Systems (GIS). The environmental constraints within these two search areas and the immediate surrounding vicinity are then layered onto the map using the same programme. Finally, a 400m radius is plotted around all known residential buildings and represents a suitable "buffer zone" between residential properties and the development of any potential hydrocarbon well sites, to limit noise intrusion prior to the carrying out of a full noise assessment.

5.24 The parcels of land within the search areas which are left unaffected by any of these constraints are the first to be appraised in terms of suitability. These sites are assessed in relation to access, existing natural screening, views into and out of the site, agricultural land classification, flood risk and any other relevant features, taking into consideration any allocations in the adopted Local Plan and Proposals Map. There is a degree of flexibility with this Methodology as well as some limitations which should be taken into consideration:

- The 400m buffer zone process can sometimes identify non-residential buildings such as barns, broiler breeder houses and other outbuildings. Where a residential building appears to be an anomaly i.e. in a remote location or small in size, confirmation of the building use can usually be clarified through the Council's Public Access website or through a site visit. This can however, be time consuming and will only be carried out where without this building the site may be otherwise suitable for development i.e. there are no other buildings or

environmental constraints or where there is established natural screening;

- The 400m buffer zone can be reduced to 300m where no suitable sites are identified. The industry accepted, minimum standard for mitigating noise intrusion is considered to be 300m from the source and whilst our experience indicates that 400m is a more suitable distance, there are instances where it may be acceptable or necessary to reduce this distance. This is particularly the case where a site has other merits such as high tree cover, an existing access or a willing landowner; and
- Some areas are constrained by a high variety of environmental designations and in these instances the GIS layers can sometimes "hide" the graphic which denotes an environmental designation. It is therefore important that the Constraints Plan is read in conjunction with a separate OS base map such as an Explorer Map, the adopted Local Plan or Proposals Map.

Sites Identified

5.25 Using the Methodology as outlined above, a total of seven potential sites were identified within the primary and secondary search areas, and are illustrated on **Figure 5.3**. The potential Sites were identified from **A**-**G** in no order of preference, and a review of each Site is provided below.

Site A

5.26 **Site A** falls within the primary search to the north-west of Broadford Bridge and the site was originally favoured for development because of the mature tree screening provided by Pocock's Wood. The site benefits from access off the B2133 Adversane Lane, and existing internal agricultural farm tracks associated with Wood Barn Farm. There is a public footpath which runs from the northern boundary along the western boundary of Pocock's Wood. The gradient of the land rises from 25m AOD in the southern quadrant of Site A to 30m in the northern half of Site A. The site is not in an area of flood risk. From the desk based exercise, Site A was considered suitable for development and a site visit was undertaken on 16 March 2011 to assess the site, using Public Rights of Way (PROW) for access.

5.27 The site visit confirmed the extent of the existing woodland which provided visual screening to the potential well site location and confirmed the distance between Site A and surrounding residential properties. However, the visibility splays leading north from the farm onto the B2133 Adversane Lane were poor and highway access was not

considered suitable. Moreover, the existing internal farm track and PROW would need significant works and there was also evidence that surface water management on the road would require mitigation. It was also considered that there may be some conflict between the operation of the farm which includes pastureland for cows, and users of the PROW.

5.28 After pre-application discussions with WSCC on 17 August 2011, Site A was discounted as a suitable site for development, in favour of Site B. Site A was discounted because providing an access road would require the felling of trees which would have long term impacts on visual amenity and ecology. The Landscaping Officer at WSCC also noted that the field patterns in this area of the farm were medieval in nature and therefore had some archaeological and cultural heritage qualities worthy of preservation. Moreover, it was considered that there may be subsequent impacts on the adjacent PROW and its users, and the use of the access road by the farmer to access the northern field may cause conflicts with the operation of the farm and livestock.

Site B

5.29 **Site B** represents the Application Site. It falls within the primary search area to the north-west of Broadford Bridge. Site B was originally favoured for development because of the mature surrounding woodland on all sides, provided by Prince's Wood and the surrounding boundary woodland and hedges. It was noted that Prince's Wood was designated as Ancient Woodland, and that there were a number of large outbuildings to the south east at Broadford Bridge Farmhouse consisting of egg stores and broiler breeder houses. The site is not constrained by public footpaths or bridleways and existing internal farm tracks provide access to the Site. Site B was considered suitable for development and a site visit was undertaken on 16 March 2011.

5.30 The site visited confirmed the extensive woodland surrounding the site, and an existing agricultural access road was identified off the B2133 Adversane Lane which would provide suitable access. It was noted that there were power lines crossing the land and substantial Oak trees line the B2133 but it was considered that design measures could mitigate any impacts. Moreover, from this access there were sufficient existing visibility splays into and out of the site.

5.31 Site B was considered suitable for the development of a well site and was the preferred location for development in respect of planning, technical requirements and geological indicators. This approach was agreed with WSCC in a pre-application meeting dated 17 August 2011 and follow up correspondence. Site B was therefore taken forward as the

development site.

Site C

5.32 **Site C** falls within the primary search area and is well screened by Beeding's Copse to the south and west. The land falls and rises significantly between 30-40m+ AOD so not only would a significant amount of excavation and re-grading of the land be required to construct the site, but also it would potentially have been very visible from the north and east on such high ground.

5.33 Access to the site was also significantly constrained and there is a network of public footpaths and bridleways in the vicinity of the Site. Any access road would either need to come from the A29 and across the railway line which would require the construction of a railway crossing, or from Stallhouse Lane via an underpass beneath the A29 (height restricted) and then along a public bridleway or from a new access off the B2133 Adversane Lane to the north. Neither of these highway options were considered favourable because of the disruption they would cause during construction. Furthermore, Site C is identified as being an "Archaeological Site" in HDC's adopted General Development Control Policies document (2007) (Ref. 5.7), and is also adjacent to areas of ancient woodland in the Copse. Site C was not considered a suitable location for development and was subsequently discounted from further investigation.

Site D

5.34 **Site D** is located within the secondary search area with a small section falling in the primary search area. Site D is surrounded by a number of constraints including networks of public footpaths, interlinked sections of the River Adur and one of the UK's 15 National Trails. A site in location D would have been on higher ground (30-25m AOD) adjacent to several sections of the River Adur which is located in a valley with a ground height of 20m AOD. Whilst surface water drainage and flood risk management could reduce the risk of contamination, the HDC adopted Core Strategy (2007) (Ref. 5.8) and data from the Environment Agency indicate that this area is at risk of flooding.

5.35 National Trails are maintained by Natural England and a section of the South Downs National Trail runs along Oldhouse Lane which also provides a public bridleway. Access, as well as the presence of a well site in one of the adjoining fields, were not considered to be acceptable at Site D, especially as other alternative sites appeared to be more suitable (Site A and Site B) and less detrimental in comparison. In a site visit on 16 March 2011, the constraints of access to the site were confirmed with a narrow existing

entrance, poor visibility splays and overhead power lines across the site. Site D was discounted on the basis that access was unsuitable, and Sites A and B were preferable in comparison and based on technical, planning and environmental reasons.

Site E

5.36 **Site E** is located in the secondary search area and falls in proximity to the A29 and the Pulborough to Parbrook railway line which runs in parallel to each other on the western boundary of the search area. Site E consists of an open rural landscape where there is limited natural screening or woodland. Whilst the benefit of Site E is that it does not encroach on any environmental designations, the open nature of the landscape means that the site could lead to significant visual intrusion for the surrounding farmsteads, residents of Adversane, and road users.

5.37 Site access would have been from the A29 and an existing farm track however, National Rail have confirmed that the existing railway line crossing would not be suitable for HGVs associated with the construction of the well site. Any new access from the A29 would be faced with the same issue of crossing the railway line. There is a bridleway to the south east of Site E – Steepwood Lane, but the development or use of this for HGVs and construction access is unlikely to be suitable due to the limited width of the road and its proximity to a number of properties who would be disturbed by the development, particularly during construction. Site E was therefore not considered suitable for development.

Site F

5.38 **Site F** is located in the secondary search area, at a considerable distance from the primary search area. The Site was the smallest of the potential well site locations and fell on lower lying ground at approximately 20m AOD. There are open watercourses which run alongside the southern to eastern boundary although the land is generally at the same gradient throughout Site F, descending from 25m AOD to the north of the Site. There is mature existing mature woodland around the site which is non-ancient in designation and would provide significant natural screening. Following the desk based exercise, Site F was considered to have some development potential if an access could be developed. The Pulborough to Parbrook railway line goes in a north-east direction to the west of Site F, with a railway line crossing providing access from the A29 Stane Street to Site F.

5.39 During a site visit on 16 March 2011, it was agreed in principle that the railway crossing

was unlikely to be suitable for HGV access and this was later confirmed by Network Rail. No other suitable access points were identified, and an access from the B2133 would be long and require significant works to meet highways standards, causing disruption to existing road users and residents. Site F was therefore discounted.

Site G

5.40 **Site G** is located within the primary search area in proximity to Site A and Site B. Limited investigation into Site G was undertaken because of the proximity to Site A and Site B, both of which were considered more favourable options for development due to their extensive natural screening and potential access routes. Site G provides limited on-site natural screening but the adjacent woodland areas of Pocock's Wood, Prince's Wood, Beeding's Copse and Gatewick Copse would screen views of the development. Properties on Gay Street would be likely to see the development as would the occupants of Steepwood Farm. A longer access road would also be required, and therefore Site G was considered unsuitable for development.

Site Selection Summary

5.41 Site B represents the Application Site and was identified following a robust and comprehensive assessment of the existing geological strata, technical limitations, planning policy and environmental designations and constraints within the search area. The identification of baseline conditions and the assessment of the identified sites including the Application Site, were carried out using a number of information sources;

- Geological and seismic data collection and evaluation;
- Geographical Information Systems;
- Desk based research on planning policy, environmental designations and landowner constraints;
- On site investigations and site visits;
- Discussions with landowners;
- Pre-application discussions with WSCC; and
- Preliminary discussions with environmental experts on transport, landscaping and ecology.

5.42 The use of a variety of sources illustrates the comprehensive nature of the Alternative Sites Assessment, and supports the conclusion which has been drawn that Site B is the most suitable site to accommodate the Proposed Development. In summary, the reasons

for choosing Site B as the Application Site are:

- Natural screening provided by surrounding mature woodland;
- Existing highway access from the B2133 and internal agricultural tracks;
- The distance of the Application Site from existing residential properties and other viewpoints;
- The flat topography of the field;
- Its location away from open watercourses and areas of flood risk; and
- The acoustic screening provided by the thick woodland and adjacent agricultural outbuildings.

References (Ref)

5.1 The Energy White Paper: "Meeting the Energy Challenge", DTI (2007)

5.2 Overarching National Policy Statement for Energy (EN-1), DECC (2011)

5.3 The Energy Act (2011

5.4 Annual Energy Statement, DECC (2010)

5.5 Annual Energy Statement, DECC (2011)

5.6 The National Planning Policy Framework, DCLG (2012)

5.7 Horsham District Council (HDC) General Development Control Policies, HDC (2007)

5.8 Horsham District Council (HDC) Core Strategy, HDC (2007)

6.0 CONSTRUCTION PROGRAMME

6.1 This Chapter has been prepared by Richard Elliott and Associates Ltd and describes the Construction Programme for the Proposed Development which is separated into the relevant Phases.

6.2 The process of preparing for, drilling and testing an onshore exploratory well site follows a series of phases, each of which is distinctly different from the others. The traffic generated during each phase differs from the others, as do the activities on site and the consequential visual and noise effects arising from the work. The work can be divided into the following phases:

Phase 1: Construction of the highway entrance, access road and site;
Phase 2: Mobilisation of the drilling rig and associated components and drilling the borehole;
Phase 3: Testing the structure for hydrocarbons and de-mobilisation of the drilling rig;
Phase 4: Re-instatement of the site and access road to agricultural use, or retention.

6.3 Table 4.1 shows the anticipated duration of each phase including the best and worst case scenarios. All the durations are subject to delays due to circumstances, such as inclement weather preventing site construction. Ideally the drilling rig would move onto site as the construction work was completed, but this depends on the availability of the rig, which may be engaged on another project unconnected with this proposal.

6.4 Similarly, the testing will depend on hydrocarbons being found, with different testing periods needed for testing oil or gas wells.

Phase 1: Construction of the access road and well site

Site Entrance at the B2133

6.5 It is expected that construction of the drilling site will last about six weeks, starting with the improvement of the vehicular entrance off the B2133. Traffic warning signs conforming to the Road Signs Manual (Ref 6.1) will be erected along the B2133 either side of the entrance and sight lines will be cleared as necessary. The location of any public utility services will be confirmed prior to construction.

6.6 8m of hedgerow will be removed from the boundary with the B2133 and a further 6m of hedgerow taken out between the fields at the entrance. The culvert pipe under the existing entrance will be extended beyond the width of the new entrance and new headwalls constructed of sandbags filled with concrete. This is shown on Figure 6.1.

6.7 No trees will be felled at the entrance although the crown may have to be lifted on the tree to the left (south) of the entrance when viewed from the road. Dead branches on the tree to the right (north) of the entrance would also be removed.

6.8 Topsoil will be stripped off the entrance area and stockpiled in the area set aside for soil storage. The topsoil near the Oak trees will be retained to avoid damage and compaction of the tree roots.

6.9 The first 15m of the access road, measured from the edge of the road, will be constructed of tarmac to reduce the risk of dust or mud being tracked onto the highway. In areas away from the oak trees, the construction of the entrance will comprise Type 1 hardcore compacted into place with a tarmac wearing course laid on top. This construction will comply with the West Sussex Highways specification for such entrances.

6.10 When the entrance has been constructed, welfare facilities for the workforce and temporary off-road parking will be prepared in the field within the redline boundary.

Fencing

6.11 Whilst the entrance work is in hand, the land leased from the landowner will be fenced off from the rest of the fields using standard 1.2m high post and three strand barbed wire fencing. The fences will incorporate gates where agreed with the landowner.

6.12 This will progress from the entrance, along the line of the access road, up to and around the site to serve three purposes:

a) to keep livestock off the work area;
b) to confine the workforce and equipment to the area leased from the landowner; and
c) To provide root protection areas or zones around the roots of significant trees adjacent to the works.

Tree Root Protection

6.13 The trees and hedgerows in the vicinity of the proposed site and access form an important feature within the landscape of the area and and consequently need to be protected from possible damage arising from compaction by equipment or stockpiled soil.

6.14 The root protection areas (RPAs) for each of the significant trees and hedges are shown on Figures 6.2, 6.3 and 6.4.

6.15 The access from the highway passes over one such RPA and protective measures will be taken to protect the roots of the hedgerow trees. It is proposed to place a layer of sand over the RPA, with a 25mm thick layer of polystyrene on top to ensure that any load is spread evenly and not concentrated onto a protruding root. A steel road plate would then be laid on top of the polystyrene before the application of a tarmac finish.

6.16 Further along the access road, the wayleave is sufficiently wide to allow the positioning of the soil bund near to the hedgerow without intruding into the RPAs of the hedgerows, as shown in Figure 6.2 and 6.3, with the bund stopped off where the RPA of a tree extends further than usual.

6.17 The hedgerow has a number of gaps in it of various lengths, where there is no effective screening of vehicles using the new access road. It is proposed to infill these gaps with new planting, using either whips or semi-mature plants. The new plants would replicate the native species within the existing hedgerow and in approximately the same ratios as the different species in the existing hedgerows.

6.18 Rabbit-proof fencing would be erected to protect the plants and would maintained during the life of the development and in any aftercare scheme following any re-establishment. Plants that fail to thrive or die will be replaced during the life of the development and subsequent aftercare period.

6.19 The road has been aligned to pass between the woodland and the five isolated trees without encroaching upon the respective RPAs, although there is a minor encroachment of about 1m into the RPA at the second corner for tree W21 where an internal field boundary meets the corner of the woodland fence (See Fig 6.3). This minimal encroachment will be checked when construction starts on site and the road realigned on site to avoid any encroachment.

6.20 The topsoil and subsoil bunds have been located outside the canopies of the trees (Fig 6.4) with the exception of a limited length of the earthworks embankment on the south side of the site, which intrudes 2.5m into the 11m diameter RPA for an oak tree. The embankment will only rise to about 900mm and is considered less damaging than building a length of retaining wall for that 15m length.

Topsoil Removal

6.21 All excavated soils will be retained on site for future reinstatement of the site and access road. The topsoil will be removed and stockpiled to avoid compaction that can lead to permanent loss of the soil structure. This would have to be carried out when the soil is in a suitable condition and this is usually when the soil moisture content does not exceed the plastic limit of the soil, which can be verified with a simple hand test in the field. If the soil is too wet, work has to be suspended until the ground has dried out.

6.22 The topsoil will be stripped off using an excavator and placed in a stockpile as close as possible to the point of excavation. This limits the disturbance of the soil structure and the amount of tracking over both the topsoil and the exposed site formation. Topsoil removed from the access road will be placed in a strip alongside the access road, except where the road crosses other tracks.

