

Non-Technical Summary

JUNE 2016

(A4SMR-SEAG-Z-DEV-205-SRP-302)



CONTENTS

INTRODUCTION	1
THE APPLICANTS	2
NEED FOR THE PROJECT	2
PROJECT DESCRIPTION	3
Programme of Works	7
EIA PROCESS	8
Consultation	9
Impact Identification and Evaluation	10
PLANNING POLICY CONTEXT	12
LANDSCAPE AND VISUAL IMPACT	13
CULTURAL HERITAGE	14
ECOLOGY AND NATURE CONSERVATION	15
GEOLOGY AND SOILS	17
HYDROLOGY AND HYDROGEOLOGY	19
TRAFFIC AND ACCESS	20
NOISE	21
AIR QUALITY	22
SOCIO-ECONOMICS, LAND USE AND RECREATION	23
CONCLUSION	25
FURTHER INFORMATION	26

INTRODUCTION

This document provides a Non-Technical Summary (NTS) of the Revised Environmental Statement (ES) produced as part of the application process for the renewal of the Planning Permission in Principle (PPP) for the Seagreen Phase 1 Onshore Transmission Works (hereafter referred to as the Project).

The Project comprises all the onshore infrastructure necessary to export the electricity generated by the Seagreen Alpha and Seagreen Bravo offshore wind farms with a generating capacity of up to 525MW each, (the Seagreen Phase 1 Offshore Project). The Project is an integral part of the overall development in enabling the transmission of the electricity generated by the offshore wind farms.

The Project extends from Mean Low Water Springs (MLWS) to a connection point with the National Electrical Transmission Grid System (the Grid) at the existing substation at Tealing in Angus. The Project, including the proposed route of the export cables and location of the proposed substation is shown on NTS Figure 1.

The Revised ES reports the findings of the Environmental Impact Assessment (EIA) which has been carried out to assess the impacts of the Project on the environment.

The EIA for the Seagreen Phase 1 Offshore Project was reported within a separate ES which accompanied the Section 36 and marine licence applications submitted to Marine Scotland Licensing Operations Team (MS-LOT) in October 2012. Consents for the construction and operation of the Seagreen Phase 1 Offshore Project were issued by Marine Scotland Licensing Operations Team (MS-LOT) on 10 October 2014. Each offshore wind farm (OWF) will accommodate up to 75 wind turbine generators with the capacity to generate up to 525 Megawatts (MW) of power. The consents include offshore platforms, array cables, meteorological masts and wave buoys, high voltage export cable(s) and cable landfall at Carnoustie.

This Revised ES has been prepared in support of an application for Planning Permission in Principle for approval for the principle of development. The Applicants previously submitted an application for PPP to Angus Council in May 2013 (Planning Ref. 13/00496/PPPM), for the Project, which was granted in December 2013. A further application for PPP was submitted to Angus Council in July 2014 (Application Ref. 14/00918/PPPN) for amendment of a small section of the approved cable route in the vicinity of Balhungie Farm, to the north of the A930. The amendment to the PPP was granted in February 2015.



*Rock armour coastal protection at the Carnoustie landfall
Photo © Cathie Associates*

In January 2015, the Royal Society for the Protection of Birds (RSPB) raised a Judicial Review challenging the offshore consents awarded to Seagreen Alpha and Seagreen Bravo, Inch Cape (Repsol) and Neart Na Gaoithe (Mainstream) Windfarms in the Firth of Forth and Firth of Tay region. Delays that have resulted from the legal challenge to the offshore consents have resulted in a requirement for Seagreen to renew the onshore PPP works granted by Angus Council as this is due to expire on 4th December 2016. This Revised ES will accompany the new application.

The Project seeking consent is a combination of the original and amended PPP applications. Given the amendment to the cable route at Balhungie Farm, a section of the original cable route is no longer required and, as such, this section of the Project, as consented by the original PPP, is not included in the new application. Prior to the works commencing Approval of Matters Specified in Conditions (AMSC) will still need to be obtained. These approvals will contain the detail on the final design of the substation and the number of cables to be installed.

The PPP application will be made to Angus Council under the Town and Country Planning (Scotland) Act 1997 (as amended). This Revised ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, more commonly referred to as the EIA Regulations.

The Planning Permission in Principle application is for National development (as defined in the National Planning Framework for Scotland ("NPF3", June 2014)). The necessary statutory pre-application consultation has been undertaken.

THE APPLICANTS

Seagreen Wind Energy Limited (Seagreen) is the parent company of Seagreen Alpha Wind Energy Limited (SAWEL) and Seagreen Bravo Wind Energy Limited (SBWEL). The Planning Permission in Principle application will be jointly submitted by SAWEL and SBWEL.

Seagreen is a joint venture between SSE Renewables Developments UK Limited (SSER) and Fluor Limited. Seagreen combines the established and extensive track record of renewable energy development, asset management and operations experience of one of the UK's leading energy companies, with the offshore project delivery expertise of one of the world's largest publicly owned contracting, engineering, procurement, construction and maintenance services companies.

NEED FOR THE PROJECT

The central aim of the UK Government energy policy is to establish a portfolio of energy supplies that is diverse, sustainable and secure and is offered at competitive prices. Underpinning this policy goal is a commitment to reduction of carbon dioxide (CO₂) emissions by 60% by 2050. The development of renewable energy plays a fundamental role in UK Government strategy for delivering reduced emissions. This is reflected in the UK government target that 20% of the UK's electricity supply should come from renewable sources by 2020.

The Scottish Government has gone much further than any other European Union country in support of renewable energy and has committed to generating an equivalent of 100% of electricity demand from renewable sources by 2020. Furthermore, the Scottish Government has made legally binding commitments through the Climate Change (Scotland) Act 2009, which sets a greenhouse gas emissions target, for a reduction of 80% from 1990 levels by the year 2050, in line with the UK Climate Change Act 2008.

The Seagreen Phase 1 Offshore Project is the first phase in the development of the Firth of Forth Round 3 Zone 2. At over 1 Gigawatt (GW) target capacity, it is one of the largest renewable energy projects in Scotland and will produce enough clean, renewable energy to meet the equivalent of the annual energy consumption of up to 670,000 homes¹.

1 This figure is based on an annual average consumption of 4,700 kilowatt hours (kWh) (DECC Annual Digest of United Kingdom Energy Statics (DUKES), 2011).

The Seagreen Phase 1 Offshore Project, and the planned development of a further 2.5GW of capacity in subsequent development phases within the Zone, will contribute significantly to the Scottish Government's aim of cutting greenhouse gas emissions by 80% and achieving the equivalent of 100% of electricity demand from renewable sources by 2020.

The Seagreen Phase 1 Offshore Project will also contribute as part of a wider economic aim to secure investment and opportunities for renewables and to make a significant contribution to the national economy. It will offset high-carbon means of generation, with a knock-on effect in reducing the growth in carbon emissions, and the consequent climatic effects of a greater proportion of atmospheric carbon. In addition, the generated power will contribute to national goals such as energy supply security for the UK.

One of the 14 identified national developments in the NPF3 is enhanced high voltage energy transmission network to facilitate renewables electricity development and its associated export; of particular consideration are onshore links to support offshore renewable energy development. The development of offshore electricity generation is intrinsically linked to the development of the required onshore high voltage electricity transmission network, which when combined forms a vital element in Scotland's framework for meeting national targets for renewable electricity generation, statutory climate change targets and securing of energy supplies. The Project, which forms the subject of this Revised ES, is one such onshore project and forms a vital part in the feasibility of the overall Seagreen Development.