Access Track

6.23 The access track will be constructed of crushed stone, compacted into place on a geotextile such as 'Lowtrak' to separate the stone from the subsoil and strengthen the road. The excavator is expected to work from the undisturbed topsoil, excavating and placing the soil in the bund to the side of the track and preparing the soil formation. The geotextile is laid down and stone end-tipped directly from road lorries onto the membrane. The lorries will reverse up to the tipping point along the previously constructed access road. By working in this way the road lorries remain on a hard surface, which minimises the potential for mud being tracked onto the highway.

6.24 The road width will generally be 4.5m, widening at corners to accommodate the swept paths of the longer vehicles. Where possible passing places have been located at the wider sections, to minimise land take.

6.25 Passing places are constructed to ensure inter-visibility and normally within 350m of each other.

Site Construction

6.26 The topsoil is stripped from the site area in the same way as for the access track, with dumpers taking the soil to soil bunds. These bunds would not normally exceed 3m in height, and will be sufficiently high to screen the temporary site cabins and the lower parts of the drilling substructure.

6.27 A separate parking area will be provided for the contractor's cars, which will be used later by the drilling crews for their cars. The construction of this area will be the same as for the access track, using compacted stone on a geotextile membrane. The parking area will be 'at grade' with no specific excavations or levelling of the area.

6.28 Once the topsoil has been removed from an area of the Site, the levelling of the formation will take place on the exposed formation to form the working platform. There is a slight diagonal fall across the Site with a height difference of just over 1m from corner to corner. Surplus soil will be excavated from the higher corner and moved to the opposite corner to level the site in a 'cut and fill' operation. If the excavated soil is unsuitable for use as fill it will be stockpiled in a separate bund away from the topsoil bund.

6.29 As the site is levelled, a Bentomat membrane or similar will be laid on the exposed and rolled surface, protected by a layer of geotextile. This membrane is continued from under the site into the ditches to form a continuous lining.

6.30 Imported stone will then be compacted on top of the membrane to form the drilling platform.

6.31 The well head will be located within a concrete chamber (cellar) with a sealed floor to maintain control of any fluid arising from the drilling operations. The cellar is usually constructed of concrete manhole rings, set into a concrete base and with a concrete apron around the top to facilitate site cleanliness.

6.32 All the works will be kept outside the tree canopy to minimise the risk of compaction of soil around the tree roots.

6.33 A low bund is formed around the site using excavated subsoil for containment purposes, merging with the ground level when the site is cut into a slope. This containment bund is separate from the topsoil bund, which is kept separate to avoid contamination of the topsoil.

6.34 When this work has been completed, the site is ready to receive the drilling rig and its ancillary equipment.

General

6.35 Working hours during site construction are from 8am – 7pm Monday to Friday (to be agreed with the Planning Authority), with a part day on Saturday and no construction work on Sunday or Bank Holidays. Night time working is not carried out in the construction phase.

6.36 Traffic generation during construction arises primarily from deliveries of stone for the road and site, and delivery of other materials. These deliveries are usually random in nature but made during the working day. No exceptional or non-standard deliveries are made during this time.

6.37 The construction phase usually generates the largest number of vehicle movements as a result of these deliveries, but they are spread out throughout the working day. Further details on vehicle movements and their effects are provided in Chapter 10 – Transport and Access.

Phase 2: Mobilisation of the drill rig and drilling operations

6.38 The drilling rig will not necessarily arrive on the Site immediately after the construction has been completed, as it may be committed elsewhere and arrive when that commitment has been completed. However, it is usual to try and synchronise timing so that the rig can move on as soon as substantial completion of the site has been achieved.

6.39 Moving the drilling rig and its ancillary equipment onto a site is termed 'Rig mobilisation' or just 'Mobilisation' within the industry. Mobilisation takes place over a period of up to three days when a haulage contractor transports the drilling rig and its components to the site.

6.40 The haulage contractor has responsibility for traffic control and escort duties for the rig whilst it is under his command and prepares for the rig movement well beforehand to ensure all traffic movement orders and holding areas have been organised.

6.41 The rig components are delivered to the site in a strict sequence over the mobilisation period, preceded by one or two 100 tonne cranes. The rate at which the mobilisation

proceeds is controlled to ensure that the deliveries are made at a rate to suit the construction of the rig. This ensures that there isn't a build-up of stationary lorries on the public highway.

6.42 Cabins for the drilling supervisors and welfare cabins for the drilling crew are delivered and located on site. Electrical supplies for these units are taken from the rig power generators and septic tanks are provided for the collection of waste waters from showers and toilet facilities. Water supplies to the rig and cabins are made by road tanker unless a supply is taken from a metered mains water source.

6.43 Drilling materials such as drill pipe, blow-out preventers and drilling mud are also delivered during this period.

6.44 When the rig construction has been completed and the necessary safety checks and briefings have taken place, the drilling rig is ready to commence. Working hours during the rig mobilisation are usually longer than for the site construction with work continuing after dark, in winter, with the aid of free-standing lighting towers. 12 hour working days are usual in this period, between 7am and 7pm (to be agreed with the Planning Authority).

6.45 The traffic generated in this phase has a high proportion of articulated vehicles and they are controlled to ensure they arrive in an orderly sequence and timing. Too many vehicles upon the site slow down the mobilisation process.

6.46 The drilling operations are under the control of the Celtique Energy Drilling Supervisor who will co-ordinate with the rig contractor's Site Manager (Toolpusher). The crew operating the rig will work in either two or three shifts and will work around the clock. 24hr operation is essential from a safety and operational necessity and the rig and site will therefore have to be lit at night. Noise and lighting mitigation measures are described more fully in the relevant Chapters of this report – Chapter 9 and Chapter 12 respectively.

6.47 The operations will be supervised by a representative of Celtique Energie (the Drilling Supervisor), who will be assisted by other Celtique staff to track the progress of the well. The Drilling Supervisor has a separate cabin on site and will remain on site throughout the drilling process.

6.48 Deliveries of drilling materials, water, casing, cement and other consumables and equipment will be carried out during this process, with all but essential deliveries being

made during daylight hours. Only in exceptional circumstances will deliveries be made at night.

6.49 The bulk of traffic generation during this time usually consists of private vehicles when crews change working shifts with HGV deliveries forming a lower proportion than in previous stages.

6.50 The drilling operation will start with the installation of first length of steel casing to isolate any aquifers near ground level. Subsequent casing diameters are smaller to allow them to be inserted inside the first casing down into the newly drilled borehole.

6.51 The casing strings are cemented into place to ensure isolation of the surrounding rock formations and to prevent fluids from seeping around the casing shoe and up the casing annulus.

6.52 Control over pressures in the borehole is maintained by varying the density of the drilling mud. A blow-out preventer is located on top of the string of surface casing to allow the well to be shut in, in the event that abnormal pressures are encountered.

6.53 When the correct formation is approached, drilling records, rock and drilling mud samples returned to the surface are analysed to confirm that the borehole has penetrated into the expected rocks. If the target formation has been penetrated, the bore hole is tested.

Phase 3a: Short term testing and evaluation - gas

6.54 Until the geological structure has been drilled, the exact nature of any confined hydrocarbons will not be known – if there are any present at all. If gas is discovered, the well will be completed and a flow line taken from a manifold on the well head and connected to a flare via a separator to remove any hydrocarbon liquids and produced water. A choke is installed to control the flow and meters are installed to measure the flow rate.

6.55 The gas that comes from the reservoir is burnt if volumes are too high for venting, or if toxic gases such as Hydrogen Sulphide (H_2S) are present. These gases are burnt using purpose designed burners that are located within an area set aside from the main site.

6.56 A screening bund is usually built around the flare area to limit radiated heat. This flare

area is constructed during the site construction phase to avoid disruption when the drilling rig is on site and uses subsoil excavated from the site.

6.57 Delivery and connection of the equipment to the well head usually takes some days, during which time the drilling rig would be dissembled and moved off site. The rig demobilisation is the reverse process to the earlier mobilisation, leaving the wellhead in place and a cabin on the site for monitoring staff.

6.58 The well is then tested by allowing the gas to flow for specific times and at specific rates to assess both the initial pressure and deliverability characteristics of the well, including longer term flow rates.

6.59 During this period there will be very little traffic generated, comprising mainly of light and private vehicles. The rig will not be operating but smaller generators will continue to provide power for lighting and testing equipment.

6.60 If these tests are satisfactory the well would be temporarily closed down (suspended).

6.61 A safety cage would be erected around the well head to protect the equipment and prevent tampering.

Phase 3b: Short term testing and evaluation – oil

6.62 If oil is detected in the rock and mud samples recovered whilst drilling the well, and subsequent analysis confirms the presence of oil, the well will be tested to see if the oil will flow freely and in sufficient quantities to justify further appraisal.

6.63 Gas is often associated with oil deposits so facilities will be required for flaring gas as well as tanks for recovery of the oil. The surface equipment will be the same as for gas testing, but will require at least three additional tanks, to store the liquids produced from the well.

6.64 The tanks would be contained within a temporary bunded area comprising an HDPE or similarly lined flat area on the site, with a perimeter bund over which the HDPE would rise, to create sufficient storage capacity to equal 110% of the capacity of one of the tanks.

Phase 4a: Restoration

6.65 If the well fails to locate hydrocarbons, or the tests show that extracting the hydrocarbons is not commercially viable, the well will be abandoned. When the well is abandoned, the drilling rig already on site or a smaller rig (Workover Rig) will be used to assist in plugging and abandoning the well.

6.66 The process whereby a well is shut down and sealed is known as plugging and abandoning, or capping, a well. The process follows a sequence of operations agreed with DECC and involves a process of pumping cement into the well to create a series of plugs to prevent any leakage.

6.67 When this cementing work has been completed the blowout preventer can be removed and the well head cut down to at least 1.8m below ground level, where it is capped by welding a steel plate across the top of the exposed casing.

6.68 The drilling rig is then removed and restoration of the Site can commence.

6.69 All loose debris and materials are taken offsite for salvage or disposal at a suitably licensed tip and the stone surface scraped clean of any mud or rock cuttings. Contaminated stone is dug out and disposed of at a landfill site licensed to accommodate such material. All ditches and the cellar are pumped out and the water taken off site to a water treatment plant.

6.70 The remaining stone is then stripped methodically from the site and either taken for re-use on another site or used to repair the landowner's tracks. The latter course of action significantly reduces the traffic generated upon the highways as the stone would be used in the local area.

6.71 The Bentomat membrane and geotextiles are lifted as they are exposed and taken to a landfill site.

6.72 The concrete slabs and cellar walls are broken up and the cellar concrete is used as a backfill around the capped casing. The remaining concrete is taken off site for recycling.

6.73 The subsoil is then pulled back to re-form the original contours of the Site and approved in writing by both the landowner and the WSCC Planning Officer. This soil will be taken from the stockpiles around the site and from areas of fill within the drilling pad area. No soil will be imported.

6.74 After any pans in the subsoils surface have been subsoiled using a winged-tine subsoiler, (an agricultural implement that lifts and breaks the soil pan), the topsoil is spread back over the site in a uniform layer. This soil is also taken from the bunds created when the soil was originally stripped from the site and will be laid to a depth equal to the original depth as no topsoil will be taken off the development or imported. The final surface is subsoiled again and cultivation can re-commence using a suitable after-care programme to ensure the ground returns as soon as possible to productivity.

6.75 The same process of stone removal and replacement of the soil takes place along the access road and at the entrance onto the public highway. Where hedges have been removed these are replanted with young whips of native variety hedgerow plants that are protected by wooden post and rail fences with rabbit netting to deter rodents. The hedgerows planted at the beginning of the development would be included in the aftercare scheme and any dead plants replaced.

6.76 The post and wire fences would be left up to protect the freshly worked soils from livestock and the farmer would usually take them down at his own convenience. The aftercare of the site is also sub-contracted to the farmer so he can time the work to suit his own operations.

6.77 Where land drains were originally located within the fields disturbed by the development they would be reinstated or a new system installed by agreement with the landowner. There are no water courses adjacent to the wellsite but any ditches around the perimeter of the fields would be cleaned as appropriate.

6.78 No further landscaping works would be carried out once the fields have been returned to their original contours.

6.79 All highway signage would be removed upon completion of the works.

6.80 No trees will be removed in the site construction and those retained around the site and alongside the access road will be protected.

Phase 4b: Retention

6.81 When commercially viable deposits of oil or gas are located and tests prove positive, the Site may be retained whilst future options are considered. These options are outside the scope of this assessment but may involve further testing or re-appraisal of seismic data and re-drilling to reach a different area underground.

6.82 Such options will only be undertaken after the appropriate consultations with the planning authorities and submission, where appropriate, of a new planning application.

6.83 In the event of retention, the site would be cleaned as for restoration but the stone surface, drainage ditches and the cellar would be left in place. A safety cage would be built around the wellhead valve assembly and all valves closed, pending a decision either to plug and abandon the well or to carry out further works.

6.84 All fence lines would be retained and maintained, and gates across the entrance would be locked to deter unauthorised access.

References (Ref)

6.1 The Traffic Signs Regulations and General Directions 2002, as amended, London, The Stationery Office.

7.0 ECOLOGY

Introduction

7.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of ecology and nature conservation through the construction, operational and decommissioning stages of the project. The chapter is supported by **Appendices 7.1** to **7.3** which contain the results of the desk-based study, the target notes which accompany the Phase 1 Habitat Survey Map, and the Confidential Badger Survey Results.

7.2 The chapter describes the legal and policy basis for the topic, and the ecological assessment used which requires the identification of key ecological features (receptors) in an area and determination of the following:

- Their value;
- The sources of impact and the sensitivity of receptors to these;
- The nature, scale and duration of any effects (both direct and indirect) of the proposal upon sensitive receptors;
- Potential mitigation measures to reduce any negative effects; and
- Assessment of the significance of any residual effects.

7.3 This chapter has been prepared by URS Infrastructure and Environment UK Ltd.

Planning Policy Context

National Planning Policy Framework

7.4 The National Planning Policy Framework (NPPF) (Ref. 7.1) states that the planning system should contribute to, and enhance, the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible, including by establishing coherent ecological networks that are more resilient to current and future pressures.

7.5 Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status.

7.6 To minimise impacts on biodiversity, planning policies should plan for biodiversity at a landscape-scale; identify and map components of the local ecological networks; and promote the preservation, restoration and re-creation of priority habitats and ecological networks and the protection and recovery of priority species populations and identify suitable indicators for monitoring biodiversity.

7.7 A number of principles should be applied by local planning authorities when determining planning applications. Notably, the primary aim should be to avoid significant harm to protected species and habitats and, if not possible, mitigate impacts, or, as a last resort, provide adequate compensation. If these options are not feasible, planning permission should be refused. Furthermore, opportunities to incorporate biodiversity should be sought.

7.8 The NPPF should be read in conjunction with the Government Circular: Biodiversity and Geological Conservation, ODPM Circular 06/2005 (Ref. 7.2).

Regional Planning Policy

The South East Plan (adopted May 2009) (Ref. 7.3)

National Resource Management 5: Conservation and Improvement of Biodiversity

7.9 States that local planning authorities and other bodies shall avoid a net loss of biodiversity, and actively pursue opportunities to achieve a net gain across the region. This means using all available legislation to protect designated sites and looking for opportunities to enhance nature conservation value through the planning system as well as reducing diffuse pollution and protecting soil resources.

National Resource Management 7: Woodlands

7.10 States that local authorities and other bodies will support the implementation of the Regional Forestry and Woodland Framework, ensuring the value and character of the region's woodland are protected and enhanced. This involves protecting ancient woodland from damaging development and land uses and effective sustainable woodland management.

Local Planning Policy

General Development Control Policies Development Plan Document (2007) (Ref. 7.4)

7.11 Policy document 5 Biodiversity and Geology states that development will not be permitted unless, where relevant, it includes measures to protect, conserve or enhance biodiversity of the district. In addition to this, within areas designated of importance for biodiversity, development will not be permitted where there would be a direct or indirect adverse effect on the site unless it can be clearly demonstrated that;

- the reason for the development clearly outweighs the need to protect the value of the site; and
- that mitigation and compensation measures are provided.

The Horsham District Council Biodiversity Action Plan (June 2003) (Ref. 7.5)

7.12 This sets out an overall aim to help enable the effective conservation and enhancement of biodiversity in the District, and thereby to contribute to biodiversity conservation on a regional, national and international scale. It includes a series of objectives to support this aim and sets priorities for action accordingly.

West Sussex Minerals Local Plan (adopted July 2003) (Ref 7.6)

7.13 The plan prioritises the avoidance of statutory designated sites for mineral exploration and extraction.

Assessment Methodology

Scoping

7.14 A scoping opinion request for the Proposed Development was submitted to WSCC on 15th May 2012. WSCC adopted a Scoping opinion on 13th June 2012 (Ref. 7.7). Requirements set out in the Scoping Opinion relating to ecology included:

- Consideration of any impacts upon any local wildlife sites and/or ancient woodland;
- Conduct relevant protected species surveys for the project and where those species are found providing the following information within the ES:

- The population level at the site affected by the proposal;
- The direct and indirect effects of the development upon that species;
- Full details of any mitigation or compensation that might be required; and
- Whether the impact is acceptable and/or licensable.

- Conduct relevant surveys for protected species at the optimum time of year by suitably qualified and where appropriate licensed ecologists;
- The development should avoid adversely impacting sensitive areas for wildlife within the site, and should if possible provide opportunities for overall wildlife gain; and
- Consideration of cumulative and or in-combination impact.

7.15 All of these comments have been taken into account during the preparation of this assessment.

7.16 The survey area considered during the ecological investigations included the proposed well site and access route which totals 2.12ha and is depicted in **Figure 7.3**. The adjacent habitats within a minimum 100m 'buffer zone' around the Application Site were also included in order to evaluate any nearby sensitive receptors which could be affected by noise and light pollution associated with the Proposed Development.

7.17 The scope of ecological investigation undertaken for the assessment is as follows:

- Desk-based study to search the online MAGIC website (Ref 7.8) and National Biodiversity Network (NBN) Gateway website (Ref. 7.9) to identify statutory and non-statutory designated sites of nature conservation importance and records of protected and/or notable species;
- Phase 1 Habitat Survey to record the nature and extent of vegetation and habitats within and adjacent to the Application Site; and
- Species-specific surveys for the following species:
  - Badger;
  - Bats;
  - Amphibians (particularly great crested newt); and
  - Hazel Dormouse.

7.18 The Phase 1 Habitat Survey did not identify the potential for any other protected or notable species or significant populations of mammals, invertebrates, reptiles or vascular plants in the survey area that should be subject to specific surveys.

Consequently, no further survey work was undertaken, none has been recommended at a later stage, and these groups are not considered further within the ES. Reptiles were scoped out of the survey as the site did not provide suitable habitat for these species.

Desk-based-Study

7.19 A desk-based study was undertaken in September 2011. The sources consulted and information sought along with the approximate search distance from the Application Site is shown in **Table 7.1**.

Table 7.1: Data Search Information

Consultee	Search Distance from Site	Information sought
Sussex Biodiversity Records Centre	1km	• Protected and rare species and habitat records • Biological Action Plan (BAP) Species Inventory • Sussex Alien Species Register
Sussex Bat Group	1km	Bat records
Sussex Ornithological Society	1km	Bird records
MAGIC website	5km	Identify statutorily designated sites of nature conservation importance and ancient woodland
National Biodiversity Network gateway	2km	Records of protected species

Field Survey

Methods

7.20 All ecology field surveys were undertaken by appropriately experienced ecologists from URS Infrastructure and Environment UK Ltd.

Vegetation and Habitats

7.21 A Phase 1 Habitat Survey was undertaken on the 5th September 2011, to record vegetation and habitats present within the Application Site as well as adjacent habitats (up to approximately 100m away from the Application Site boundary). The extent or area to be covered by ecological assessment varies depending upon the ecological context and type of development being considered. There is no standard 'buffer' area for a scheme within which impacts should be assessed however 100m was seen to be

adequate for the initial investigations, given the small scale and temporary nature of the project.

7.22 Habitats were recorded according to published Joint Nature Conservation Committee (JNCC) guidelines for Phase 1 Habitat survey (Ref. 7.10). Habitats were mapped and target notes made for areas of more interest. This survey was completed at the appropriate time of year in order to get a good assessment of the botanical diversity at the site.

7.23 The purposes of the Phase 1 survey undertaken for this study was to identify the type, quality and extent of habitats present within an area, and to identify any habitats or features that might require more detailed field investigations.

Badger

7.24 A survey for badger Meles within the Application Site and land up to approximately 50m from the Application Site boundary was undertaken during the Phase 1 Habitat Survey. Survey methods were in accordance with published badger survey methodology (Ref. 7.11).

Bats

Bat Roosts

7.25 The habitats within and adjacent to the Application Site were assessed for their potential to support roosting bats on the 5th September 2011 in accordance with the Bat Conservation Trust guidance (Ref. 7.12). This appraisal focused on trees within Pocock's Wood within 20-30m of the Application Site boundary. Trees exhibiting potential roosting features such as cracks and crevices were assessed and categorised in accordance with the published guidance. Trees were also checked for evidence of bat use such as greasy marks, scratches, and droppings around any suitable entrance holes.

Other Bat Activity

7.26 Three remote bat detectors (Anabat SD1) were deployed near to the Application Site. The detectors were sited to ensure the maximum coverage of the borehole location with both the Application Site and adjacent linear features covered. The locations of the detectors are shown in **Figure 7.1.**

7.27 The detectors were programmed to record between 19:00 and 07:00 each day between the 14th and 20th September 2011. Batteries were replaced on the 17th September to ensure the devices continued recording throughout this period.

7.28 Data was downloaded and analysed using Analook Software (Ref. 7.13). For the purposes of this assessment the following scale of bat activity is used:

- **Low:** Less than five passes per species per hour;
- **Moderate:** Between five and ten passes per species per hour; and
- **High:** Greater than five passes per species per hour.

7.29 Although the survey was undertaken towards the end of the bat activity season, the environmental conditions were considered to be appropriate with warm temperatures throughout the survey period and low winds. Bat activity was recorded throughout the survey period.

7.30 Bat activity surveys were completed during one part of the bat's active season in early September and therefore only sample one part of the season when bats are most active. However, due to the lack of adjacent suitable roosting positions adjacent to the proposed wellsite and temporary nature of the project, which will be completed outside of the bats active season, this is considered adequate survey to assess likely significant effects arising from the Proposed Development.

Amphibian Survey

7.31 Amphibian surveys were carried out in 2012 in order to ascertain whether great crested newts (GCN) *Triturus cristatus* were present within 500m of the Application Site boundary. Ditches and water bodies were assessed using the Habitat Suitability Index (HSI) (Ref. 7.14).

7.32 The HSI indicated that a pond on adjacent agricultural land was suitable for newts (TN3 in **Figure 7.3**) and a presence/absence survey was conducted. No further waterbodies were suitable for this species. As stipulated within 'Great Crested Newt Mitigation Guidelines' (Ref. 7.14), three methods of survey were used to search for GCN on four separate occasions between April and June. The three methods employed were; bottle-trapping of the pond, searches of vegetation for GCN eggs and torch light searches of the pond.

7.33 The turbidity of the water limited visibility for the great crested newt torch survey in parts of the pond, but the bottle-trapping method and egg searches provided an adequate assessment of this pond during the surveys.

7.34 Great crested newts were recorded using the bottle trapping method on the final survey and therefore a further two surveys were completed at the site in order to gather information to estimate the population size-class.

7.35 All surveys were completed during the optimum time of year and under suitable environmental survey conditions for this species.

Dormouse Survey

7.36 Dormouse Muscardinus avellanarius tube surveys and hazelnut searches were carried out from September 2011 and will be complete in August 2012 according to the Dormouse Conservation Handbook (2nd ed.) (Ref 7.15). Eighty nest tubes were positioned within the hedges and woodland providing a more than acceptable index and adequate survey of the surrounding habitats. The locations of the tubes are shown in **Figure 7.2.** Hazelnut searches were conducted throughout the stands of hazel within Pocock's Wood and Prince's Wood.

7.37 At the time of writing, seven nest tube checks were undertaken in September, October, November 2011 and April, May, June and July 2012 as well as hazelnut searches within the large stands of hazel on the Application Site. One further survey is to be completed in August, 2012. Impacts of the Proposed Development are assessed on the basis of current information, and mitigation will be reviewed in the light of further survey results.

Other Flora and Fauna

7.38 The habitats within the Application Site and surrounding land were appraised for their suitability to support other notable species or assemblages that could be sensitive to the Proposed Development, such as notable plants and invertebrates in accordance with 'Guidelines for Baseline Ecological Assessment' (Ref 7.16).

Assessment Methodology

7.39 The assessment evaluated sites, habitats, species and other ecological features using an approach based on the 'Guidelines for Ecological Impact Assessment' (Ref. 7.16),

classifying potential ecological receptors into a hierarchy of ecological value based on geographical scale of importance. Key areas and/or species of ecological value within the site were identified and the main factors contributing to their current ecological value are described.

7.40 The assessment also took account of relevant wildlife legislation and national policy on nature conservation and development including:

- The Conservation (Natural Habitats, &c.) Regulations 1994;
- Wildlife and Countryside Act 1981, (as amended);
- The Protection of Badgers Act (1992);
- The UK Biodiversity Action Plan (UKBAP);
- The Horsham District Council Local Biodiversity Action Plan (LBAP); and
- Guidelines for Baseline Ecological Assessment (IEA, 1995).

7.41 The specific requirements and guidance set out in the above documents are discussed in more detail in the relevant sections of this chapter.

7.42 In order to determine the significance of any effects of the Proposed Development a robust assessment methodology is required. The assessment method used is based upon various different protocols for the assessment of significance. The criteria draw on the IEEM guidelines for ecological impact assessment (IEEM, 2006) and also incorporate good practice from other published documents listed in Section 7.40 above.

7.43 The importance of nature conservation resources present within the survey area have been evaluated to place their relative biodiversity value, social/community value and economic value into context. The value of the recorded ecological receptors present are identified and placed in a geographic context from "international" to "zone of influence" levels in accordance with the following scale:

- International (Very High);
- UK and National; (High);
- Regional/County (Medium);
- Local or Parish (Low); and/or
- Site (Negligible).

7.44 Any processes or factors within the Proposed Development that could potentially affect habitats and species or the wider environment are identified within the assessment.

7.45 Habitats and species within the survey area that might be affected by potential effects either directly or indirectly are considered and existing conditions are defined.

7.46 All likely impacts arising from the Proposed Development and the effects (beneficial or negative) of these on species and their habitats are predicted, and where possible quantified. The geographic level at which these effects are considered to be significant is determined. The IEEM guidelines suggest ecological experience and professional judgement should be integral part of this assessment process and impacts are described simply as "significant" or "not significant" at certain geographical levels, e.g. "significant at a local level" etc.

7.47 In order to produce a summary of the ecological impacts within this chapter (**Table 7.6**) the IEEM impact descriptions are translated to the terms for effect significance throughout the rest of the ES. The approach to this translation is shown in **Table 7.2**

Table 7.2 Translation between IEEM Assessment and ES Significance Terminology

EIA Effect Significance		Equivalent IEEM Assessment
Significant	Major Beneficial	Significant Positive Impact on ecological integrity or conservation status at Regional, National or International level.
	Moderate Beneficial	Significant Positive Impact on ecological integrity or conservation status at Borough - County level.
Non-significant	Minor Beneficial	Significant Positive Impact on ecological integrity or conservation status at Site - Local level.
Neutral	Negligible	No Significant Impact on ecological integrity or conservation status.
Non-significant	Minor Adverse	Significant Adverse Impact on ecological integrity or conservation status at Site - Local level
Significant	Moderate Adverse	Significant Adverse Impact on ecological integrity or conservation status at Borough - County level.
	Major Adverse	Significant Adverse Impact on ecological integrity or conservation status at Regional, National or International level

7.48 When describing impacts on ecosystem structure and function, consideration is given to the following factors:

- Confidence in predictions (levels of uncertainty);
- Extent (the area over which the impact occurs);
- Magnitude ('size' or 'amount' of impact, determined on a quantitative basis

where possible, e.g. the numbers of a species that are influenced);

- Duration (the time over which the impact is expected to last prior to recovery or replacement of the resource or feature);
- Reversibility (whether recovery is possible within a reasonable timescale);
- Timing and Frequency (whether impacts coincide with critical life changes or seasons (e.g. breeding bird season) and how frequent the impacts are likely to be); and
- Cumulative Effects.

7.49 Measures to avoid or reduce any significant effects, if possible, were then developed in conjunction with other elements of the design and mitigation for other environmental disciplines. If necessary, measures to compensate for impacts on features of nature conservation importance were also included.

7.50 Any remaining (residual) impacts of the Proposed Development after the implementation of mitigation were reported.

7.51 Scope and opportunity for enhancement within the Proposed Development has been considered, even if there are no significant negative impacts.

Baseline Conditions

Desk-based Study Results

Designated Nature Conservation Sites

7.52 No statutory or non-statutory designated sites are located within 2km of the Application Site.

Protected and/or Notable Species of Flora and Fauna

Vegetation

7.53 No records of protected or notable species were identified within 1km of the Application Site.

Badger

7.54 Records of badger were identified within 1km of the Application Site. Further information is provided within the confidential badger section in **Appendix 7.3**.

Bats

7.55 No records of bat roosts were identified within the survey area. However, within 1km of the Application Site unspecified roosts of Natterer's Bat *Myotis nattereri*, long-eared bat *Plecotus sp.*, *Pipistrelle sp*. bat and unspecified bat *Chiroptera sp.* have been recorded. Roosts were predominantly associated with farm buildings to the south east and south west of the Application Site and all were more than 300m from the Proposed Development; they are unlikely to be affected by any of the Proposed Development phases.

Birds

7.56 Bird records were provided by the Sussex Ornithological Society. There are no records from within the survey area but seventeen bird species have been recorded within 1km of the Application Site. Within this list, there are six different notable species. These species are UK BAP species, Species of Principal Importance for Nature Conservation and/or Birds of Conservation Concern (Amber or Red). One Schedule 1 species was also identified during the search which was fieldfare *Turdus pilaris*. Though not within the data search area there was one record of the Schedule 1 species Barn Owl Tyto alba between 2.5-3km from the Application Site. A full list of species is provided in the data search in **Appendix 7.1**.

Dormouse

7.57 No records of hazel dormouse were identified within 1km of the Application Site.

Amphibians

7.58 No records for amphibian species including great crested newts were identified within 1km of the Application Site. The closest records were provided were for common frog *Rana temporaria* and common toad *Bufo bufo* located approximately 2.1km from the Application Site.

Reptiles

7.59 No records for reptile species were identified within 1km of the Application Site. The closest reptile records were for grass snake *Natrix natrix* and common *lizard Lacerta vivipara* at approximately 2.2km from the Proposed Development.

Invertebrates

7.60 No records of protected or notable invertebrates were identified within 1km of the Application Site.

Site Survey Results

Phase 1 Habitat Survey Results

7.61 The Extended Phase 1 Habitat Survey was carried out on 5th September 2011; the results of the Survey are described below and are depicted according to the JNCC Guidelines within the Phase 1 Habitat Survey Map in **Figure 7.3** and the associated Target Notes (TN) are listed in **Appendix 7.2**.

Improved Grassland

7.62 The Application Site is predominantly improved grassland containing dominant species of perennial rye-grass *Lolium perenne,* and annual meadow-grass *Poa annua*, with common chickweed *Stellaria media*, spear thistle *Cirsium vulgaris*, prickly sow-thistle *Sonchus asper*, common nettle *Urtica dioica*, dandelion *Taraxacum officinale agg,* white clover *Trifolium repens* and scarlet pimpernel *Anagallis arvensis.*

Species-poor hedgerow

7.63 A blackthorn hedge is located between Pocock's wood and the proposed access route into the Application Site from the north east field boundary (H1 on **Figure 7.3**). This hedge is species-poor and defunct. This hedge is also heavily grazed by cattle.

7.64 The hedgerow alongside the road and the proposed access track to the north east (H2 on **Figure 7.3**) is predominantly bramble and blackthorn and contains mature standard oak trees.

Broadleaf Woodland

7.65 Pocock's Wood is directly adjacent to the north of the Application Site and consists of semi-natural broad-leaved woodland. Prince's Wood is situated over 50m to the east and south east of the Application Site and is designated ancient woodland.

7.66 Species recorded within Pocock's Wood and Prince's Wood included beech *Fagus sylvatica*, pedunculate oak *Quercus robur,* hazel *Corylus avellana*, holly *Ilex aquifolium*, hawthorn *Crataegus monogyna*, field maple *Acer campestre*, buckthorn *Rhamnus cathartica,* blackthorn *Prunus spinosa* and wild service tree *Sorbus torminalis*. Ground flora included bluebell *Hyacinthoides non-scripta*, wood melick *Melica nutans*, bracken *Pteridium aquilinum*, bramble *Rubus fruticosus agg.,* foxglove *Digitalis purpurea*, male fern *Dryopteris filix-mas,* broad buckler fern *Dryopteris dilatata*, wood avens, ground ivy *Glechoma hederacea* and false-brome *Brachypodium sylvaticum*. Pocock's Wood also contains a large pheasant rearing pen.

Scattered Trees

7.67 Two large oak trees were recorded between Pocock's Wood and Prince's Wood.

Arable

7.68 A large arable field was recorded to the north east of Pocock's Wood.

Protected & Notable Flora and Fauna

7.69 This includes species under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended); Schedules 2 and 4 of The Conservation (Natural Habitats &c.) Regulations 2010; and Species and Habitats of Principal Importance in England, listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and the Protection of Badgers Act 1992.