The Project comprises all of the onshore infrastructure necessary to export the electricity generated by the Seagreen Alpha and Seagreen Bravo offshore wind farms (the Seagreen Phase 1 Offshore Project), with a generating capacity of up to 1050MW, to the Grid. The Project is integral to the Seagreen Phase 1 Offshore Project in enabling the transmission and subsequent use of the electricity generated by the offshore wind farms. As such the need for the Project must properly be seen in the context of the need for the Seagreen Alpha and Seagreen Bravo offshore wind farms.

PROJECT DESCRIPTION

The design of the Project has been progressed to the point where a landfall location, onshore cable route, approximate cable route access points, and the substation location and footprint are all known. In addition, much of the proposed approach to construction is also known. For some elements of the onshore transmission works, several options remain under consideration and further engineering studies will be needed to reach a final detailed design.

The Project will comprise the following main components:

- A buried shore end export cable which will run from the MLWS mark to the transition joint bays at the landfall point south of Carnoustie (this is a continuation of the offshore export cable);
- Up to four transition joint bay(s) located a short distance inland of the intertidal zone where the shore end export cables are jointed to the onshore export cables;
- Approximately 19km of underground export cables to Tealing Substation;
- Up to 50 joint bay locations with a maximum of 200 joint bays to enclose and protect the joints between the lengths of cable along the onshore cable route; and
- A new High Voltage Direct Current (HVDC) or High Voltage Alternating Current (HVAC) substation, located immediately east of the existing Tealing Substation.

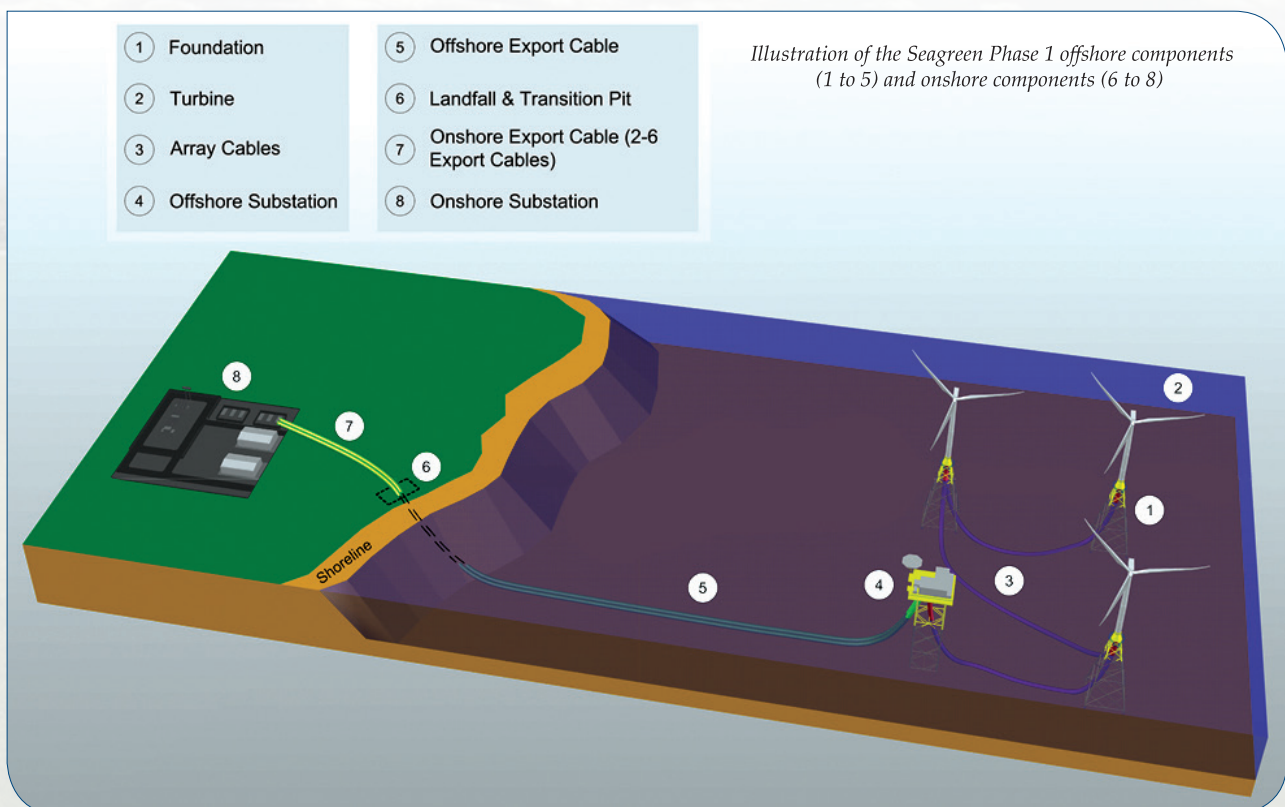
The Project will also include associated ancillary works including permanent components, such as road access, sewerage and site drainage, services (water, gas and electricity supply) and landscaping or planting, as well as temporary works, such as construction compounds for storage and accommodation, horizontal directional drilling working areas and temporary access tracks.

Two Export Transmission System technologies are being considered, HVDC or HVAC. The size and nature of the Seagreen Alpha and Seagreen Bravo offshore wind farms means that either approach to transmission of the electrical power generated could be used. Seagreen has included both options within the Project design to ensure it has the necessary flexibility to use the best and most appropriate technology that is available at the time of construction.

The HVAC option will require an onshore substation to convert the power generated by the offshore wind farms to the appropriate voltage to feed into the Grid. HVAC is the more conventional and proven technology, currently used by most national scale electricity transmission grids, including all UK offshore wind farms currently operating. However, HVAC can have limited efficiency over long subsea or underground distances where buried cables are required. HVAC potentially results in a limited power capacity per cable and in grid compatibility issues, which may make the system technically unattractive or require additional mitigating electrical equipment at the onshore substation.

A typical HVDC system suitable for use offshore requires two converter substations. Power from the wind turbines is converted to HVDC for transmission and the onshore substation at the grid connection point converts the HVDC power back into HVAC so it is compatible for input to the Grid. HVDC systems are capable of large amounts of power transfer over long distances where buried cables must be used, as in the case of the Project.

Modern HVDC technology is developing rapidly, however the supply chain in Europe is currently limited, with associated potential cost and timetable risks to the Project. The Applicants are continuing to monitor development in this technology to assess its applicability to the Export Transmission System while retaining HVAC technology as a design option.



Four scenarios are being considered for the Export Transmission System. These are:

- Scenario 1 Single circuit HVDC, 1050 MW (operating at up to $\pm 320\text{kV}$);
- Scenario 2 Double circuit HVDC, 2 x 525MW (operating at up to $\pm 300\text{kV}$);
- Scenario 3 Four circuit 220kV HVAC; and
- Scenario 4 Double circuit 275kV HVAC.

Ongoing studies will identify which of these two options is the preferred design for the Export Transmission System. The final decision will influence specific aspects of the Project such as the design of the onshore substation, the number of cables and the extent of onshore installation works. The decision on technologies and scenarios will be taken before applications for Approval of Matters Specified in Conditions are submitted.

This ES has adopted the established principle of the Rochdale Envelope for assessment of the Project. This entails a worst case or maximum parameters approach. Thus the ES describes the assessment of the impacts of the Project based on worst case design parameters. The final design of the scheme must accord with or sit within these assessed parameters. A summary of the worst case design parameters is presented in Table 1.

Table 1. Worst case EIA parameters for the Onshore Transmission Works Project

Project Element	Assessment Parameters	Notes/Assumptions
Shore End Export Cables (between MLWS and seaward limit of installation beneath coastal defence)		
Maximum number of export cables	6 export cables (plus 2 fibre optic cables)	Scenario 4: Double circuit 275kV HVAC
Installed condition	Directly buried	All scenarios
Installation method	Plough, jetting, or backhoe excavator	All scenarios
Maximum number of trenches	6 (1 per export cable)	Scenario 4: Double circuit 275kV HVAC
Maximum intertidal trench dimensions	3.0m width x 3.0m depth Up to 200m length (from MLWS to HDD cable duct)	Cables are laid in trenches from MLWS to the exit point of the HDD duct
Access to the intertidal area	Access via existing route or directly over coastal defence	All scenarios
Shore End Export Cables (installation beneath the existing coastal defence)		
Maximum number of cables	6 export cables (plus 2 fibre optic cables)	Scenario 4: Double circuit 275kV HVAC
Installed condition	In ducts	All scenarios
Number of cable ducts	6	Scenario 4: Double circuit 275kV HVAC
Duct/cable protection properties.	400mm diameter MDPE/PVC ducts	Scenario 3: Four circuit 220kV HVAC
Burial method beneath coastal defences	Horizontal Directional Drilling (HDD)	All scenarios
HDD working area	Up to 15000m ² (2500m ² per drilling operation)	Scenario 4: Double circuit 275kV HVAC
Landfall construction compound and access	Maximum compound area 6650m ² Access to intertidal area via existing route or directly over coastal defence Access to construction compound via existing route	All scenarios

Project Element	Assessment Parameters	Notes/Assumptions
Transition Joint Bays – Transition between Shore End Export Cables and Onshore Export Cables		
Number of transition joint bays	4	Scenario 3: Four circuit 220kV HVAC
Transition joint bay dimensions	12m length x 6m width x 2.25m depth (per bay)	Scenario 3: Four circuit 220kV HVAC
Above ground equipment properties	Manhole covers may be present on the surface at each transition joint bay location	Scenario 3: Four circuit 220kV HVAC Scenario 4: Double circuit 275kV HVAC
Onshore Export Cables		
Maximum number of cables	12 export cables plus 4 fibre optic cables	Scenario 3: Four circuit 220kV HVAC
Maximum number of cable bundles	4 (3 export cables plus 1 fibre optic cable per bundle)	Scenario 3: Four circuit 220kV HVAC
Maximum number of cable trenches	2	Scenario 3: Four circuit 220kV HVAC Scenario 4: Double circuit 275kV HVAC
Maximum volume of excavated material along whole cable route	342,000m ³	Scenario 3: Four circuit 220kV HVAC
Maximum cable trench construction width	30m	Scenarios 3 and 4: Four circuit 220kV HVAC or Double circuit 275kV HVAC
Maximum length of cable route	19km	All scenarios
Maximum construction compound area extent	Main compound 15,000m ² 2 x Satellite compounds, 6,300m ² per compound	All scenarios
Cable Joint Bays		
Maximum number of joint bays at each joint location	4	Scenario 3: Four circuit 220kV HVAC
Maximum number of joint bay locations	Up to 50	All scenarios
Maximum joint bay dimensions	10m length x 3m width x 2m depth	All scenarios
Above ground equipment properties	Manhole covers may be present on the surface at each joint bay location	Scenario 3: Four circuit 220kV HVAC Scenario 4: Double circuit 275kV HVAC
Substation		
Maximum substation footprint	122,200m ²	All Scenarios
Main building dimensions	One building 110m length x 110m width x 20m height or Two buildings 80m length x 60m width x 20m height	Scenario 1: Single circuit 105075MW HVDC Scenario 2: Double circuit 52550MW HVDC
Piling requirements	Driven/hammered piles will be used if required	All scenarios
Maximum operational noise emissions	95dB	Outdoor cooling fans for both HVDC solutions
Maximum construction compound, laydown area extent	Construction compound area 22,500m ² including laydown	All scenarios

To minimise impacts and disruption Seagreen intends to use HDD to bring the power cables ashore beneath the coastal defence. Cable ducts will be installed from the landward side to an exit point seaward of the coastal defence, within the lower intertidal zone between the toe of the coastal defence and MLWS.



*Transition joint bay and cable trench
Photo © GGOWL*

Between the transition joint bays and the substation, the majority of the buried cable will be installed by cutting open trenches in agricultural land. The trench will then be back filled once cable installation is complete. In special circumstances, such as road crossings or water course crossings other installation techniques will be used as required such as HDD. These include where the cable route crosses the East Coast Main Line railway, the A90 and A92 trunk roads. HDD will also be used to avoid disruption to access roads on the MoD land at Barry Buddon. This will also avoid direct impacts to the Barry Links SAC/SSSI site where the proposed cable route passes beneath the site for a small distance.

Up to five temporary construction compounds will be required during the construction phase of the Project. A number of access points have been identified along the route and where required the surface of the access track will be upgraded. Access to the beach for cable installation works in the intertidal area may be achieved via the existing access point or by temporary local access directly over the coastal defence from Carnoustie.

Programme of Works

The key programme elements for construction of the Project are summarised in Table 2 below. The indicative programme given is based on achieving PPP for the Project in 2016 and on achieving approval of matters specified by condition in 2020. The durations given in Table 2 are conservative and the works duration may be shorter.

Table 2. Indicative Construction Programme based on achieving consent in Q4 2016

Programme Stage	Start	Finish
Financial close		Q1 2020
Installation of offshore export cables	Q1 2022	Q1 2023
Tendering and award of onshore construction contracts	Q4 2018	Q4 2020
Shore end installation and transition joint bay construction		Q4 2022
Onshore cable installation	Q4 2020	Q2 2022
Substation construction	Q4 2020	Q2 2022
Onshore Transmission Works commissioning	Q3 2022	Q4 2023
Offshore wind farms installation	Q3 2021	Q3 2023
Commissioning of OWFs and handover to operator(s)	Q2 2022	Q3 2024
Seagreen Phase 1 completion		Q4 2024

Construction for the Onshore Transmission Works is phased over 2020 to 2022. It is in Seagreen's interest to plan and implement an efficient and effective construction programme. Construction activities will take place within the periods below but are not expected to take the full duration shown against each activity.

The HDD, transition joint bay and cable pulling works at landfall are expected to take up to 90 days in total, based on 7 day, 24 hour working, but the activities may be phased. The maximum duration of installation works to lay the onshore cable will be up to 100 weeks, based on 6 days per week and 12 hours working per day. The estimated duration of works to build the new substation at Tealing is up to 100 weeks, 6 days per week and 12 hours working per day. Seagreen will work with landowners and others to minimise the impact of construction works and avoid, so far as practicable, undertaking work during more sensitive periods. All works are expected to be completed by the end of 2022.

EIA PROCESS

The requirements for EIA are set out in European Council Directive 2011/92/EU. The Directive is transposed into law in Scotland through a number of different Regulations. The relevant Regulations for the Project are the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.

Environmental assessments have been carried out to identify impacts arising from the Project and assessing these to determine if they are significant in the context of the EIA Regulations. The EIA process helps inform the Project design, including the inclusion of measures to mitigate impacts. Additional mitigation is proposed where appropriate to further reduce impacts. The Revised ES submitted with the application included a review of the Original ES to consider any updates required due to changes in the intervening period.

In accordance with the EIA Regulations, the assessment has also considered cumulative impacts. These are the impacts that result from the impacts of the Project cumulatively with other reasonably foreseeable developments. Following consultation with Angus Council, it was confirmed that since the Original PPP Application, which assessed the cumulative impact of a proposed wind turbine development at Tealing Airfield, several more developments have been either proposed or constructed within the vicinity of the Project. Those which are now constructed form part of the baseline environment.

The Scottish Government advises that where planning permission has been granted for another development then the cumulative effects of such a development should be taken into account. In relation to the Seagreen application, there is an unusual situation in that the planning permission for the Tealing Solar Park (reference: 14/00428/FULM) overlaps with the existing Seagreen permission. The extent of the overlap is so considerable (approximately 66% of the red line area of the solar park is within the red line area of the Seagreen permission) that there is no realistic prospect of the both schemes being constructed as it would be a physical impossibility. In practice, either the Seagreen scheme will be constructed or the Tealing Solar Park will be constructed. If the Seagreen scheme is constructed then the Tealing Solar Park as consented will not be constructed. Alternatively, a fundamental revision to the solar park scheme would be required, whose details are unknown. Accordingly, it is not appropriate or required that a cumulative assessment of the Tealing Solar Park be carried out as there is no sensible way of conducting a meaningful assessment.