Badger

7.70 Full details of the badger survey are provided in a confidential appendix (**Appendix 7.3**) accompanying this report.

Bats

7.71 One tree within the survey area with low/moderate potential for roosting bats (TN 2, **Figure 7.3**) was noted adjacent to the north of Pocock's Wood and approximately 200m from the Proposed Development. All other trees adjacent to the site had negligible potential for roosting bat species.

7.72 A low to moderate level of bat activity was recorded over a period of three nights between the 14th and 17th September; This included moderate levels of common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* activity and low levels of activity for brown long-eared bat *Plecotus auritus* and a Myotis species (possible Natterer's). Soprano pipistrelle bat were also recorded social calling during the surveys. No activity was recorded between 17th and 20th September 2011.

Birds

7.73 The hedgerows and woodland surrounding the Application Site have potential to be used by breeding birds. The adjacent Pocock's Wood contains good species diversity and structure and is likely to support a good range of bird species during the breeding season and also provide foraging habitat for common species of woodland and farmland birds during winter months.

Hazel Dormouse

7.74 The woodlands and surrounding connectivity of hedgerows and other woodland blocks comprises a network of habitats that could support dormouse. No evidence of dormouse has been found during either the hazelnut searches or the completed tube surveys at the time of writing this report.

Great Crested Newt

7.75 All water bodies within 500m of the Application Site were assessed using the Habitat Suitability Index (HSI). One pond was considered suitable for great crested newts. The results of this are shown in **Table 7.3.**

Table 7.3: Habitat Suitability Index Results for Great Crested Newts

Factor	Pond Score
Location	1
Pond area	0.6
Pond drying	0.9
Water quality	0.67
Shade	1
Fowl	0.67
Fish	0.67
Pond count	0.5
Terrestrial habitat	1
Macrophytes	0.3
HSI score	0.69

7.76 The other water bodies were highly seasonal (unable to support breeding populations) and considered unsuitable. Further presence/absence surveys and a population survey revealed a low population of great crested newts using this pond. The peak count using any one survey method was eight. The details of the surveys are given **Table 7.4**.

Table 7.4: Great Crested Newt Survey Results

Survey Visit	Date	Air Temp◦C	Water Temp ◦C	Peak Great Crested Newt Count Using Any One Survey Method
1	12/03/12	Night: 10.1 Day: 8.5	10	None
2	19/03/12	Night: 11 Day: 8	10	None
3	04/05/12	Night: 9 Day: 8.2	11	None
4	05/05/12	Night: 9 Day: 8.2	11	Two (two adult males)
5	08/05/12	Night: 10 Day:14	14	Eight (six adult males, one juvenile male, one adult female)
6	08/05/12	Night: 13.7 Day:14	14.7	Six (four adult males, one adult female, one juvenile male)

7.77 A number of both male and female smooth newts *Triturus vulgaris* and palmate newts *Lissotriton helveticus* were recorded during the amphibian survey as well as numerous common frogs and common toads within the pond.

Evaluation

7.78 This section evaluates the nature conservation interest of the survey area in terms of the habitats and the species it supports. This value is placed in a geographical context through the framework shown in the Assessment Methodology section, based on relevant legislation and guidance. This evaluation is shown in **Table 7.5.**

Table 7.5: List of Ecological Receptors

Ecological Receptor (Habitat/Species)	Importance
Assessment Site Habitats	
Species-poor Habitats	On site habitats which would be affected within the Application Site are predominantly improved grassland and also a small amount of species-poor hedgerow. These were assessed as being predominantly of limited ecological value. These habitats are classed as **Site** (Negligible) importance.
Adjacent Habitats	
Ancient Woodland –Prince's Wood	This broadleaf woodland approximately 50m from the proposed wellsite contains a good range of associated flora and has therefore been assessed as of **County** (Medium) importance.
Pocock's Wood- Broadleaf Woodland	This woodland directly adjacent to the north of the Application Site has no designations but contains a good range of flora and fauna and woodland is listed on the LBAP so this has therefore been assessed as of **local** (Low) importance.
Species	
Breeding Birds	The Application Site is of limited value for breeding birds with predominantly improved grassland however a good assemblage of woodland birds are likely within adjacent woodland. The data search had records of 6 notable species which are UK BAP species, Species of Principal Importance for Nature Conservation and/or Birds of Conservation Concern (Amber or Red). One Schedule 1 species was also identified during the search which was fieldfare *Turdus pilaris.* Works are to be completed during the winter therefore no impact is expected on breeding birds and the value of **Site** (Negligible) has been used in assessment of value of this receptor as there will be no breeding assemblage due to the planned timings of works and habitat losses are of low value.
Bats	All 17 species of UK bat are protected under The Conservation Regulations (Natural Habitats &c.) 2010 and the Wildlife and Countryside Act 1981. Common pipistrelle is also listed as a UK BAP species. Soprano pipistrelle, and brown long-eared bats are also a priority species under the Sussex BAP. As the two species of pipistrelle, natterer's and brown-long-eared bats occur frequently throughout England and no roosts are present within the likely zone of influence and overall bat activity was assessed as low, they are assessed as **Local** (Low) importance.
Hazel Dormouse	The hazel dormouse is given full protection under Schedule 5 of the WCA (1981), (as amended). Protection to the species is also afforded by Schedule 2 of the Conservation (Natural Habitats &c) Regulations (2010). No evidence of hazel dormouse has been found at the Application Site but one nest tube check is still

Ecological Receptor (Habitat/Species)	Importance
	to be completed. Works are to be completed outside of the active dormouse season and no habitats due for removal show potential to be used as a hibernation site for dormouse therefore they are assessed as **Local** (Low) importance.
Great crested newt	The Great crested newt is given full protection under Schedule 5 of the WCA (1981), (as amended). Protection to the species is also afforded by Schedule 2 of the Conservation (Natural Habitats &c) Regulations (2010). A pond containing a low population of great crested newts was recorded approximately 130 m from the proposed temporary wellsite. The site itself was assessed as being largely unsuitable for great crested newts. They are therefore assessed as **local** (Low) importance.

7.79 The Proposed Development involves the siting and construction of a temporary wellsite including an access track and ancillary infrastructure. Further details on the proposed development and phases of development can be seen in Chapter 4: Project Description and Chapter 6: Construction.

Likely Significant Effects

Phase 1: Construction of the access road and well site

Potential Effects of Temporary Landtake

Designated Sites

7.80 During Phase 1, the ecological integrity of Prince's Wood ancient woodland would not be adversely affected by the Proposed Development as it is over 50m from the Application Site and would be fully retained.

Pocock's Wood-Broadleaf Woodland

7.81 During Phase 1 the entire woodland would be retained and no significant impacts are anticipated on the ecological integrity of this habitat. However, in order to prevent any accidental damage to the woodland edge some precautionary avoidance and mitigation measures have been recommended below.

Species-poor Habitats

7.82 The construction of the well site and access track will lead to the temporary loss of an area of improved grassland totalling 2.12ha (5.23 acres) which was assessed as being of low ecological value. In order to create a visibility splay for the Application Site, 8m of hedgerow running adjacent to the B2133 (H2 on **Figure 7.3**) would need to be removed and 6m of the hedgerow running adjacent to the proposed access track (H1 on **Figure 7.3**). This section of hedgerow is species poor and contains predominantly scrub species such as bramble and blackthorn. Elsewhere, the hedge contains standard oak trees which are to be retained within the Proposed Development. Without mitigation this loss of habitat as a result of the Proposed Development is an adverse effect assessed as significant at the site level only.

Badger

7.83 The potential effects of temporary landtake on badger are identified in the confidential badger report in **Appendix 7.3**.

Bats

7.84 The Application Site was assessed as being of low value for bats with no closely adjacent roosting positions and low activity of relatively common bat species being recorded during the activity surveys. The timing of construction works is to be completed outside of the bats' peak period of breeding and other activity (May-September) and therefore no significant effects on the conservation status of bats are likely as a result of construction, either through impacts on roosts or foraging and/or commuting behaviour.

Birds

7.85 The Application Site is entirely within improved grassland. This habitat is not considered suitable for ground nesting species such as skylark due to the high level of disturbance from cattle. No significant effects on the conservation status of ground nesting birds are predicted.

7.86 All nesting birds are protected whilst nesting under the Wildlife and Countryside Act (1981). The timing of works is to be outside of the breeding bird season and therefore no significant effects on breeding birds are predicted by the Proposed Development.

Hazel Dormouse

7.87 Hazel dormouse is given full protection under Schedule 5 of the WCA (1981), (as amended). After seven of the eight planned surveys using a high density of well placed nest tubes, no evidence of hazel dormouse has been found within the Application site and no records of hazel dormouse were identified within 1km during the data search.

7.88 According to the Dormouse Conservation Handbook the number of visits completed so far and the tube density across the site results in a survey effort score of 30. This is calculated by adding the Index of Probability Scores shown in **Table 7.6** and multiplying by 1.5 due to the increased density of tubes positioned on the site.

Table 7.6: Index of Probability of Finding Hazel Dormouse Present in Nest Tubes in Any Month

Month	Index of Probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

7.89 The Dormouse Conservation Handbook recommends that absence should not be confirmed with a survey effort score of less than 20, and this score has already been exceeded. It is therefore considered that hazel dormouse is unlikely to be present.

7.90 The proposed wellsite area itself has no habitat suitable for hazel dormouse. However, the species-poor hedgerows (H1 and H2) have a low potential for dormouse presence, during summer months. The removal of a small section (8m of H2 and 6m of H1) to allow for the proposed access route would take place between October and February. This loss would be temporary and restored after completion of the project. These sections of hedgerow were assessed as being of negligible value to hibernating hazel dormouse. No significant effects on the conservation status of hazel dormouse are likely to occur.

Great Crested Newts

7.91 A low population of great crested newts has been shown to be present within a pond

approximately 130m from the Application Site. The Application Site is of negligible value to this species as it is heavily grazed improved grassland. The pond and immediately adjacent grassland, which has high value (foraging and shelter) for GCN in the terrestrial phase, will not be affected by the Proposed Development. There is a low potential that great crested newts would migrate across the Application Site between the pond and woodland when entering and leaving hibernation. However, the construction works are to be completed between October and February during which hibernation is most likely. Therefore it is assessed that no significant impacts on the conservation status of this species during construction are likely to occur.

7.92 It is assessed that the Proposed Development would not cause harm or disturbance to great crested newts and therefore no European Protected Species Licence will be necessary in order to complete the work. This conclusion will be reviewed if the project programme or other design details change.

Run-off

7.93 Standard drainage control measures are to be employed during construction and therefore significant run-off effects on the flora and fauna are unlikely.

Dust

7.94 Dust emissions arising from site establishment would be controlled through standard dust suppression measures and any deposition to adjacent woodland is likely to be limited to a level that is highly unlikely to cause adverse effects on woodland edge vegetation and associated fauna. Dust emissions would also be temporary during construction. No significant effects of flora and fauna are anticipated.

Soil Compaction

7.95 Soil compaction would be restricted to the improved grassland of ecologically low value within the Application Site and this would be a temporary impact during the Proposed Development. Bunds and the access track would not be located directly adjacent to this woodland meaning no impacts on root zones at the woodland edge. No significant effects are anticipated on the ecological integrity of this woodland.

Noise Disturbance

7.96 Chapter 9 of this ES contains the noise assessment which was used in evaluating any

noise impacts on adjacent receptors.

7.97 During the construction period noise levels would be restricted to daylight hours and between October and February. The noise isopleth for construction noise (**Figure 9.4** in Chapter 9: Noise) illustrates that the majority of Pocock's Wood would have a noise level lower than 60dB with areas of both Pocock's and Prince's Wood showing areas with no increase in noise at all. This suggests very limited potential for noise impact on birds and other woodland fauna. However specific assessments of noise impacts on sensitive receptors are given below.

Badger

7.98 Refer to the Confidential Badger Report in **Appendix 7.3**.

Bats

7.99 As construction noise would be temporary and limited to daylight hours during winter months (October- February) and no potential bat hibernation roosts were found near to the Application Site, no significant effects on the conservation status of bats from noise disturbance are anticipated from Phase 1 of the Proposed Development.

Birds

7.100 Works are to be completed outside of the breeding bird season therefore no significant effects are predicted from noise disturbance on breeding birds.

7.101 There is very limited potential for some localised disturbance effects to birds during the construction period. Records of fieldfare which is a schedule 1 bird were identified during the desk based study and could potentially be present in the adjacent woodland during winter months. However, this would be temporary and outside of the breeding bird season and most areas of adjacent woodland are shown in the noise isopleths to have no increased noise at all during this period, so whilst there may be localised displacement this is reversible and it is assessed that this would have no significant affect on the conservation species of Schedule 1 species.

Lighting

7.102 During the construction period lighting would be limited to emergency situations, therefore no significant lighting effects are anticipated.

Phase 2, 3a and 3b: Mobilisation, Testing and Evaluation

Noise Disturbance

Adjacent Woodland

7.103 The noise isopleth (**Figure 9.4** in Chapter 9: Noise) illustrates that the majority of Pocock's Wood during the operational drilling phase would have a noise level lower than 60dB which would be continuous for 24 hours throughout a 12 week operation period with the majority of adjacent woodland showing low or negligible increases in noise. This increase in noise is temporary, reversible and would occur during winter months reducing the likelihood of any significant adverse effects on woodland fauna.

7.104 Princes's Wood shows a predicted noise level of under 50 dB, even at the woodland edge. The greatest effect is on a small section of Pocock's Wood to the north which shows a predicted level of approximately 70dB which could lead to a temporary displacement of noise sensitive species from this woodland edge. Specific assessments for the impact of operational noise on sensitive receptors are given below.

Bats

7.105 Temporary noise disturbance during winter months could cause localised short-term displacement or a reduction in foraging activity of bats within and on the woodland edge on mild winter nights. However, no roosts would be affected and the short-term and reversible disturbance of this small section of foraging habitat is unlikely to have significant adverse impacts on the conservation status of local bat populations given the large area of woodland habitat available in the immediate locality. No significant effects on the conservation status of bat species are predicted by the Proposed Development.

Badger

7.106 Refer to the Confidential Badger Report in **Appendix 7.3**.

Birds

7.107 Works are to be completed outside of the breeding bird season. It is therefore assessed that there would be no significant effects from operational noise on the conservation status of breeding birds.

7.108 As with construction noise, it is possible that the temporary noise increase associated with the drilling period will cause some short term, localised displacement of birds from the woodland edge in Pocock's Wood. However this impact would be temporary and reversible and is therefore assessed that there would be no significant effect on the conservation status of local bird populations. Noise habituation is likely to occur relatively quickly given that current land-uses within the Application Site include recreational shooting and agricultural practices.

Hazel Dormouse

7.109 The timings of works between October and February are outside of the active dormouse period which reduces the likelihood of disturbance to dormouse activity. On the basis of current baseline information, no significant effects are likely to occur. This will be reviewed if the final nest-tube check for dormouse confirms the presence of this species and further information will be provided to the local authority as the monitoring surveys progress.

7.110 Even if hazel dormouse were to colonise, the temporary and reversible nature of the noise disturbance which is over a relatively small area of woodland suggests that this impact would be negligible. No significant impacts on the conservation status of dormouse are therefore predicted to result from the Proposed Development.

Lighting Disturbance

7.111 Potential lighting effects are associated with the drilling phase (Phase 2) and are therefore both temporary and reversible. Lighting during this period would be continuous throughout the night. The Application Site has been assessed as being an E2 lighting environmental zone under the Institute of Lighting Engineers (ILE) Guidelines (Ref. 7.17). The obstructive light limitations for this project as described in Chapter 12: Lighting are shown in **Table 7.7**.

Table 7.7: Obtrusive Light Limitations for an E2 Environmental Zone

Environmental Zone	Sky Glow ULR (Max) %	Light Trespass (Into windows) Ev Lux		Source Intensity I Kcd		Building Luminance L (cd/m2)
		Pre-curfew	Post-curfew	Pre-curfew	Post curfew	Pre-curfew
E2 Low distinct brightness Rural, small village, relatively dark urban location	2.5	5	1	7.5	0.5	5

7.112 The lighting assessment in Chapter 12 of this ES considers the directional lighting to result in minimal spill to the surrounding agricultural land and woodland.

Badger

7.113 Refer to the Confidential Badger **Appendix 7.3**.

Bats

7.114 Increased lighting levels directly adjacent to the wellsite during the operation period would occur during winter months on the woodland fringe of Pocock's Wood. This could temporarily displace bat foraging on mild winter nights and displace bats further into the woodland. However, this would be temporary and reversible and outside of the bats most active period and not all bat species exhibit avoidance of artificial lighting. Lighting disturbance was therefore assessed as having no significant effect on conservation status of bats.