Whilst no cumulative effects would occur as a result of the aforementioned developments, Angus Council (November, 2015) specifically requested the Revised ES includes a cumulative landscape and visual impact assessment which considers the following developments:

- Tealing Solar Park (planning reference: 14/00428/FULM); and
- Solar Park northeast of Tealing (planning reference: 15/00331/FULL).

Chapter 7 of this Revised ES subsequently includes a cumulative assessment which considers the aforementioned developments at the request of Angus Council, despite there being no realistic prospect of both schemes being consented. As this has not been requested by Angus Council or any statutory consultee for other technical areas, the cumulative effects from Tealing Solar Park or the Solar Park northeast of Tealing have not been considered elsewhere within the Revised ES.

Consultation

The scope of the Original ES was agreed with the Council through a formal scoping request which was made under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. The resultant scoping opinion confirmed the basis for the environmental impact assessment with some additional considerations included. Further discussions were held with the Council and Statutory Consultees regarding the scope of the update to the EIA process. The Revised ES submitted with this Application has updated the environmental considerations identified by the Council as relevant to the original application. Key consultees were re-consulted in 2015 with regards to the scope proposed to update the Original ES and these are summarised within each individual technical chapters of this Revised ES. The technical assessments have been updated and impacts are assessed in terms of the maximum impact that the Project may have. The maximum impacts of the Project are unchanged from the original ES.

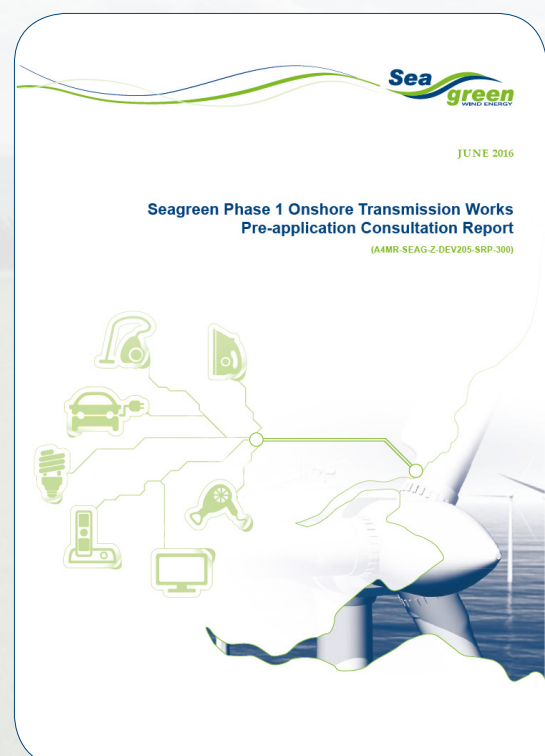
The Applicants have sought views and opinions from the local community through the provision and receipt of information via www.seagreenwindenergy.com (the Applicants' website) attendance at a Community Council meeting in Tealing and through public exhibitions at which the local community were given the opportunity to comment on the Project.

The exhibitions were publicised using letters sent directly to properties neighbouring the proposed cable route and in the wider area around the proposed substation site, posters sent to Community Councils and libraries for display and distribution, letters of invitation, advertisements in the local press and on the Applicants' website.

The public exhibitions took place on the following dates and times:

- Wednesday 11th May 2016 3pm – 7pm Carnoustie Leisure Centre, DD7 7JB
- Thursday 12th May 2016 3pm – 7pm Tealing Hall, Inveraldie, DD4 0QW

The exhibition material included background information on the applicants and the Seagreen Phase 1 Offshore Wind Farms together with detailed information of the onshore grid connection and export cable corridor, including the proposed amendment to the approved route of the cable corridor in the vicinity of Balhungie Farm. The details of the public consultation undertaken by Seagreen is separately described in a Pre-Application Consultation (PAC) Report submitted with the application.



Impact Identification and Evaluation

The identification and evaluation of impacts was carried out using a number of methods and techniques. This included literature review, collation of new and existing data, data analysis, consultation, reference to relevant guidance and standards, as well as first hand experience of similar developments. The Revised ES evaluates potential changes to the existing environment, both positive and negative, as a result of activities associated with construction, operation and decommissioning of the Project.

Impacts were evaluated with reference to definitive standards, accepted criteria, technical guidance or legislation where these are available, for each technical study. Where it was not possible to quantify impacts, and where a qualitative or semi-qualitative assessment was made, the assessment is set out in a logical way so that the science based or evidence based reasoning is explained.

Following the assessment of impacts using the significance criteria the impacts are classified by significance; as major, moderate, minor, or negligible. Impacts are also described according to whether they are considered to be adverse (negative) or beneficial (positive). Specific significance criteria were developed to describe the impacts, and of these criteria, the sensitivity of the receptor and the magnitude of the impact are the most important measures. The definition of sensitivity and magnitude varies depending upon the parameter under question, and therefore these are defined in detail within each relevant section of the Revised ES technical chapters.

Within the impact assessment the receptor's sensitivity is identified, from negligible to high. The sensitivity of a receptor refers to its importance and/or its value. This can be determined in a number of ways, but generally relates to its capacity for accommodating and/or recovering from a change in baseline conditions. Table 3 provides an example framework for defining sensitivity.

Table 3. Example of terms relating to the sensitivity and value of generic receptors

Sensitivity	Definition
High	Nationally important / rare with limited potential for offsetting / compensation. Feature or receptor has very limited capacity to accommodate the proposed form of change.
Medium	Regionally important / rare with limited potential for offsetting / compensation. Feature or receptor has limited capacity to accommodate the proposed form of change.
Low	Locally important / rare. Feature or receptor has some tolerance to accommodate the proposed change.
Negligible	Not considered to be particularly important / rare. Feature or receptor is generally tolerant and can accommodate the proposed change.

The impact assessment also defines the magnitude of the effect, from negligible to high. Table 4 provides an example framework for how magnitude is defined in this ES.

Following the identification of receptor value and sensitivity and the magnitude of the impact, the significance of the impact is calculated. An example impact assessment matrix is presented in Table 5.

The significance of the impact(s) identified are then defined according to the terminology in Table 5. This methodology provides a consistent framework for considering and evaluating impacts.

Major and moderate impacts are considered to be 'significant' for the purposes of the EIA Regulations unless this is otherwise stated in the specific methodology outlined within the ES technical chapters. The maximum impacts of the Project are unchanged from the original ES.

Table 4. Example of terms relating to the magnitude of an impact

Sensitivity	Definition
High	Fundamental, permanent / irreversible changes, over the whole feature or asset, and/or fundamental alteration to key characteristics or features of the particular environmental asset's character or distinctiveness. Impact certain or likely to occur.
Medium	Considerable, permanent / irreversible changes, over the majority of the feature or asset, and/or discernible alteration to key characteristics or features of the particular environmental aspect's character or distinctiveness. Impact certain or likely to occur.
Low	Discernible, temporary (throughout project duration) change, over a minority of the feature or asset, and/or limited but discernible alteration to key characteristics or features of the particular environmental aspect's character or distinctiveness. Impact will possibly occur.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the feature or asset, and/or slight alteration to key characteristics or features of the particular environmental aspect's character or distinctiveness. Impact unlikely or rarely to occur.

Table 5. Significance of an impact resulting from each combination of receptor sensitivity and the magnitude of the effect upon it

Value / Sensitivity	Magnitude			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

SITE SELECTION AND ALTERNATIVES

This EIA has considered the use of alternative sites and alternative designs. Alternatives have been evaluated on the basis of technical, engineering and environmental constraints identified during the design and EIA process. The site selection process was undertaken to establish the landfall point for the offshore export cable route and the most suitable route for the export cables from landfall to the grid connection point at Tealing. National Grid Electricity Transmission (NGET) selected the existing 275kV substation at Tealing as the most suitable connection point. Land immediately adjacent to Tealing substation was selected for the proposed substation.

Landfall options were considered on environmental merit, distance from substation, proximity to centres of population and technical feasibility. Five landfall options were assessed which resulted in land to the west of Carnoustie being chosen as the preferred option.

The terrestrial cable route links the landfall point at Carnoustie to the proposed new substation at Tealing. The cable route was identified and designed by taking into consideration technical, physical, social and environmental constraints. The cable route is currently indicative within the Application Site; the exact route will be determined (within the Application Site) following detailed feasibility assessment at the detailed design stage.

Given the additional consent of the alternative cable route at Balhungie Farm in 2015 a section of the original cable route is no longer required. The current cable route shown on Figure 3.2 of the Revised ES therefore includes the diversion at Balhungie Farm and omits the relevant original section. Other than the incorporation of the route amendment at Balhungie Farm the cable route is as originally consented.

PLANNING POLICY CONTEXT

Scottish land based planning policy at Scottish Government level which are relevant to the Project are contained in:

- Scotland's National Planning Framework 2 (NPF2) (June 2009); and
- Scottish Planning Policy (SPP) (June 2014).

NPF3 identifies fourteen national developments that are needed to help to deliver the spatial strategy. The Project falls within the categories of National Development at Section 4: High Voltage Electricity Transmission Networks. Such developments are described as "vital in meeting national targets for electricity generation, statutory climate change targets, and security of energy supplies. The need for the proposed onshore transmission works needed to connect Seagreen Offshore Phase 1 Project is established by NPF3.

SPP sets out the Scottish Government's overall policy for land use planning. SPP acknowledges that the Scottish Government's commitment to increasing the amount of electricity generated from renewable sources is a vital part of the response to climate change.

The planning application and ES will be submitted to Angus Council. The Statutory Development Plan for this area comprises:

- TAYPlan (approved June 2012); and
- Angus Council Local Plan (adopted February 2009) (the Local Plan).

Material considerations include the Proposed Angus Local Development Plan (ALDP), the National Planning Framework for Scotland ("NPF3", June 2014) and Scottish Planning Policy ("SPP"), (June 2014).

The principle of the development of the Project has already been considered and found acceptable having regard to the development plan in the previous planning permission and its amendment. The Project has not significantly altered since those determinations.

The TAYPlan sets out the overarching strategy for development in Dundee, Angus, Perth and North Fife areas. Importantly, the TAYPlan gives general support to renewable energy infrastructure through promoting opportunities for the sensitive development of renewable energy.

The Local Plan details site specific policies and requirements to be applied by Angus Council when making decisions on planning applications. It offers broad support to renewable energy developments based on the appropriate mitigation of environmental variables.

A separate planning statement has been provided with the Planning Permission in Principle application which provides an analysis of the Project against the relevant planning policies, including the new material consideration of the Proposed ALDP.

LANDSCAPE AND VISUAL IMPACT

The purpose of the Landscape and Visual Impact assessment (LVIA) is to identify the impacts that the Project may have on the landscape and visual resource of the study areas, and assess which (if any) of these impacts are likely to be significant. The assessment covers impacts on landscape character and impacts on visual amenity of key visual receptors and an assessment of impacts on eight representative viewpoints.

The assessment methodology for the Revised ES has been updated to reflect new guidance i.e. Landscape Institute and the Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment, 3rd Edition and Scottish Natural Heritage (2014) Visual Representation of Wind Farms Version 2.1. The cumulative landscape and visual baseline has been updated and the viewpoint photography taken again to reflect changes to the visual baseline since 2013. The Study Area has also been adjusted to include the Ballhungle Farm amendment to the cable route although this has not resulted in the need to assess additional landscape or visual receptors.

This assessment considers effects arising during the construction, operational and decommissioning phases of the Project. During operation impacts will primarily relate to the substation as all other elements will be below ground. For the construction/decommissioning phases impacts arising from works associated with construction/removal of cable and substation infrastructure are assessed.

The onshore export cable, cable joint bays, transition joint bays and shore end cable will be buried to minimise long term potential landscape and visual impacts. This will result in temporary disruption to the landscape along the route during the construction phase, however impacts would be sequential and would occur in a linear form within the landscape. As such, the Project would only potentially affect a narrow corridor over the 19km route at any one time.

The proposed substation has been designed to minimise impacts on landscape and visual amenity. Mitigation planting has been designed into the scheme and the details of this will be finalised during the detailed design stage and agreed with Angus Council. The substation is located adjacent to the existing Tealing substation and will be visible as an extension to it.

The assessment has considered the impacts of both the HVDC and HVAC substation scenarios and has focused on the impacts of the HVDC substation as this would be the worst-case in terms of landscape and visual impacts. The height and massing of the buildings and equipment of the HVDC substation is greater than the components of the HVAC substation.

A desk study was undertaken in order to identify landscape and visual receptors within the study area that could potentially be affected by the Project. This was followed up with site visits to inform a list of key visual receptor locations. Site visits were undertaken on several dates in 2011, 2013 and 2016 in Summer and Winter.

No landscape designations have been identified within the study area. The study area includes three landscape character types Type 14: Coast (14A: Coast with Sand), Type 13: (Dipslope Farmland) and Type 8: Igneous Hills.

The assessment of impacts on visual receptors covers a number of settlements. Dundee being the major population centre to the south of the study area, key villages and hamlets including Tealing, Kirkton of Tealing, Inveraldie, Newbigging and Bridgefoot. Smaller groups of houses close to the site of the proposed substation are also included in the assessment. Key routes are included within the assessment; the A90, A928, minor roads including the B960 and local unclassified roads including Tealing, Strathmartine and Emmock Road.

Relevant visitor attractions and recreational receptors are also considered in the assessment, these include Carnoustie Golf Links, Clatto and Camperdown Country Parks and the Sidlaw Hills. Eight representative viewpoints throughout the study area have also been assessed.

The assessment has found that short term and temporary significant impacts on both landscape character and visual amenity are anticipated during the construction phase as a result of the onshore cable works. Impacts on both landscape and visual receptors will reduce from year 1 of operation. The assessment also concludes that the proposed substation will have short term and localised significant impacts on landscape character, and visual amenity during the construction phase.

Once operational no significant effects are predicted on landscape character or visual receptors as a result of the onshore export cable, cable joint bays and shore end cable.

Significant effects have been identified as a result of the substation. The assessment has concluded that the proposed substation will have a significant impact on landscape character within and immediately around the proposed site, reducing with distance from the site, with a negligible and not significant impact on the character within the wider landscape. The selected location adjacent to the existing substation will allow it to be viewed as part of the larger substation development rather than an isolated development in the landscape.

Impacts on landscape character of both the HVDC and HVAC substations would not differ greatly. The visual impacts of the HVDC substation are, however, slightly greater due to the larger convertor buildings when compared to the HVAC substation.

No significant impacts have been identified on any receptors resulting from the decommissioning phase relating to the substation or cable works.

The existing Tealing substation, which is a similar development to the proposed substation, and the operational Tealing Airfield Wind Turbine have been considered as part of the cumulative baseline scenario against which the proposed substation has been assessed.