Birds

7.115 Increased light spill on the fringes of Pocock's Wood could displace some bird species into the woodland due to increased visibility during the night and therefore an increased chance of predation. It could also displace some nocturnal species further into woodland. However, the changes in lighting are described in the lighting chapter as minimal and would be temporary, reversible and limited to a small area. Therefore it is assessed that there would be no significant effect on the conservation status of any protected or notable bird species present within the woodland.

7.116 Works are to be completed outside of the breeding bird season and therefore no significant effect on the conservation status of breeding birds is predicted.

Hazel Dormouse

7.117 No evidence of hazel dormouse has been recorded to date. Furthermore, the work is to be completed whilst dormice are hibernating and therefore no significant effects on the conservation status of hazel dormouse due to operational lighting are predicted.

Vehicle Collisions

7.118 There is a potential for mammals and other fauna to cross between the two woodland areas particularly at night. However vehicle movements would be very few, particularly at night and vehicles would be moving at slow speeds across the Application Site. It is therefore considered that there would be no significant effects on the conservation status of nocturnal species due to the Proposed Development.

Phase 4a and 4b: Restoration and Retention

Habitat Loss or Degradation

7.119 Habitats would be restored to their previous condition if restoration occurs after the Proposed Development is complete (4a) and therefore no further adverse effects are likely to occur. If however the site is retained then the small area of landtake would not be restored and would be retained without the drilling equipment whilst awaiting further planning decision. This would mean that landtake could be more long term. This land was valued as being of low ecological value and therefore this 'worst-case' effect of habitat loss is assessed as being of site importance only.

Run-off

7.120 Standard run-off control measures are to be employed during decommissioning and therefore significant effects on flora and fauna are unlikely to occur.

Dust

7.121 Dust emissions arising from decommissioning would be controlled through standard dust suppression measures and any deposition to adjacent woodland is likely to be limited to a level that is highly unlikely to cause adverse effects on woodland edge vegetation and

associated fauna. Any dust produced would also be temporary. No significant effects on flora and fauna are likely.

Noise

7.122 As with the construction period noise disturbance would be limited to daylight hours for a minimal amount of time. No significant effects on flora and fauna are likely to occur.

Lighting

7.123 Artificial lighting would only be used during an emergency and therefore is unlikely to have a significant effect on flora and fauna.

Cumulative Effects

7.124 All likely effects are highly localised and limited to the immediate environs of the Application Site. There are no other development projects that could cause cumulative adverse effects.

7.125 Cumulative effects across construction, operational and decommissioning development phases (22 weeks) may occur through noise and lighting disturbance to birds and also to low numbers of bats foraging on mild winter nights. This remains a temporary and reversible effect at a time of year unlikely to affect breeding success that is unlikely to have significant adverse effects on conservation status of local bird or bat populations at more than the site level.

Summary of Effects

7.126 No significant adverse effects on the ecological integrity of sites or the conservation status of protected or notable flora or fauna populations have been identified. Although some disturbance effects to other fauna may occur, these affect small areas in the immediate vicinity of the Application Site and are short term and reversible. The works are to be completed between October and February which reduces impacts of noise or lighting disturbance on adjacent fauna.

7.127 The following potential effects have been identified during the assessment and, although no significant effects on conservation status are likely, they are to be addressed through specific measures and where appropriate enhancements during the restoration period have been recommended:

- Damage to woodland edge (significant at site level);
- Loss of hedgerow habitat (significant at site level); and
- Mitigation by design is also described for prevention of pollution to adjacent habitats through dust and run-off.

Mitigation Measures

7.128 The short section of hedgerow to be lost to increase the site entrance will be replaced during the construction phase and/or translocated to a suitable location adjacent to the access road. Translocation would involve coppicing the existing hedgerow to c 500mm above ground, excavation (retaining root mass) and placement in a pre-prepared receptor 'trench' followed by management (watering) if necessary. Any replacement hedgerow will also be species-rich, enhancing the existing species-poor defunct hedgerow.

7.129 The site construction (installation of plant and infrastructure) and decommissioning extents would be clearly marked prior to commencement in order to reduce the risk of accidental damage to woodland edge vegetation or compression of tree roots. Trees and woodland would be marked as no go areas for both workers and machinery in order to reduce disturbance. Areas used for materials and storage would be clearly defined within the Application Site and away from the woodland edge.

7.130 Standard pollution prevention controls over site establishment, operation and decommissioning would be implemented to avoid surface run-off and dust emissions from the Application Site to the adjacent habitats.

7.131 No other significant adverse effects on the ecological integrity of designated sites, or the conservation status of protected or notable species, or other flora and fauna have been identified by this assessment. All potential effects are limited in magnitude, temporary and reversible and considered to be not significant.

7.132 No other specific avoidance or other mitigation measures are required to address effects on flora and fauna.

Enhancements for Biodiversity

7.133 The NPPF requires that opportunities for enhancements of biodiversity are taken within the planning system. The hedgerow which is to have a 6m section removed (H1 on

Figure 7.3) currently contains large gaps and is heavily grazed by cattle. It is therefore recommended that, this hedge be inter-planted during the construction stage with broadleaf species such as hazel, field maple and beech in order to increase the diversity of the hedgerow and improve connections between Pocock's Wood and adjacent hedgerows. Planting some flowering plants within the hedgerow such as honeysuckle would benefit insect species as well enhancing the site for hazel dormouse. Protecting this hedgerow from grazing by increasing the distance between the hedge and the fence would also improve the quality of this linear corridor. This enhancement would provide cover and food resources for a wide range of native species.

Residual Effects

7.134 No significant residual adverse effects on flora and fauna are anticipated after mitigation. A high level of confidence is given to the ecological assessment of most of the Application Site's sensitive receptors including protected species and habitats. Due to the incompletion of the dormouse survey the ecological assessment on this species is reduced to moderate.

Summary

7.135 The Application Site is not within 1km of any areas designated for their nature conservation value and the Application Site was assessed as being of land of low ecological value.

7.136 Pocock's Wood directly north of the Application Site had low bat foraging activity and is likely to support an assemblage of woodland birds. There is also some potential for hazel dormouse to be present and a low population of great crested newts within a pond approximately 130m from the proposed wellsite.

7.137 The timing of construction and operational works between October and February mitigates for any significant effects on these species with works occurring predominantly during the hibernation period for hazel dormouse (November- late April) and great crested newts (October- March).

7.138 The timing of works is also outside of the peak bat activity season which is between May and September and also the breeding bird season which is from Late February to September so that no significant effects are predicted on these faunal groups during this temporary and reversible development.

7.139 **Table 7.8** contains a summary of the mitigation and likely significant residual effects of the Proposed Development.

7.140 Enhancements to the hedgerow proposed for vegetation removal (H1 on Figure 7.3) are recommended in order to improve connections between Pocock's Wood and adjacent habitats.

Table 7.8: Table of Significance – Ecology

Potential Effect	Nature of Effect (Permanent/ Temporary)	Significance (Major/Moderate /Minor) (Beneficial/ Adverse/ Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/ Minor) (Beneficial/Adverse/ Negligible)
				I	UK	E	R	C	B / D	L	
Phase 1: Construction of the access road and well site											
Removal of small sections of species-poor habitats	Temporary	Minor Adverse	Enhancements recommended to improve hedgerow during the construction stage (H1 in Figure 7.3).							*	Minor Beneficial
Damage to woodland edge	Permanent	Minor Adverse	As a precaution the site construction (installation of plant and infrastructure) and decommissioning extents would be clearly marked prior to commencement in order to reduce the risk of accidental damage to woodland edge vegetation or compression of tree roots. Trees and woodland would be marked as no go areas for both workers and machinery in order to reduce disturbance. Areas used for materials and storage would be clearly defined within the Application Site and away from the woodland edge.							*	Negligible
Pollution to adjacent habitats through run-off and dust	Temporary	Minor Adverse	Standard pollution prevention controls over site establishment, operation and							*	Negligible

			decommissioning would be implemented to avoid surface run-off and dust emissions from the site to the adjacent habitats.								
Potential effects of landtake on badger (See Confidential Appendix 7.3)	-	-	-								-
Potential effects of landtake on bats	Temporary	Negligible	No mitigation required							*	Negligible
Direct disturbance to breeding birds during vegetation removal	Temporary	Negligible	No mitigation required							*	Negligible
Impacts on hazel dormouse during landtake. Removal of low quality habitat	Temporary	Negligible	Enhancements to hedgerow (H1 on Figure 7.3) would benefit this species.							*	Minor Beneficial
Impacts on great crested newts during migration to and from breeding pond.	Temporary	Negligible	No mitigation required							*	Negligible
Effect of noise disturbance on breeding birds	Temporary	Negligible	No mitigation required							*	Negligible
Effect of noise disturbance on badger (See Confidential Appendix 7.3)	-	-	-								-
Phase 2: Mobilisation of the drill rig and drilling operations											
Effects of noise and lighting disturbance on bats	Temporary	Negligible	No mitigation required							*	Negligible

Effects of noise and lighting disturbance on breeding birds	Temporary	Negligible	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on hazel dormouse	Temporary	Negligible based on the current but incomplete surveys.	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on badger (See Confidential Appendix 7.3)	-	-	-								-
Potential vehicle collision risk with nocturnal wildlife	Temporary	Negligible	No mitigation required							*	Negligible
Phase 3a: Short term testing and evaluation - gas											
Effects of noise and lighting disturbance on bats	Temporary	Negligible	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on breeding birds	Temporary	Negligible	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on hazel dormouse	Temporary	Negligible based on the current but incomplete surveys.	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on badger (See Confidential Appendix 7.3)	-	-	-								-

Phase 3b: Short term testing and evaluation - oil											
Effects of noise and lighting disturbance on bats	Temporary	Negligible	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on breeding birds	Temporary	Negligible	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on hazel dormouse	Temporary	Negligible based on the current but incomplete surveys.	No mitigation required							*	Negligible
Effects of noise and lighting disturbance on badger (See Confidential Appendix 7.3)	-	-	-								-
Phase 4a: Restoration											
Effects on the site's vegetation, habitats and wildlife	Permanent	negligible	Enhancement recommended to improve hedgerow during construction stage (H1 in Figure 7.3).							*	Minor Beneficial
Phase 4b: Retention											
Small loss of ecological value land.	Permanent/Temporary	negligible	Enhancement recommended to improve hedgerow at construction stage (H1 in Figure 7.3).							*	Minor Beneficial

* Geographical Level of Importance
I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; D = District; L = Local

References (Ref)

7.1 Department for Communities and Local Government, (2012); 'National Planning Policy Framework.'

7.2 Office of the Deputy Prime Minister, (2005); Government Circular: Biodiversity and Geological Conservation.'

7.3 Secretary of State (adopted May 2009); The South East Plan.

7.4 General Development Control Policies Development Plan Document (2007)

7.5 The Horsham District Council Biodiversity Action Plan (June 2003)

7.6 West Sussex County Council (adopted July 2003); West Sussex Minerals Local Plan.

7.7 West Sussex County Council (2012) Planning consultation: Scoping Opinion under Regulation 13 for an Exploratory Hydrocarbon Wellsite (13th June 2012).

7.8 Multi Agency Geographic Information Centre (MAGIC) (2011) Available: http://magic.defra.gov.uk/ (date accessed: September 2011).

7.9 National Biodiversity Network (NBN) Gateway (2011) Available: http://data.nbn.org.uk (date accessed: September 2011).

7.10 Joint Nature Conservation Committee (JNCC), (1993); 'Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit, revised reprint 2003.' JNCC. Peterborough.

7.11 Harris, Creswell and Jefferies, (1989). Surveying Badgers. The Mammal Society.

7.12 Bat Conservation Trust (BCT), (2007); 'Bat Surveys; Good Practice Guidelines. Bat Conservation Trust.

7.13 Titley Electronics Analook Software (version 4.8f)

7.14 English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature.

7.15 English Nature (2006) The Dormouse Conservation Handbook (2nd edn) English Nature.

7.16 Institute of Ecology and Environmental Management (IEEM), (2006); Guidelines for Ecological Impact Assessment. IEEM.

7.17 The Institution of Lighting Engineers (2005) Guidance Notes For the Reduction of Obtrusive Light. ILE.

8.0 LANDSCAPE AND VISUAL IMPACT

Introduction

8.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of Landscape and Visual Impact and is supported by Appendix 8.1.

8.2 The chapter describes the baseline conditions currently existing at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. This chapter has been prepared by The Terra Firma Consultancy.

8.3 The chapter should be read in conjunction with the following:

- Appendix 8.1: Landscape and Visual Impact Assessment Methodology
- Figures 8.1- 8.16: Landscape and Visual Impact Assessment Figures

Planning Policy Context

8.4 A study has been made of the relevant policies providing the context for landscape and visual effect at National, Regional and Local level that apply to the Application Site and its surroundings. This is summarised as follows.

National Planning Policy

National Planning Policy Framework 2012 (Ref. 8.1)

8.5 In reference to sustainable development, the framework states the environmental role of the planning system is to protect and enhance the natural environment through the improvement of biodiversity and through positive improvements in quality of the natural and built environment.

8.6 It states that core planning principles should take into account the character of different areas and recognise the intrinsic character and beauty of the countryside, contribute and enhance the natural environment.

8.7 It states that the planning system should contribute and enhance the natural and local environment by protecting and enhancing valued landscapes and soils, minimising effects on biodiversity, providing net gains where possible.

8.8 It refers to the aim for planning policy to minimise adverse effects on local and natural environment, through comprehensive assessment of ecological networks, provision of adequate mitigation where harm cannot be avoided, and the encouragement of opportunities for increased biodiversity.

8.9 In relation to the sustainable use of minerals, the framework states the need for policy criteria to ensure that permitted developments do not have unacceptable adverse effects on the natural environment and that worked lands is subject to high quality restoration.

Technical Guidance to the National Planning Policy Framework 2012 (Ref. 8.2)

8.10 In the Minerals Policy section, the guidance refers to the need for landscape strategies to define key landscape opportunities and constraints, identify visual exposure and need for screening, and the preferred character of the restored landscape.

8.11 The strategy should address effects on the existing landscape, including working operations and haul roads. It suggests that careful consideration of phasing, provision of screening can minimise visual and landscape effect and that key stages of restoration should be fully considered and detailed.

Regional Planning Policy

The South East Plan (adopted May 2009) (Ref. 8.3)

8.12 The Plan refers to the need for sustainable development and the importance of the protection, conservation and enhancement of the physical and natural environment, with regard to local diversity and distinctiveness as informed by landscape character assessment.

Local Planning Policy

Horsham District Council Core Strategy (adopted February 2007) (Ref. 8.4)

8.13 The Strategy sets out the need for the protection and enhancement of the diverse character and local distinctiveness of the District and accepts the need to integrate this need with the need to allow the natural evolution of the countryside and character and environment of settlements.

Horsham District Council: General Development Control Policies (Ref. 8.5)

8.14 Policy DC1 includes reference to the need to protect and enhance the countryside through the control of development unless essential, supports sustainable development in the countryside and of an appropriate scale.

8.15 Policy DC2 refers to the need to protect, conserve and enhance the key characteristics of landscape character areas including the development and natural environment patterns and topography.

8.16 Policy DC5 refers to the need to protect, conserve and enhance the biodiversity of the District and, where areas are designated as of importance for biodiversity not development with adverse effect is permitted unless the reason outweighs the need for protection and adequate mitigation measures are included.

8.17 Policy DC6 states that the felling of trees will only be permitted in exceptional circumstances and that replacement will be required.

West Sussex Minerals Local Plan (adopted July 2003) (Ref 8.6)

8.18 The Plan accepts that there may be areas that can accommodate mineral extraction without permanent harm and with possible opportunities for enhancement and habitat creation but that in areas of local environmental significance without statutory protection, benefits should outweigh detrimental effects.

West Sussex County Council 'A Strategy for the West Sussex Landscape' (2003) (Ref 8.7)

8.19 The strategy is based on West Sussex County Council Landscape Character Assessment character areas. In respect of the Low weald, which the Application site lies within, it

refers to the vision of a characteristic mix of pastures, woodlands, hedges and shaws providing an intimate and secluded landscape, the characteristic agricultural landscape and the flourishing woodland cover of the area.

8.20 The strategy sets out guidelines for development that include the need to: protect areas valued for their natural beauty; retain key landscape features to aid setting of development; minimise modification to existing landforms and vegetation; conserve and enhance trees and hedgerows; secure, where appropriate, landscape and habitat enhancement, in particular to screen and integrate development, and plant native species; respect character of rural roads by minimising alteration, ensuring entrances fit in the landscape and utilising discreet signage; minimising impact of lighting; identify and conserve surviving historic landscapes and field patterns, in particular those showing little change and greater time depth, incorporating within landscape schemes; protect, conserve and enhance ancient woodlands and trees of historic importance.

Summary

8.21 In summary, the key themes running through from national planning policy, minerals policy and landscape strategy at a county level and local level policy are the importance of sustainable development, respect for landscape character and protection of important landscapes and features. In landscape terms these themes can be summarised as the need:

- To contribute and enhance the natural and local environment;
- To respect local landscape character and distinctiveness;
- To respect local historic landscape character;
- To protect designated landscapes, wildlife habitats and good quality agricultural land;
- To minimised and mitigate the effect of any proposed development through considered design and by the enhancement of existing habitats or creation of new habitats.