Two ground mounted solar photovoltaic (PV) arrays for which valid planning applications have been submitted have been considered as part of the cumulative LVIA in the Revised ES, as requested by Angus Council. It is considered that cumulative impacts resulting from the addition of the substation, Tealing Solar Park and the solar PV development to the northeast of Tealing will be no greater than impacts of the substation alone. This is due primarily to the low height of the solar arrays, the screening effects of intervening vegetation and the modified context of the landscape at and immediately adjacent the substation site.

CULTURAL HERITAGE

An assessment was undertaken to understand potential impacts of the Project on the archaeology and cultural heritage resource. The assessment, comprising desk-based study and targeted survey, has been undertaken to identify cultural heritage assets that may be directly affected by construction or indirectly affected by the operation of the Project. The Revised ES includes updates to datasets which resulted in eight Scheduled Monuments, four Listed Buildings, and six local sites being added to the baseline data. The assessment has been updated to include consideration of these aforementioned heritage assets.

There are numerous recorded assets within the cable corridor reflecting the fact that the general area has seen activity throughout history. The geology and agricultural regime within the cable corridor is conducive to the formation of cropmarks, facilitating the identification of later prehistoric assets that

would otherwise be unrecorded. There is an appreciable concentration of recorded archaeological assets particularly on the eastern side of the study area and near the coast, and the potential for unrecorded archaeology to be present within the corridor is considered high, albeit likely to be of no more than local importance. Elsewhere along the cable corridor, and at the substation site, this potential is considered moderate.

None of the archaeological assets identified as being directly affected by the Project are of national importance or designated and it is unlikely that any unrecorded assets of national importance are present. Consequently, avoidance/relocation where possible, fencing off known coastal anti-tank blocks and preservation by record for other resources is an appropriate mitigation strategy. Following implementation of this mitigation strategy all residual construction impacts will not be significant in terms of EIA Regulations; the physical loss of subsurface features being offset by the realisation of their value as sources of data.

As the above ground element of the Project, the operation of the substation has been assessed for its potential to affect the setting of cultural heritage assets. Due to existing infrastructure at Tealing Substation and the new substation's location in a hollow combined with planted visual screening; no significant indirect impacts have been identified.

ECOLOGY AND NATURE CONSERVATION

An assessment of the impacts upon ecology and ornithology has been carried out in accordance with the guidance set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2016). Data from a series of field surveys, consultations and desk based literature was used to generate the ecological and ornithological baseline and assess the impacts of the Project on the ecological interests of the area.

The Ecology surveys for habitats and protected species were originally undertaken from 2010 to 2012 and ornithological surveys were originally carried out in 2011 and 2012. The resulting data was used to inform the Original ES but was not considered sufficiently current to inform the Revised ES. Therefore, this assessment is based on updated baseline data collected during 2015–2016 surveys; specifically, an Extended Phase 1 Habitat survey and overwintering and breeding bird surveys.

12 statutory designated sites were identified within 5km of the Application Site; including the Firth of Tay and Eden Estuary Special Protection Area (SPA), Ramsar and Special Area of Conservation (SAC), Barry Links SAC and SSSI, seven SSSI's, one NNR and two Local Nature Reserves. A small section of the Application Site overlaps with Barry Links SAC and SSSI which is designated for notable coastal habitats, bryophytes and invertebrates. The Firth of Tay and Eden Estuary SPA, SAC and Ramsar is also located approximately 95m from the Application Site and is designated for estuarine habitats, common seal and notable assemblages of breeding and non-breeding birds. A Habitat Regulations Appraisal (HRA) Screening Report has been prepared and submitted as part of the supporting information with the Application in accordance with the relevant regulations.

The HRA Screening Report identifies that there will be no direct physical disturbance to the Barry Links SAC due to the proposed use of HDD and existing access tracks which do not require to be upgraded. No likely significant effects are anticipated on any of the designated features of Barry Links SAC.

No likely significant effects are predicted on any of the designated features of the Firth of Tay and Eden Estuary SAC. The conditions at the landfall are not suitable for breeding seals. The preferred

installation approach being to install ducts from the landward side of the sea defences using HDD and then trenching from the HDD exit point across the lower intertidal zone. There are also no likely significant effects predicted on the designated features of the Firth of Tay and Eden Estuary SPA/ Ramsar Site. Although no works are proposed within the boundary of either the SPA or the Ramsar Site, potential short-term disturbance effects on any birds recorded from onshore vantage point locations were considered, including birds beyond MLWS.

Habitats within the Application Site are dominated by arable land with occasional fields of grassland, the majority of which are improved or semi-improved neutral grasslands. Fields are generally enclosed by hedgerows (sometimes with occasional trees), tree shelter belts, or stone dykes. Areas of woodland are present and scattered across the survey area, with the largest corridor associated with the dismantled railway crossing the study area from north-west to south east.



*Rough grassland with scattered trees, Carnoustie Golf Course
Photo © Royal Haskoning*

Coastal margins are characterised by sand dune habitat, including grey dunes, yellow dunes and dune slacks. Blown sand has also led to the creation of small areas of acid grassland, marshy grassland and heath matrices. The intertidal area at the proposed landfall location is generally species-poor, with the communities on the rock revetment being most diverse. The sandy beach itself is typical of that exposed to high currents and wave action, with mobile sediments (almost devoid of benthic fauna) present in the upper and middle shore.

Field surveys to inform the Original ES recorded the presence of otter within the Application Site and a 250m buffer including a run along a drainage ditch near Barry Camp, a slide and sprainting site along Tealing Burn, a couch and slide at a drainage ditch near Barry Sands, two sprainting sites on Buddon Burn and otter prints were also recorded along Pitairlie Burn. Several signs of otter were also recorded during the update survey to inform the Revised ES; with a resting site, print and spraint recorded on Buddon Burn, a spraint recorded on Tealing Burn and numerous spraints recorded on Murroes Burn. No confirmed holts were recorded within the Application Site.



*Otter habitat, Buddon Burn
Photo © Royal Haskoning*

Surveys did not record any evidence of water vole and it is considered likely that the species is absent from the Application Site.

A number of features were identified as having potential to support roosting bats including mature trees and buildings; and a badger survey identified three sets within close proximity of the Application Site. No evidence of any other protected species such as red squirrel, great crested newt or reptiles was recorded during the field surveys and the nearest areas of woodland to the application site which may provide suitable habitat for red squirrels is located at least 100m away.

A total of 21 species of conservation concern were recorded during the 2015 breeding bird surveys BBS, but no SPA or Ramsar qualifying Species were recorded.

During the 2015-2016 overwintering bird surveys at the proposed cable route landfall area, a total of 34 species of conservation concern were recorded of which 16 were SPA or Ramsar qualifying species.

Potential impacts on habitats and species found to be present within the Application Site principally include habitat loss, mortality, displacement and disturbance and pollution. These impacts were minimised during the design process, by locating the Application Site to avoid the most sensitive habitat features. Taking into account these design measures, together with a suite of embedded and additional mitigation measures, the impacts of the Project on ecological and ornithological receptors have been assessed as not significant.

Overall, potential impacts of the Project on the ecological and ornithological interests of the area are assessed as being not significant in the Revised ES.

GEOLOGY AND SOILS

An assessment of the potential direct and indirect impacts of the Project, including the construction and operation and decommissioning phases, on geology and soils has been carried out in order to identify areas of potential contamination and assets that may be affected by the Project. A desk-based study of geological, soils and land use data was carried out over a study area of 1km corridor along the cable route and 1km around the substation in order to establish the current baseline condition and inform the assessment.

For the Revised ES datasets that were consulted as part of the baseline data collection for the Original ES were reviewed and updated and Angus Council were consulted to ensure data on contaminated land was up to date, including the revised cable route area at Balhungie. Since the submission of the Original ES, the value of land as an agricultural resource in Scotland is now indicated by its Land Capability for Agriculture in Scotland (LCAS) and the Revised ES reflects the change in datasets and provides a reassessment of land classification.

The geology of the study area consists of beach and intertidal deposits (blown sand) along the current coastline; raised marine deposits of sand, gravel, silt and clay extending approximately 1km inland and parallel with the coast; and glacial till deposits of brown sandy clay further inland interspersed with sporadic glacial meltwater deposits of sand and gravel. The underlying bedrock is predominantly formations of the Lower Devonian (Lower Old Red Sandstone). There are areas where bedrock is marked at or near the surface and is subject to quarrying (e.g. Ardownie Quarry, Ethiebeaton Quarrie, Kingennie Quarry, Downie Mill Quarry).

Barry Links located immediately adjacent to the landfall area of the Application Site has been designated as a SSSI and SAC, one of the qualifying features being Coastland: Sand dunes. No other geological designations or Regionally Important Geological Sites (RIGS) have been noted within the environs of the Application Site.

The predominant soil type of the study area is brown forest soils; some with gleying. The sensitivity of the soils based on the physical characteristics is assessed as medium to high due to the vegetation that they are capable of and are supporting.

In addition potential areas of contamination were identified within the study area. Historic land uses for potential contamination include smithies, disused works, disused petrol stations and garages, historic airfields, disused railways and rail embankments, and miscellaneous sites. Current areas of potential contamination include farms, military land, waste management sites, water treatment works, quarries and infilled ground, a council depot and Tealing substation.

The main impacts of the scheme on the geology and soils would occur during the construction phase. The construction methodology for the cable route ensures that direct impacts on soil resulting from excavation will be limited spatially to the export cable route corridor and temporally to a one off process of excavation, storage and replacement. Additionally, the cable route siting has been designed to avoid where possible, known areas of potential concern and to minimise excavation of potentially contaminated material by maintaining a 25m buffer.



*Open farmland and minor road crossing in the eastern part of the cable route
Photo © Xero Energy*

The substation is located within an area of potential concern in terms of land contamination (as identified by Angus Council) due to its historic use as a World War II airfield (c. 1942-1945), farming activities at the Muir of Pert Farm and Muir of Pert Poultry Houses, and as an existing substation with associated electrical transformers. Prior to construction, land quality data will be collected via an intrusive investigation to establish the contamination status of the site. This will allow any remediation measures to protect controlled waters and / or construction workers health to be undertaken if required.

Impact on land quality during operation is limited to any excavation or re-excavation work undertaken and therefore the impacts are substantially reduced. The impacts are at most minor to negligible and are not significant in EIA terms.

With regards to the cable route, there are no perceived impacts to geology and soils during the decommissioning phase of the work as under current guidelines the cables will be left in situ. The decommissioning of the substation may result in spillages and leakages of potentially contaminative substances; however, adoption of mitigation measures and a Site Waste Management Plan (or equivalent requirements at the time of decommissioning) will ensure that options for waste reduction, reuse and recycling will be maximised. All waste materials will be handled in accordance with legislation current at the time of decommissioning.

No residual impacts deemed significant in terms of the EIA Regulations relating to geology and soils have been predicted to occur as a result of the installation of the cable route and substation. The cable route siting has been designed where possible to avoid known areas of potential concern to minimise excavation of potentially contaminated material. The route has also been designed to follow field boundaries or access tracks/roadways as much as possible to minimise damage to the main soil resource used by agriculture.

HYDROLOGY AND HYDROGEOLOGY

An assessment was undertaken to understand the potential impacts of the Project on the hydrological and hydrogeological resource which includes hydrological catchments, surface hydrology, hydrogeology, flooding, Groundwater Dependent Terrestrial Ecosystems (GWDTEs), public and private water supplies. The hydrology assessment comprises the results of a baseline desk-based assessment and walkover survey including hydrochemical testing. Additionally, preliminary and specific Flood Risk Assessments (FRA) were undertaken with appropriate modelling. For the Revised ES the datasets that were consulted as part of the baseline data collection were reviewed and updated where necessary.

There are no designated sites of hydrological or hydrogeological relevance within the Application Site boundary. The Application Site crosses the surface water catchments of the Barry Burn, Buddon Burn, Monifieth Burn and Dighty Water. Key concerns for surface water quality and drainage patterns are the locations where export cable watercourse crossings are necessary. Each of these locations has been visited and where appropriate alternative locations have been identified to minimise environmental impacts.

Private water supplies of concern identified at Denfind, Blawearie, Pitkerro House, Wellbank and Balkemback Farm. Of these supplies, only the Pitkerro House supply is located downhill/downstream of the Application Site and was considered in the impact assessment.

A preliminary flood risk assessment (FRA) was carried out to assess the potential for more extensive flooding in the locale of Barry and the lower Barry Burn catchment close to the landfall location, plus in the Tealing area (Fithie Burn). The preliminary report identified that onshore infrastructure that was vulnerable to flooding should be sited outwith flood zones (this included assets such as construction compounds) and recommended further studies to focus on improving the understanding of flooding issues in the area of the proposed substation at Tealing. Further assessment and modelling as part of a specific FRA focussed on the area around the existing Tealing substation and the adjacent proposed substation site led to consideration of various flood mitigation options and associated impacts, which were discussed with stakeholders in order to develop the criteria for appropriate flood resilience measures which could be employed at the substation.

Potential impacts on hydrology and hydrogeology found to be present within the Application Site principally include contamination via pollutants and sediment, modifications to surface water drainage patterns; or modifications to groundwater flows or levels.

These impacts were minimised during the design process, by locating the Application Site to avoid the most sensitive hydrological features. Where HDD is required a ground investigation will be required to ensure ground conditions are confirmed as suitable. If bentonite (as a drilling lubricant) or grout is required during construction, good practice storage, use (to minimise the risk of break-out) and collection methods will be documented and communicated.



Tealing Burn at NO 41143725, looking downstream to south

Flood resilience measures for up to 1:1,000 year flow events and good practice drainage measures will be implemented at the proposed substation involving a combination of deflecting flows locally around the substation via preferred flow routes, raised plinths for specific items of electrical equipment and ensuring new site access routes are flood resilient. These are designed to minimise any influence on surface runoff patterns and also reduce impact of flood events upon the substation or neighbouring properties. These measures have been carefully considered to avoid increasing the flood risk to the existing substation or nearby properties and will ensure that all of the essential infrastructure forming part of the substation site will be capable of remaining operational during extreme flood events.

Taking into account these design measures, together with a suite of embedded and additional mitigation management measures, the impacts of the Project on hydrological and hydrogeological receptors have been assessed as not significant.

TRAFFIC AND ACCESS

A transport assessment was undertaken in respect of the Project. The approach for the assessment followed relevant guidelines for traffic assessment and followed Institute of Environmental Assessment (IEA) Guidelines (1993) in relation to the assessment of environmental impacts associated with increased traffic. The Original ES assumptions and detail relating to: study area extent, study area characteristics, scope of assessment, construction methodology and traffic volumes generated as a consequence of the Project remain valid to the Revised ES. The Baseline Environment section has been updated to consider, where applicable, the most up to date traffic flow data and accident records available.

Due to the time lapse since the traffic surveys were undertaken for the Original ES it was agreed with consultees to update traffic survey data in order to inform the Revised ES. Traffic survey data was therefore collected/collated in 2016 based on a combination of data sources including permanent Automatic Traffic Counters (ATC) managed by Angus Council and Transport Scotland and commissioned traffic surveys. The location and scope of traffic survey data collection was agreed with Angus Council and Transport Scotland and is consistent with the parameters of the Original ES.



*Minor road crossing at the proposed main construction compound location
Photo © Xero Energy*

The assessment covered the potential environmental impacts of increased road traffic expected as a result of the construction, operation and decommissioning of the Project. These impacts included accidents and safety, driver delay, fear and intimidation, pedestrian/cycle amenity and severance.