8.22 There are various implications of the policies on the Proposed Development.

8.23 Whilst the Proposed Development is sited in an undeveloped countryside site, the protection and enhancement of which is encouraged in the NPPF, there are essential reasons for this due to the location of the underground resource to be explored and local policy supports the extraction of minerals in the countryside in this situation.

8.24 There is a need for any development to be sited sensitively within the countryside, to conserve features of landscape, wildlife and historic value and to have a minimal effect on biodiversity and landscape character. The Proposed Development is sited within the existing historic field structure framework, with minimal loss of existing vegetation or adverse effect on protected natural features. The location takes advantage of the screening offered by surrounding vegetation. In addition the proposals include additional hedge planting that enhances the quality and character of the countryside, giving a net gain to biodiversity.

8.25 The need conserve soil resources and protect good quality agricultural land is carefully addressed in the Proposed Development with a strategy of careful site management and full restoration to agricultural land on completion.

8.26 The need to respect the rural roads character is carefully addressed in the Proposed Development; in order to provide adequate visibility splays there is only a need for light pruning of existing hedges and minimal signage is proposed.

8.27 The relevant policies have been considered in the proposed development to ensure that the compliance, where possible and suitable, is addressed through sensitive siting of the development, protection, conservation and enhancement of the local biodiversity and landscape character.

Assessment Methodology

Methodology Used

8.28 The methodology for the Landscape and Visual Impact Assessment is explained fully in Appendix 8.1.

Guidance

8.29 The Landscape and Visual Impact Assessment (Appendix 8.1) has been prepared using guidelines set out in the Landscape Institute and Institute of Environmental Management and Assessment's '*Guidelines for Landscape and Visual Impact Assessment*' (Ref 8.8).

Limitations and Assumptions

8.30 In the production of the LVIA the following limitation and assumptions apply:

- elevations of viewpoints are estimated from OS data;
- distance of viewpoints are approximated from the centre of the Application Site; and
- users of footpaths have been classified as high sensitivity view receptors, regardless of the level of usage or status of the footpath.

Baseline Conditions

Description of Proposed Development

8.31 The principal elements of the Proposed Development are as follows:

- Site clearance involving the excavation and removal of top soil (except where within rootzone of Oak trees at entrance);
- Screening bunds on all boundaries of the site compound to store excavated topsoil and subsoil, up to 5m in height;
- Removal of 8m length of hedge to boundary with road and 6m length of hedge between fields at entrance to facilitate access and clearance of sight lines as necessary (only light pruning of hedge anticipated);
- Crown lifting to one tree and dead wood removal to another tree at entrance;
- Gated access track to be constructed using a no-dig tarmac construction to protect tree roots at junction with Adversane Lane and crushed stone from therein with bunding along the northern boundary of the track, up to 2m in height;
- Erection of signage to road (no lighting proposed);
- Erection of post and wire fencing to Application site boundary;
- A drilling rig (worst case scenario MR7000 at 36m high) and ancillary drilling equipment for construction of an exploratory borehole including toolpush cabin, toolhouse, generators and fuel tank, matting boards, blow-out preventers and manifold;
- Staff car park for 12 vehicles within the compound but outside of the drilling area;
- Concrete chamber sunk into the ground acting as a 'cellar' to include large diameter pipework as a starting point for drilling;
- Purpose built tanks for the storage of semi-dry drilling mud and rock cuttings;
- Low level flare within bunded compound;
- External lighting to drill rig including rig floor, mud tanks and pumps, catwalk, doghouse and site cabins;

- 2 on-site water storage tankers and a portable skip for on-site refuse collection;
- 5 portable cabins providing office accommodation and essential 24-hour staff living accommodation and laboratories;
- Noise attenuation and dust control procedures will operate on site including effective silencers and damping down runways as the weather dictates;
- Retention of all trees, with all works outside tree canopy with the exception of trees at entrance and a limited length of 900mm ht. bunding intruding 2.5m into an 11m root protection zone on the southern boundary of the compound.

Phasing of Proposed Development

8.32 The Proposed Development is phased. Each of the four phases, with the elements and effects involved, are described in more detail elsewhere. The duration is likely to be over a period of 19 weeks. This may not be consecutive, depending on the availability of the drilling rig.

8.33 The Proposed Development is the subject of a temporary application, with the aim that the Application Site will be reinstated to baseline condition. If no hydrocarbons are found to be present then the baseline greenfield status is restored as part of the immediate restoration process (Phase 4a).

8.34 If hydrocarbons are found then the site is retained in part whilst an application for production is submitted, giving permanence to some aspects of the scheme. The intention is that at the cessation of any future production stages, works are reversed and the site will be fully restored to baseline greenfield status, as the minerals resource is finite in nature.

Baseline Landscape

8.35 A comprehensive study of the landscape features and character of the Application Site and immediate surrounding area has been undertaken.

Landscape Sensitivity

8.36 Sensitivity of the features and character has been assessed using the criteria set out in Appendix 8.1. This is set out in the Visual Effects Assessment Table at Figure 8.15.

Site Location and Setting

8.37 The Application Site is set on land at Wood Barn Farm to the north east of Broadford Bridge, within a rural landscape with scattered settlements and dispersed villages. The closest settlements are Wood Barn Farm and the adjacent property to the north east, Gay Street Farm to the south west, and Homefield Farm to the south east (Figure 8.1).

8.38 The Application Site is agricultural land, of a Grade 3 classification, used for pasture. The Application Site is set within a field that extends further than the site area, and is divided into two halves visually by a group of individual parkland character trees.

8.39 The north eastern section of the field abuts the road, with trees within a hedge line running along the road side and to the eastern boundary. A hedge line runs across the northern boundary with gaps at either end. Princes Wood lies to the south. A track runs north south across the field and Pocock's Wood lies to the west. The south western section of the field is bounded on the north by Pocock's Wood and the group of individual trees, Princes Wood on the east and to the south, and trees along the west and western end of the southern boundary (Figures 8.2-8.5).

8.40 The sensitivity of the land use of the Application Site is assessed as of medium importance; the agricultural nature of the land use is part of a wider extent of similar land use patterns, without designation, but characteristic of the surrounding area.

Topography

8.41 The Application Site lies at approx. 27m AOD and is very flat. The Application Site lies within a relatively low lying and level area, with landform falling very gradually to west and east. To the south land rises to a higher ridge with two higher points affording good views across the lower land to the north (Figure 8.6).

8.42 The sensitivity of the topography of the Application Site is assessed as of medium importance; the nature of the landform is part of a wider extent of similarly low-lying land, without designation, but characteristic of surrounding area.

Access and Public Rights of Way

8.43 The Application Site is not open to public access. There is a field gate from the B2133 Adversane Lane and a private farm track running from Wood Barn Farm to the Application Site across the fields to the north of the site. Whilst there is no public right

of way across the Application Site, the LVIA study area contains an extensive network of public rights of way (Figure 8.7).

8.44 The closest footpath to the Application Site *(PROW ref. 2324)* runs approx 250m to the east, on a south-west to north east direction, from Gay Street Farm to Wood Barn Farm. A second footpath *(PROW ref. 2308/2)* runs approx 350m to the south, on an east – west direction, from Broadford Bridge Farm towards Gay Street. The West Sussex Literary Trail *(PROW ref. 2344 at this point)* runs north - south approx 1.5km to the east of the Application Site. This is a long distance recreational path that runs from Horsham to Chichester.

8.45 The sensitivity of the access and public right of way in relation to the Application Site is assessed as of low importance as there are none directly running through or adjacent to the Application Site.

Vegetation

8.46 Pocock's Wood is a large woodland area to the north of the Application Site boundary. It is comprised mainly of mature oak and beech trees, with some understorey of holly, birch, hawthorn, bramble and dog rose. The wood is dense and it is only possible to see through the understorey a short distance.

8.47 Prince's Wood, to the east of the Application Site is of a similar vegetative character, but the wood is designated as ancient woodland.

8.48 To the south and west of the Application Site there is a belt of mature oak and beech trees which runs from Prince's Wood and links to Pocock's Wood. The eastern end is wider and has more understorey. This also links to a belt of trees running southwards and linking to Gatewick Copse. As the tree belt returns around the south west corner of the Application Site the understorey thins out and it is possible to see through in places.

8.49 There are some mature oak individual trees to the northeast corner of the Application Site.

8.50 The native field hedge to the north of the access track is a very intermittent and gappy, with a post and wire fence running along the length.

8.51 The agricultural land classification of the Application Site is a Grade 3 but there is no further information available to assess whether the sub category is 3a or 3b available

Arboricultural Survey

8.52 A full arboricultural assessment has been undertaken in line with BS5837: 2005. This gives advice on tree condition, root protection zones and management recommendations and is included elsewhere in the submission.

8.53 A summary of the key points is as follows:

- 10 individual trees, 1 hedge, 1 woodland and 2 shelterbelts were surveyed to BS5837:2005 recommendations.
- 5 individual trees are situated on the road frontage either side of the Application Site access point. Of these, tree 3, an oak to the immediate south of the access, is categorised as grade A condition, defined as of high quality and value. Tree 4, also an oak further south, is categorised as grade B, defined as moderate quality and value, and others are of low quality and value or recommended for removal.
- The hedge runs westwards from the Application Site access point. It is not a continuous run and requires some infilling and management to increase future quality.
- 5 individual trees are likely to be remnants of a hedgerow linked to adjacent woodland, but are now isolated individuals. Tree 6, an oak to the east of the group, is categorised as grade A condition and is defined as of high quality and value. Tree 7, also an oak further west, is categorised as grade B, defined as moderate quality and value, and others are of low quality and value or recommended for removal. The gap between tree 10 and the adjacent woodland is a potential pinch point with the combined root protection zones leaving a 10m gap.
- Pocock's Wood, surveyed as Woodland 1, has been surveyed as three sections of woodland edge. The first section, running west from the hedge, is formed of mature oaks, of varied value, with 3 categorised as grade A and 7 categorised as grade B, most with a low branching habit and much storm damage. The second section running south is a mix of ash, oak and sycamore; with the ash and sycamore of low quality and value or recommended for removal. The third section, running westwards to the north western corner of the Application Site, is formed of mature oaks, of varied value, with 2 categorised as grade A and 1 categorised as grade B, most with a low branching habit and much storm damage. The woodland has been given an overall condition of grade A, defined as of high quality and value.
- To the western boundary of the Application Site, shelterbelt 1 runs southwards and is an extension to Woodland 1. It is formed in majority of mature oaks, with

some hazel, holly and bramble understorey. The shelterbelt has been given an overall condition of grade B, defined as moderate quality and value.

- To the southern boundary of the Application Site, shelterbelt 2 runs west – east and is a narrow shelterbelt of oak trees separating fields. It is formed in majority of mature oaks, with some hawthorn understorey. The shelterbelt has been given an overall condition of grade B, defined as moderate quality and value.
- Summary recommendations include the need to for the siting of the Proposed Development to respect recommended root protection zones, to avoid crown spread zones to avoid forced pruning work if possible and for surgery to make many of the surveyed trees safe.

8.54 The sensitivity of the vegetation of the Application Site and directly bounding the site is assessed as of high importance due to the positive value of the surrounding trees and woodland, their importance on a local scale and the ancient woodland designation of Princes Wood.

Ecology

8.55 The effects of the Proposed Development on the ecology of the Application Site and surrounding area are dealt with in a separate chapter.

8.56 The Phase 1 Habitat survey results included the following:

- The Application Site is predominately improved grassland with a few scattered trees and adjacent broadleaf woodland.
- The hedgerows to the north of the access track and roadside are species poor;
- The nearest badger sett is over 200m from the Application Site
- One tree, 200m from the Application Site, had low / moderate potential for roosting bats; other adjacent trees had negligible potential;
- The surrounding hedgerow and woodlands have potential for breeding and forging birds;
- A low population of great crested newts were found within a pond 130m from the Application Site.

Statutory Designations

8.57 There are no statutory designations covering the Application Site itself.

8.58 Princes Wood is designated as ancient woodland, along with other woodlands and parts of woodland not abutting the Application Site in the study area.

8.59 There are two SNCI (Site of Nature Conservation Interest) designations within the LVIA study area; fields to the east of Solelands Farm, 2km to the south east of the Application Site and part of Rosier Wood, 2.8km to the north of the Application Site.

8.60 There are no trees covered by tree preservation orders on or adjacent to the Application Site.

Landscape Character

8.61 There are two levels of landscape character assessment that cover the site: national and county.

8.62 In the *'National Landscape Character Assessment' (2005)*, (Ref 8.9) the Application Site lies within Character Area 121: Low Weald.

8.63 In the *'West Sussex: Landscape Character Assessment' (2003)*, (Ref 8.10), the Application Site lies within Character Area LW5: Southern Low Weald.

8.64 In the Horsham District Landscape Character Assessment (2003), (Ref 8.11), the application site lies within character area J2: Billingshurst and North Heath Farmlands

8.65 The main characteristics of the local landscape character running through from national to local assessment can be summarised as:

- Land is low lying with gentle undulation
- Small scale landscape with patchwork of small to medium size fields with historic field patterns
- Mix of woodlands, copses and shaws creating a well wooded character and smei-enclosed landscape, allowing only occasional longer views
- Variable hedgerow network

8.66 The key issues relating to the change and the local landscape character can be summarised as:

- Removal of hedgerows
- Decline of individual trees in hedgerows and fields

- Lack of management of woodlands and hedgerows
- Conversion of pasture to arable use
- Effect of pylons and introduction of large farm buildings

8.67 The key opportunities identified as relating to the local landscape character can be summarised as the:

- Conservation of rural character
- Conservation and management of existing trees, woodland and hedgerows
- Strengthening of hedgerow network and respect for the existing field patterns
- Establish new planting to help mitigate visual effect

8.68 The sensitivity of the landscape character of the Application Site is assessed as of medium importance as, when its features are assessed as a whole, it is representative of the key characteristics that define the Landscape Character Area it lies within, but forms part of a wider extent of area with similar landscape character.

Historic Landscape Character

8.69 West Sussex County Council's Historic Landscape Characterisation provides information on time depth, broad character type and character type. *(Ref 8.12 Excerpt from West Sussex Historic Landscape Character; undated)*

8.70 The Application site is set within the broad character type 'fieldscape'. It is set within a small area of fields with a field pattern classified as of 'Early Post-Medieval' time depth dating from 1500-1599AD. The character type is 'assarts'; this reflects that possible previous character type of 'Ancient Semi-natural' woodland (Medieval 1066-1499AD) from which the fields were likely to have been cut.

8.71 The field patterns on the Application Site are of an early post medieval period (1500-1599). They are part of a slightly wider area of the same, but the surrounding landscape to the west and south is early medieval (410-1065). The pattern of the fields to the east is a mix of medieval (1066-1499) and late 20th century (1845-present time).

8.72 The sensitivity of the historic landscape character of the Application Site is assessed as of high importance due the significant time depth and intactness of the historic landscape character and historic field patterns that the Application Site lies within.

Visibility

8.73 A comprehensive photographic appraisal was undertaken from public footpaths and roads in the possible zone of visual influence, out to a radius of approximately 3km from the Application Site. The extent of the study area has been agreed in discussions with West Sussex County Council to be appropriate to assess the effects of the Proposed Development. The main aim of the photographic survey was to establish an understanding of the visibility of the Application Site.

8.74 The visual effects assessment survey was undertaken in autumn, with deciduous trees and shrubs losing leaves.

8.75 Figure 8.8 shows the key to viewpoint photographs. This indicates the location of viewpoint photos taken up to 3km from the Application Site. Viewpoints are colour-coded to show visibility.

8.76 Figures 8.9 - 8.12 display the photographs taken from the viewpoints shown on Figure 8.8, along with text to indicate their direction and approximate distance from the centre of Application Site and a description of the view and visibility of the Application Site.

8.77 Figure 8.13 shows the views from the boundary of the neighbouring property to the north, however it should be noted that this is not a publicly accessible viewpoint.

Viewpoint Receptors and Sensitivity

8.78 Sensitivity of receptors has been assessed using the criteria set out in Appendix 8.1. In line with guidance, where the presence of footpath users is included within representative viewpoints this has been categorised as high sensitivity. This is set out in the Visual Effects Assessment Table at Figure 8.16.

Viewpoint Categorisation

8.79 Within the zone of visual influence views of the Application Site fall broadly into 7 categories, with viewpoints being described in each category to include receptor sensitivity as assessed against criteria set out in Appendix 8.1: Landscape and Visual Impact Assessment methodology.

Close Views within 1 Km Of The Application Site From Public Rights Of Way

8.80 The land immediately surrounding the site is broadly flat, falling slightly to northeast.

8.81 Viewpoints 4, 7, 8, 9, & 10 look across open pastoral fields to the southwest and south east of the Application Site, with woodland belts to the site boundaries partially restricting the views of the Application Site, with ground plane not visible. Viewpoint 6 from the southwest is partially obscured by the immediate field boundary vegetation and also by the woodland belts to the Application Site boundary, restricting the views of the site to a partial view with ground plane not visible. From viewpoint 5 to the south the dense woodland of Gatewick Copse screens the site from view. From viewpoints 11 and 12 to the northwest the dense woodland of Pococks Wood screens the Application Site from view.

8.82 Receptor sensitivity is high from these viewpoints.

Close Views within 1 Km Of The Application Site From Roads

8.83 The land immediately surrounding the site is broadly flat, falling slightly to northeast.

8.84 Viewpoint 2 is from the north east at the field gate giving access to the Application Site; there is a clear view of the north eastern access to the Application Site and a partial view of the ground plane of the Application Site restricted by the individual trees within the site itself. From viewpoint 1 to the northeast the dense woodland of Pococks Wood screens the Application Site from view. From viewpoints 3 & 14 the dense woodland of Princes Wood screens the Application Site from view.

8.85 Receptor sensitivity is medium from these viewpoints.

Middle Distance Views from Between 1 And 2 Km from the Application Site from Public Rights Of Way

8.86 The land falls slightly to northwest and northeast and rises more steeply to the south at 2km distance. From viewpoint 15 to the south the dense vegetation of Gatewick Copse screens the Application Site from view. Viewpoint 16, from higher ground to the south, gives a wide view across the well wooded lower landscape to the north, with no view of the Application Site possible due to intervening vegetation. Viewpoint 17 looks northeast across pastoral fields with vegetated field boundaries at a similar level to the Application Site and there is no view of the Application Site due to intervening vegetation. From viewpoints 21 & 22, at a lower level than the Application Site, looking

southwest across pastoral fields there are no views of the Application Site due to intervening vegetation.

8.87 Receptor sensitivity is high from these viewpoints.

Middle Distance Views from Between 1 And 2 Km from the Application Site from Roads

8.88 The land falls slightly to northwest and northeast and rises more steeply to the south at 2km distance.

8.89 From viewpoints 13, 18, 19 & 20 to the north from lower land there are no views of the Application Site due to intervening vegetation. From viewpoint 23 to the south east the dense vegetation of Cannon Copse screens the Application Site from view.

8.90 Receptor sensitivity is medium from these viewpoints.

Long Distance Views from Between 2km and 3km from the Application Site From Public Rights Of Way

8.91 Land falls slightly to northwest and east and rises more steeply to two high points to the south.

8.92 From viewpoints 27, 28 and 29 to the northwest from lower land, and viewpoint 30 to the northeast from lower land, distance and intervening vegetation screen the Application Site from view.

8.93 Receptor sensitivity is high from these viewpoints.

Long Distance Views from Between 2km And 3km from the Application Site from Roads

8.94 Land falls slightly to northwest and east and rises more steeply to two high points to the south.

8.95 From viewpoints 24, 25 and 26 on higher ground to the south distance and intervening vegetation screen the Application Site from view. From viewpoints 31 & 32 from lower land to the east there is no view of the Application Site due to intervening vegetation. From viewpoint 33 to the southeast the dense vegetation of the intervening woodlands screens the Application Site from view.

8.96 Receptor sensitivity is medium from these viewpoints.

Views from Within 1km from Neighbouring Property to North East (Private View)

8.97 Viewpoints at same level as Application Site. Views from the property look across an open pastoral field towards the Application Site and access. Partial views of the Application Site access are possible though the intervening hedge. Views into the Application Site are partially restricted by Pocock's Wood.

8.98 Receptor sensitivity is high from these viewpoints.

Summary of Visibility

8.99 The Application Site is generally well screened by the surrounding woodlands, trees and hedgerows. This strong existing vegetation framework to the Application Site and surrounding area also serves to prevent views of the ground plane of the Application Site from the majority of viewpoints, but allows some partial views into the Application Site area. Substantial woodland blocks between the viewer and the Application Site also prevent views from some viewpoints (Figure 8.14).

8.100 In longer views from higher ground to the south of the Application Site the views look down onto and across the wide open landscape. The Application Site forms a part of this wide open landscape. The landscape beyond the Application Site further north is also visible and therefore the Application Site is seen set against the landscape beyond, rather than against the skyline. This may serve to diminish any visibility, as elements are generally more visible when seen to be cutting a skyline, than seen set against the landscape, generally due to the greater contrast against the sky.

Assessment of effects

8.101 The effects of the Proposed Development have been assessed with regard to four phases of development:

- 1. Construction of access road and well site
- 2. Mobilisation of drill rig and drilling operations
- 3a. Short term testing operations and evaluation - gas (if hydrocarbons found)
- 3b. Short term testing operations and evaluation – oil (if hydrocarbons found)
- 4a. Restoration
- 4b. Retention

8.102 In line with the methodology set out in Appendix 8.1, the assessment of each phase has looked at the sensitivity of landscape features, landscape character, historic landscape character or viewpoint categories, the magnitude of change the Proposed Development brings to each, likely significant landscape and visual effects of that change in relation to the sensitivity, the mitigation measures required to prevent, reduce or offset those effects and the likely residual landscape and visual effects after the mitigation measures have been implemented.

8.103 An assessment of the rig visibility has been undertaken and is included as Figure 8.14. The rig visibility diagram (Figure 8.14) assesses the potential visibility of the upper section of the rig from all viewpoints where there are substantial blocks of woodland in the possible line of sight to the Proposed Development. The assessment of visibility is carried out with the assumption that there are no views possible through blocks of woodland, but that the angle and elevation of the view may allow views over woodlands in some cases. The assessment does not take account of smaller or narrower shelterbelts or hedgerow trees. Therefore it is assumed that the resultant rig visibility indicated is the worst case scenario.

8.104 Descriptions of the significance of the effects, details of the proposed mitigation and the significance of the residual effects are set out in the sections below (8.103 to 8.198). These, along with the assessment of sensitivity and magnitude of change, are also tabulated in the Effects Assessment Tables (Figures 8.15 and 8.16).

Likely Significant Effects

8.105 In this section, an assessment of the landscape and visual effects of the Proposed Development without mitigation has been undertaken for the predicted effects during all phases. In later sections the mitigation proposals and residual effects of the Proposed Development after mitigation are described.

Phase 1: Construction of Access Road and Well Site

Landscape Effects

8.106 During the construction phase there will be considerable physical alteration of the Application Site. The sensitivity of landscape features and character varies, as does the magnitude of change.

8.107 With the assessed medium sensitivity, the high magnitude of change through the loss of agricultural land and soils has a major/moderate adverse effect on the land use.

8.108 The storage of soils in bunds and the creation of a ditch brings a low magnitude of change to the topography of the Application Site. With an assessed medium sensitivity, this has a moderate/minor adverse effect on topography.

8.109 The loss of some hedgeline vegetation to the site entrance, the encroachment of low bunding around the compound area on the root protection zones of 5 trees to the southern boundary and the encroachment of the access track on the root protection zones of 2 trees at the Application Site entrance will bring a low magnitude of change to the vegetation of the Application Site. With an assessed high sensitivity, this has a moderate adverse effect on vegetation.

8.110 Access, assessed as having low sensitivity, is not affected by the Proposed Development.

8.111 The introduction of elements of an industrial nature into the otherwise agricultural landscape of the surrounding area and the loss of vegetation brings a high magnitude of change to landscape character. With an assessed medium sensitivity, this has a major/moderate adverse effect on landscape character.

8.112 The loss of agricultural land with a significant time depth and historic landscape character brings a medium magnitude of change to historic landscape character. With an assessed high sensitivity, this has a major/moderate adverse effect on historic landscape character.

Visual Effects

8.113 During construction views of the Proposed Development will only be available from close viewpoints.

8.114 Where these close views are from public rights of way (PRoW), mainly to the west and south west of the Application Site, with high receptor sensitivity (viewpoints 4, 6, 7, 8, 9, and 10), the magnitude of change is medium, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site having a major/moderate adverse effect.

8.115 Where these close views are from the road to the north east of the site, with medium receptor sensitivity (viewpoint 2), the magnitude of change is medium, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound having a moderate adverse effect.

8.116 Where these close views are from the neighbouring property to the north east, with high receptor sensitivity (Figure 8.13 viewpoints), the magnitude of change is medium, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound having a major / moderate adverse effect.

8.117 Views from the other viewpoints are not affected due to lack of visibility of the Application Site and the Proposed Development.

Phase 2: Mobilisation of Drill Rig and Drilling Operations

Landscape Effects

8.118 During the mobilisation and drilling phase the effects on the landscape features of the Application site remain the same as in the previous phase.

8.119 The presence of the drill rig will introduce more elements of an industrial nature into the otherwise agricultural landscape of the surrounding area. As the magnitude of change is already assessed as high there is no change in the effect on landscape character; this remains major / moderate adverse.

Visual Effects

8.120 During this phase the presence of the drilling rig increases the height of the Proposed Development. The visibility of the rig has been assessed (see section 8.94) and the magnitude of change for all viewpoints from which the rig is visible (Figure 8.8) has increased.

8.121 Where close views are from PRoW, mainly to the west and south west of the Application Site, with clear views of the upper sections of the rig and partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site,

with high receptor sensitivity (viewpoints 4, 6, 7, 8, 9, and 10), the magnitude of change is high, having a major adverse effect.

8.122 Where close views are from PRoW to the north west of the Application Site, with clear views of the upper sections of the rig only over the top of vegetation, with high receptor sensitivity (viewpoints 11 & 12), the magnitude of change is low, having a moderate adverse effect.

8.123 Where close views are from the road to the north east of the site, with clear views of the upper sections of the rig and partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound, with medium receptor sensitivity (viewpoint 2), the magnitude of change is high, having a major/moderate adverse effect.

8.124 Where close views are from roads, from the north and south west of the site, with clear views of the upper sections of the rig only over the top of vegetation, with medium receptor sensitivity (viewpoints 1 and 14), the magnitude of change is low, having a moderate/minor adverse effect.

8.125 Where middle distance views are from PRoW to the north east and south west of the Application Site, with clear views of the upper sections of the rig only over the top of vegetation, with high receptor sensitivity (viewpoints 16, 17, 21 and 22), the magnitude of change is low, having a moderate adverse effect.

8.126 Where middle distance views are from roads to the north of the Application Site, with clear views of the upper sections of the rig only over the top of vegetation, with medium receptor sensitivity (viewpoints 13, 18, 19 and 20), the magnitude of change is low, having a moderate/minor adverse effect.

8.127 Where long distance views are from PRoW to the north east of the Application Site, with views of the upper sections of the rig only over the top of vegetation, with high receptor sensitivity (viewpoint 30), the magnitude of change is low, having a moderate adverse effect.

8.128 Where long distance views are from roads to the east and south of the Application Site, with views of the upper sections of the rig only over the top of vegetation, with medium receptor sensitivity (viewpoints 24, 25, 26, 31 and 32), the magnitude of change is low, having a moderate / minor adverse effect.

8.129 Where close views are from the neighbouring property to the north east, with clear views of the upper sections of the rig and with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound, with high receptor sensitivity (Figure 8.13 viewpoints), the magnitude of change is high, having a major adverse effect.

8.130 Where long distance views are from the Toat Monument, with views of the upper sections of the rig only over the top of vegetation, with high receptor sensitivity (viewpoint SAM1), the magnitude of change is low, having a moderate adverse effect.

8.131 Views from the other viewpoints are not affected due to lack of visibility of the Application Site and the Proposed Development.

Phase 3a: Short Term Testing Operations and Evaluation - Gas

8.132 This phase is omitted from the assessment being only a notional stage of the phasing and not manifested physically.

Phase 3b: Short Term Testing Operations and Evaluation - Oil

Landscape Effects

8.133 Effects remain the same as phase 2.

Visual Effects

8.134 Effects remain the same as phase 2.

Phase 4a: Restoration

Landscape Effects

8.135 With the assessed medium sensitivity of the land use, the low magnitude of change through the restoration of agricultural land and soils has a moderate/minor adverse effect reducing over time through the re-establishment of agricultural use to nil.

8.136 With the assessed medium sensitivity of the topography, the low magnitude of change through the removal of all bunding and restoration of all levels has a moderate/minor adverse effect reducing with the completion of the restoration to nil.

8.137 The loss of some hedgeline vegetation to the site entrance, the encroachment of low bunding around the compound area on the root protection zones of 5 trees to the southern boundary and the encroachment of the access track on the root protection zones of 2 trees at the Application Site entrance will bring a low magnitude of change to the vegetation of the Application Site. With an assessed high sensitivity, this has a moderate adverse effect on vegetation.

8.138 Access, assessed as having low sensitivity, is not affected by the Proposed Development.

8.139 The removal of all elements of an industrial nature into the otherwise agricultural landscape of the surrounding area, the removal of all bunding and restoration of existing levels and the loss of vegetation brings a low magnitude of change to landscape character. With an assessed medium sensitivity, this has a moderate/minor adverse effect on landscape character reducing over time through the re-establishment of agricultural use to nil.

8.140 The restoration of the agricultural land brings a low magnitude of change to historic landscape character. With an assessed high sensitivity, this has a moderate adverse effect on historic landscape character reducing over time through the re-establishment of agricultural use to nil.

Visual Effects

8.141 During restoration views of the Proposed Development will only be available from close viewpoints.

8.142 Where these close views are from public rights of way (PRoW), mainly to the west and south west of the Application Site, with high receptor sensitivity (viewpoints 4, 6, 7, 8, 9, and 10), the magnitude of change is medium reducing to nil, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site reducing throughout the restoration process and having a major/moderate adverse effect reducing to nil.

8.143 Where these close views are from the road to the north east of the site, with medium receptor sensitivity (viewpoint 2), the magnitude of change is medium reducing to nil, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound reducing throughout the restoration process having a moderate adverse effect reducing to nil.

8.144 Where these close views are from the neighbouring property to the north east, with high receptor sensitivity (Figure 8.13 viewpoints), the magnitude of change is medium reducing to nil, with partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound reducing throughout the restoration process having a major / moderate adverse effect reducing to nil.

8.145 Views from the other viewpoints are not affected due to lack of visibility of the Application Site and the Proposed Development.

Phase 4b: Retention

Landscape Effects

8.146 With the assessed medium sensitivity, the high magnitude of change through the loss of agricultural land and soils has a major/moderate adverse effect on the land use.

8.147 The continued storage of soils in bunds and the presence of a ditch brings a low magnitude of change to the topography of the Application Site. With an assessed medium sensitivity, this has a moderate/minor adverse effect on landscape character.

8.148 The loss of some hedgeline vegetation to the site entrance, the encroachment of low bunding around the compound area on the root protection zones of 5 trees to the southern boundary and the encroachment of the access track on the root protection zones of 2 trees at the Application Site entrance will bring a low magnitude of change to the vegetation of the Application Site. With an assessed high sensitivity, this has a moderate adverse effect on vegetation.

8.149 Access, assessed as having low sensitivity, is not affected by the Proposed Development.

8.150 The retention of changes to levels through bunding, the loss of agricultural land and loss of vegetation brings a medium magnitude of change to landscape character. With an assessed medium sensitivity, this has a moderate adverse effect on landscape character.

8.151 The loss of agricultural land with a significant time depth and historic landscape character brings a medium magnitude of change to historic landscape character. With an assessed high sensitivity, this has a major/moderate adverse effect on historic landscape character.

Visual Effects

8.152 During retention views of the Proposed Development will only be available from close viewpoints.

8.153 Where these close views are from public rights of way (PRoW), mainly to the west and south west of the Application Site, with high receptor sensitivity (viewpoints 4, 6, 7, 8, 9, and 10), the magnitude of change is low, with partial views of the compound, bunding and access track through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site having a moderate adverse effect.

8.154 Where these close views are from the road to the north east of the site, with medium receptor sensitivity (viewpoint 2), the magnitude of change is low, with partial views of the with partial views of the compound, bunding and access track through and over the intervening hedgeline and through the individual trees to the east of the proposed compound having a moderate/minor adverse effect.

8.155 Where these close views are from the neighbouring property to the north east, with high receptor sensitivity (Figure 8.13 viewpoints), the magnitude of change is low, with partial views of the compound, bunding and access track through and over the intervening hedgeline and through the individual trees to the east of the proposed compound having a moderate adverse effect.

8.156 Views from the other viewpoints are not affected due to lack of visibility of the Application Site and the Proposed Development.

Mitigation Measures

Phase 1: Construction of Access Road and Well Site

8.157 Soil stripping and storage will be carefully managed; topsoil and subsoil will be stored separately to avoid contamination, bunding will be carefully shaped to ensure soils are free draining and not compacted. The compound and access track will be carefully sited to minimise encroachment into tree root protection zones, with a no dig construction used for bitmac surfacing at the site access entrance. Tree protection fencing will be erected to protect existing trees and woodland.

8.158 Additional hedge planting and bunding along the northern side of the access track will assist in screening some lower level views of vehicular movements, reinforce the existing field pattern and provide a permanent net gain in biodiversity. Careful positioning of the Proposed Development to the west of the field reduces the extent of the site compound visible from the nearest neighbouring property.

Phase 2: Mobilisation of Drill Rig and Drilling Operations

8.159 No additional mitigation is proposed.

Phase 3a: Short Term Testing Operations and Evaluation - Gas

8.160 This phase is omitted from the assessment being only a notional stage of the phasing and not manifested physically.

Phase 3b: Short Term Testing Operations and Evaluation

8.161 No additional mitigation is proposed.

Phase 4a: Restoration

8.162 The careful reuse of the stored site soils is proposed. The establishment and growth of the hedge planting will partially screen the vehicular movements during restoration, provide a permanent net gain in biodiversity and reinforce the existing field patterns through the strengthening of the hedgerow network.

Phase 4b: Retention

8.163 The site will be restored in part with the removal of the operational elements of the Proposed Development.

8.164 The establishment and growth of the hedge planting and the retained bunding will partially screen vehicular movements during the initial stages of the phase where structures and equipment are removed from the Application Site. Hedge planting will provide a permanent net gain in biodiversity and reinforce the existing field patterns through the strengthening of the hedgerow network.

Residual Effects

Phase 1: Construction of Access Road and Well Site

Residual Landscape Effects

8.165 The loss of agricultural land and soils gives a major/moderate adverse effect on the land use which can be partly mitigated by the careful storage of the stripped soils for re-use on site, ensuring that the soil structure is not compromised. This alters the residual effect to moderate adverse.

8.166 The storage of soils in bunds and the creation of a ditch brings a low magnitude of change to the topography of the Application Site. With an assessed medium sensitivity, this gives a moderate/minor adverse effect on topography character. These effects cannot be mitigated against and the residual effect remains the same.

8.167 The loss of hedgeline vegetation to the site entrance and encroachment of Proposed Development on the root protection zone of trees gives a moderate adverse effect on vegetation, which can be mitigated through the planting of additional hedges which will serve to strengthen the existing network of vegetation and partly mitigate against the effects of lost biodiversity, the use of the no-dig construction for the site access entrance and the careful positioning of the development on the Application site to respect the majority of root protection zones, altering the residual effect to minor adverse.

8.168 Access, assessed as having low sensitivity, is not affected by the Proposed Development.

8.169 The introduction of elements of an industrial nature into the otherwise agricultural landscape of the surrounding area and the loss of vegetation has a major/moderate adverse effect on landscape character, which can be partly mitigated through the planting of additional hedges which will serve to strengthen the existing network of vegetation and mitigate against lost biodiversity, altering the residual effect to moderate adverse.

8.170 The loss of agricultural land has a major/moderate adverse effect on historic landscape landscape character, which can be partly mitigated through the setting of the Application Site within the existing field pattern and the planting of additional hedges which will serve to strengthen the existing hedgerow network, reinforcing the field patterns, altering the residual effect to moderate adverse.

Residual Visual Effects

8.171 Where the partial views of the construction traffic and built elements through and over the intervening hedgelines and shelterbelt vegetation have a major/moderate adverse effect on close views from public rights of way (PRoW), (viewpoints 4, 6, 7, 8, 9, and 10), the effects of these can be partly mitigated by the screening afforded by the bunding, altering the residual effect to moderate adverse.

8.172 Where the partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have a moderate adverse effect on close views from the road to the north east of the site, (viewpoint 2), the effects of these can be partly mitigated by the screening afforded by the bunding, altering the residual effect to moderate/minor adverse.

8.173 Where the partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have a major / moderate adverse effect on close views are from the neighbouring property to the north east (Figure 8.13 viewpoints), the effects of these can be partly mitigated by the screening afforded by the additional hedge planting and the bunding, altering the residual effect to moderate adverse.

Phase 2: Mobilisation of Drill Rig and Drilling Operations

Residual Landscape Effects

8.174 The residual landscape effects remain the same as Phase 1.

Residual Visual Effects

8.175 Where partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site have a major adverse effect close views from PRoW, mainly to the west and south west of the Application Site (viewpoints 4, 6, 7, 8, 9, and 10), the effects of these can be partly mitigated by the screening afforded by the bunding, altering the residual effect to major/moderate adverse. The effects of the views of the upper section of the rig cannot be mitigated.

8.176 Where there are clear views of the upper sections of the rig only (viewpoints 1, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 30, 31, 32, SAM1) having an adverse effect these views cannot be mitigated.

8.177 Where partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have a major/moderate adverse effect on close views from the road to the north east of the site (viewpoint 2), the effects of these can be partly mitigated by the screening afforded by the bunding, altering the residual effect to moderate adverse. The effects of the views of the upper section of the rig cannot be mitigated.

8.178 Where partial views of the construction traffic and built elements of the Proposed Development through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have a major adverse effect on close views are from the neighbouring property to the north east, (Figure 8.13 viewpoints), the effects of these can be partly mitigated by the screening afforded by the additional hedging and bunding, altering the residual effect to major / moderate adverse. The effects of the views of the upper section of the rig cannot be mitigated.

Phase 3a: Short Term Testing Operations and Evaluation

8.179 This phase is omitted from the assessment being only a notional stage of the phasing

and not manifested physically.

Phase 3b: Short Term Testing Operations and Evaluation

Residual Landscape Effects

8.180 The residual landscape effects remain the same as Phase 1.

Residual Visual Effects

8.181 The residual visual effects remain the same as Phase 1.

Phase 4a: Restoration

Residual Landscape Effects

8.182 With restoration of the agricultural land, the moderate/minor adverse effect can be partly mitigated by the careful re-use on site, ensuring that the soil structure is not compromised. This alters the residual effect to minor adverse reducing over time through the re-establishment of agricultural use to nil.

8.183 Adverse effects of the Proposed Development on topography cannot be mitigated against and therefore the residual effect on the topography of the Application Site remains moderate minor adverse reducing to nil with the completion of the restoration.

8.184 With restoration of the baseline conditions the moderate adverse effect can be partly mitigated by the removal of Proposed Development within tree root protection zones, and the planting of additional hedges. This alters the residual effect to minor adverse.

8.185 Access is not affected by the Proposed Development.

8.186 The removal of all elements of an industrial nature in the otherwise agricultural landscape of the surrounding area and the restoration of the Application Site and the additional hedge planting, serving to strengthen the existing network of vegetation and mitigate against lost biodiversity, alters the residual effect from moderate/minor adverse, to minor beneficial.

8.187 The additional hedge planting, serving to strengthen the historic field pattern and the restoration of the agricultural land alters the residual effect on historic landscape

character from moderate/minor adverse reducing to nil at the completion of restoration, to minor beneficial.

Visual Effects

8.188 Where the close views are from PRoW (viewpoints 4, 6, 7, 8, 9, and 10), there is no mitigation necessary as the major/moderate adverse effects reduce to nil through the restoration process.

8.189 Where these close views are from the road (viewpoint 2), there is no mitigation necessary as the major/moderate adverse effects reduce to nil through the restoration process.

8.190 Where these close views are from the neighbouring property to the north east (Figure 8.13 viewpoints), there is no mitigation necessary as the major/moderate adverse effects reduce to nil through the restoration process.

Phase 4b: Retention

Residual Landscape Effects

8.191 The adverse effects of the Proposed Development on land use cannot be mitigated against, therefore the effect remains major / moderate adverse.

8.192 The adverse effects of the Proposed Development on the topography through the continued storage of soils in bunds and the presence of a ditch cannot be mitigated against, therefore the effect remains moderate / minor adverse.

8.193 With the post-production restoration of the baseline conditions the moderate adverse effect can be partly mitigated by the removal of Proposed Development within tree root protection zones, and the planting of additional hedges. This alters the residual effect to moderate / minor adverse.

8.194 Access is not affected by the Proposed Development.

8.195 The removal of all elements of an industrial nature in the otherwise agricultural landscape of the surrounding area and the establishment of the additional hedge planting, serving to strengthen the existing network of vegetation and mitigate against

lost biodiversity, alters the residual effect from moderate adverse, to moderate / minor adverse.

8.196 The establishment of the additional hedge planting, serving to strengthen the historic field pattern alters the residual effect on historic landscape character from major/moderate adverse, to moderate adverse.

Residual Visual Effects

8.197 Where partial views of the compound, bunding and access track through and over the intervening hedgelines and shelterbelt vegetation surrounding the Application Site have a moderate adverse effect on close views from PRoW (viewpoints 4, 6, 7, 8, 9, and 10), the effects can be partly mitigated by the retained bunding which provides screening and the natural regeneration of vegetation on the retained bunding, softening the appearance of the bunding, altering the effect to moderate / minor adverse.

8.198 Where partial views of the compound, bunding and access track through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have a moderate/minor adverse effect on close views are from the road (viewpoint 2), the effects can be partly mitigated by the retained bunding which provides screening, and the natural regeneration of vegetation on the retained bunding, softening the appearance of the bunding, altering the effect to minor adverse.

8.199 Where partial views of the compound, bunding and access track through and over the intervening hedgeline and through the individual trees to the east of the proposed compound have moderate adverse effect on close views from the neighbouring property to the north east, (Figure 8.13 viewpoints), the effects can be partly mitigated by the retained bunding which provides screening, and the natural regeneration of vegetation on the retained bunding, softening the appearance of the bunding, altering the effect to moderate / minor adverse.

Cumulative Effects

8.200 It is not anticipated that there are any cumulative effects of the Proposed Development.

Summary

8.201 In carrying out assessments on most developments, the permanent effects of the development are usually more significant than the temporary effects during

construction. However, in the case of the Proposed Development, many of the effects are temporary. The most significant adverse landscape and visual effects are during the construction and operational phases.

8.202 Whilst the Proposed Development has adverse landscape effects, these are most significant during the construction and mobilisation and drilling phases, due to loss of the agricultural landscape affecting both land use and landscape character. The scheme also respects the existing field patterns and rather having an adverse effect on these, the field pattern will be reinforced by additional hedge planting, giving a net gain in biodiversity, mitigating the effects of the loss of vegetation at the site access and reinforcing the historic landscape character through the strengthening of the hedgerow network. The proposals also take care to respect the majority of the root protection zones of existing trees to the site boundary and within the site itself.

8.203 With the benefit of the flat and well wooded landscape there is no single clear view into the Application Site. However the Proposed Development has adverse visual effects, these are most significant during the mobilisation and drilling phase, due to the height of the rig, which cannot be mitigated. Other adverse visual effects can partly be mitigated by proposed bunding and hedge planting.

8.204 In the restoration of the Application Site to existing landscape conditions, all adverse effects are reversed, returning the Application Site to greenfield.

8.205 If retention of the Application Site is required following the finding of hydrocarbons, the removal of much of the operational structure and equipment from site reduces the significant adverse landscape and visual effects of the construction and operational phases.

8.206 If the site achieves permission and goes into production, the long term aim will be to restore the site to greenfield once production ceases, also mitigating the significant adverse landscape and visual effects of the production site.

8.207 **Table 8.1** contains a summary of the likely significant landscape and visual effects of the Proposed Development.

Table 8.1: Table of Significance – Landscape and Visual Effects

Potential Effect	Nature of Effect (Permanent/ Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/ Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/ Minor) (Beneficial/Adverse/ Negligible)
				I	UK	E	R	C	D	L	
Phase 1: Construction of access road and well site											
Loss of agricultural land	Temporary	Major/moderate adverse	Careful storage of soils						✓		Moderate adverse
Changes to topography	Temporary	Moderate/minor adverse	-						✓		Moderate/minor adverse
Some encroachment on tree root protection zones; loss of vegetation at access	Permanent / Temporary	Moderate adverse	Additional planting; use of no dig construction at access						✓		Minor adverse
Change in landscape character	Temporary	Major/moderate adverse	Strengthening of hedgerow network						✓		Moderate adverse
Change to historic landscape character	Temporary	Major/moderate adverse	Strengthening of field patterns through strengthening of hedgerow network						✓		Moderate adverse
Site visibility	Temporary	Ranges from major/moderate adverse to moderate adverse (some viewpoints nil)	Additional hedge planting and bunding to screen							✓	Ranges from moderate adverse to moderate/minor adverse
Phase 2: Mobilisation of drill rig and drilling operations											
Loss of agricultural land	Temporary	Major/moderate adverse	Careful storage of soils						✓		Moderate adverse
Changes to topography	Temporary	Moderate/minor adverse	-						✓		Moderate/minor adverse

Some encroachment on tree root protection zones; loss of vegetation at access	Permanent / Temporary	Moderate adverse	Additional planting; use of no dig construction at access						✓		Minor adverse
Change in landscape character	Temporary	Major / moderate adverse	Strengthening of hedgerow network						✓		Moderate adverse
Change to historic landscape character	Temporary	Major /moderate adverse	Strengthening of field patterns through strengthening of hedgerow network						✓		Moderate adverse
Site visibility	Temporary	Ranges from major adverse to moderate/minor adverse (some viewpoints nil)	Additional hedge planting and bunding to screen							✓	Ranges from major/moderate adverse to moderate/minor adverse
Phase 3a/b: Short term testing operations and evaluation											
Loss of agricultural land	Temporary	Major/moderate adverse	Careful storage of soils						✓		Moderate adverse
Changes to topography	Temporary	Moderate/minor adverse	-						✓		Moderate/minor adverse
Some encroachment on tree root protection zones; loss of vegetation at access	Permanent / Temporary	Moderate adverse	Additional planting; use of no dig construction at access						✓		Minor adverse
Change in landscape character	Temporary	Major / moderate adverse	Strengthening of hedgerow network						✓		Moderate adverse
Change to historic landscape character	Temporary	Major /moderate adverse	Strengthening of field patterns through strengthening of hedgerow network						✓		Moderate adverse

Site visibility	Temporary	Ranges from major adverse to moderate/minor adverse (some viewpoints nil)	Additional hedge planting and bunding to screen							✓	Ranges from major/moderate adverse to moderate/minor adverse
Phase 4a: Restoration											
Restoration of agricultural land	Temporary	Moderate/minor adverse reducing to nil	Careful re-use of soils						✓		Minor adverse reducing to nil
Restoration of topography	Temporary	Moderate/minor adverse reducing to nil	-						✓		Moderate / minor adverse reducing to nil
Some encroachment on tree root protection zones; loss of vegetation at access	Permanent / Temporary	Moderate adverse	Additional hedge planting; use and removal of no-dig construction for access						✓		Minor adverse
Change in landscape character	Temporary	Moderate/minor adverse reducing to nil	Strengthening of hedgerow network adversity of effect						✓		Minor beneficial
Change to historic landscape character	Temporary	Moderate adverse reducing to nil	Strengthening of field patterns through strengthening of hedgerow network						✓		Minor beneficial
Site visibility	Temporary	Ranges from: Major/moderate and moderate adverse; reducing to nil (some viewpoints nil)	Additional hedge planting							✓	Nil
Phase 4b: Retention											
Loss of agricultural land	Permanent	Major/moderate adverse	-						✓		Major/moderate adverse
Changes to topography	Permanent	Moderate/minor adverse	-						✓		Moderate/minor adverse

Some encroachment on tree root protection zones; loss of vegetation at access	Permanent	Moderate adverse	Establishment of additional hedge planting						✓		Moderate/minor adverse
Change in landscape character	Permanent	Moderate adverse	Establishment of additional hedge planting: strengthening of hedgerow network						✓		Moderate/minor adverse
Change to historic landscape character	Permanent	Major / moderate adverse	Establishment of additional hedge planting: strengthening of field patterns through strengthening of hedgerow network								Moderate/minor adverse
Site visibility	Permanent	Ranges from moderate adverse to moderate/minor adverse (some viewpoints nil)	Additional hedge planting and retention of bunding							✓	Ranges from moderate/minor adverse to minor adverse
*** Geographical Level of Importance** I = International; UK = United Kingdom; E = England; R = Regional; C = County; D = District; L = Local											

References (Ref)

8.1 National Planning Policy Framework (2012)

8.2 Technical Guidance to the National Planning Policy Framework (2012)

8.3 The South East Plan (adopted May 2009)

8.4 Horsham District Council (2007) 'Core Strategy'

8.5 Horsham District Council (2007) 'General Development Control Policies'

8.6 West Sussex County Council (2003) 'Minerals Local Plan'

8.7 West Sussex County Council (2005) 'A Strategy for the West Sussex Landscape'

8.8 Landscape Institute and the Institute of Environmental Management and Assessment (2002) 'Guidelines for Landscape and Visual Impact Assessment', Spon Press

8.9 Natural England (2005) 'National Landscape Character Assessment'

8.10 West Sussex County Council (2003) 'West Sussex: Landscape Character Assessment'

8.11 Horsham District Council (2003) 'Landscape Character Assessment'

8.12 West Sussex County Council (undated) 'Excerpt from West Sussex Historic Landscape Character'