The extent of the Project results in a considerable study area for the assessment of traffic and associated environmental impacts. The identified study area contains the A90 trunk road as well as the A92, A930, B978, B961 and B962 local roads. All roads are single carriageway links with the exception of the A90 and A92 routes which are dual carriageway in the vicinity of the Project.

The assessment identified a detailed breakdown of traffic movements associated with the construction stage of the Project. These movements were distributed between the Shore End Cable and Transition Works, the Onshore Export Cable Route and Jointing Works and the Substation Works.

The traffic calculations indicate that the Project will generate an average of 170 two-way daily movements during the construction stage of which 85 movements would be by Heavy Goods Vehicles. The effect of construction traffic on the assessed road network shows the majority of the links have impacts of negligible or minor significance. Four links are indicated to receive impacts of moderate or major significance, however professional judgement indicates the impacts are not significant in term of the environmental regulations, but are due to the low volume of traffic and in particular HGV traffic present in the base flows.

Although no significant adverse impacts have been identified, a Traffic Management Plan is proposed by way of mitigation to minimise the impact of construction traffic on existing road users. HDD would also be used to install the export cables beneath the A90 (T), A92 and East Coast Mainline in order to minimise disruption to existing road and rail users.

Overall during construction, impacts are temporary and with the implementation of mitigation measures such as an appropriate Traffic Management Plan and suitable liaison with the Police and Local Highway Authorities prior to and during the construction phase residual impacts are assessed as minor/negligible and not significant in terms of the EIA Regulations.

Once the Project is operational, there would be no significant impacts on the surrounding road network from additional traffic. No significant impacts are anticipated for the decommissioning phase of the Project.

NOISE

An assessment of the noise and vibration impact of the Project was undertaken in accordance with British Standards (BS) and other relevant guidance. The assessment considers potential noise and vibration impacts from construction activities relating to cable installation and substation construction, which includes on-site construction and on-road movement of construction traffic. An assessment of operational noise from the substation was also undertaken.

A baseline noise survey was undertaken in 2011 to quantify existing background noise levels within the study area. Unattended monitoring was carried out at the three closest receptors to the substation site, to establish baseline noise conditions during daytime and night-time periods. Noise measurements were also taken at locations surrounding the proposed route for the installation of export cables. The approach to collating baseline data for the noise assessment contained in Revised ES was agreed during consultation with Angus Council in November 2015.

Revised noise criteria have been considered in the assessment as requested by Angus Council. The threshold of significance for most daytime (08:00-16:00) working is 75 decibels (dB(A)). In the case of Murroes School. A reduced daytime noise limit of 65dB(a) has been agreed. The revised noise criterion for night-time HDD works at the landfall has increased by 5dB to 55dB. However, no properties have been identified within the 50dB (322m) initial buffer for night-time HDD works. No noise sensitive receptors were identified within sufficient proximity of landfall construction and no significant impacts were predicted from these activities within the Revised ES. The noise limits set out in the assessment can be secured by condition.

The cable installation works could result in noise levels at potentially significant levels at some receptors for a temporary period. Mitigation measures, such as ensuring adequate separation distances between construction work and the closest houses will be employed, with the aim of reducing these impacts to a non-significant level. Where such separation is not practicable, adopting of a best practice working method will reduce the perceived noise impact from construction works.

Operational noise limits for the substation have been derived from criteria agreed with the Council and can be served by condition. Noise will be taken into consideration during the detailed design process, and, provided that the substation is designed to meet the criteria, the impacts of the Project are considered to be not significant in terms of noise.

AIR QUALITY

An assessment of the Project's potential impacts upon local air quality was undertaken in accordance with the Institute of Air Quality Management (IAQM) guidance and the Highways Agency's Design Manual for Roads and Bridges (DMRB) guidance. The assessment considers potential emissions of fugitive dust during construction activities and the impacts of vehicle exhaust emissions associated with all phases of the Project.

For the Revised ES the methodology for undertaking the assessment has not changed from the Original ES but the inclusion of the Balhungie Farm amendment to the cable route within the study area has resulted in the inclusion of additional receptors in the assessment. The Baseline Environment section has been revised and updated to reflect the 2016 baseline conditions and the Impact Assessment section has been revised to consider the revisions to the baseline and receptors. Updated traffic baseline information was also utilised to inform the assessment of pollutant emissions from construction traffic.

A baseline review of the existing air quality conditions in the vicinity of application site demonstrated that there was no recorded exceedance of the NO₂ air quality objective in 2013. Exceedances of the Air Quality Standard objectives for NO₂ and PM10 are not predicted in the area of the Project, with mapped background concentrations of NO₂ and PM10 well below the respective air quality objectives within the proposed years of construction. The most likely sources of dust emissions from the Project are expected to relate to the excavation of trenches and associated earthworks for the installation of export cables and the construction of the substation. With the implementation of appropriate dust control measures throughout the construction phase, the potential air quality impact is predicted to be slight adverse and not significant for the installation of export cables and negligible and not significant for the construction of the Substation and shore end works.

The air quality assessment has indicated that construction phase traffic emissions are predicted to have a negligible and not significant impact on sensitive receptors.

It is anticipated that the installation of export cables, substation construction and HDD works will result in changes in traffic volume and composition on haul roads used by construction vehicles. The assessment of traffic emissions considered the section of the road network most likely to experience the highest increase in traffic volume as a consequence of the Project.

The changes in pollutant concentration of NO₂ and PM10 have been compared to the relevant significance criteria. The results from the DMRB screening assessment indicate that construction traffic exhaust emissions from the Project would have a negligible impact with respect to local air quality. Concentrations of the two pollutants are predicted to be below the respective annual mean Objectives.

Engine exhaust emissions from off-road vehicles, known as Non-road Mobile Machinery (NRMM), have the potential to affect local air quality. The main pollutants of concern from these emissions are those relating to fuel combustion such as NO₂, PM10, carbon monoxide (CO), and sulphur dioxide (SO₂).

Emissions from NRMM to be utilised during construction are predicted to have a slight adverse and not significant impact on air quality. However, successful implementation of robust management and control measures will reduce the local air quality impact associated with NRMM to negligible and not significant.

SOCIO-ECONOMICS, LAND USE AND RECREATION

An assessment was undertaken of the potential impacts on socio-economic, tourism and recreational and land use (including agriculture and impacts on existing utilities) receptors. The receptors were identified through consultation with local authorities and other interest groups, consulting publicly available data sources including survey results and mapping resources, and local knowledge of the area.

For the Original ES a comprehensive baseline data set was established from the aforementioned data sources. The datasets that were consulted as part of the baseline data collection were reviewed and updated where necessary and the Baseline Environment section has been updated including the population and economic activity statistics for the local area surrounding the Project. The inclusion of the Balhungie Farm amendment has slightly altered the Study Area for land use resulting in identification of one additional tourism and recreation receptor (the Barry Downs Mobile Park) approximately 300 metres (m) south of the Balhungie Farm amendment. The Impact Assessment section has been updated to reflect the identification of the additional receptors and minor changes to land use.

The assessment in the Revised ES considered the potential impacts on the receptors through the construction, operational and decommissioning phases of the Project.

The key socio-economic receptors are employment and expenditure. The assessment concluded that during the construction phase the Project has the potential to generate a significant beneficial impact in terms of local employment. Further positive impacts were identified during the construction, operational and decommissioning for local expenditure and local employment.

The Project will require temporary landtake at the location of the transition and cable joint bays and along the route of the onshore export cable. Land will be required temporarily for construction of the haul route, excavation of the trench, cable installation and reinstatement of the ground. Additional areas of land will be required temporarily for the access routes and the site compounds. The phased nature of the works should ensure that disruption to land is short term. Once installed, all land will be returned to its former use.

Approximately 11.8 hectares (ha) of Class 1 agricultural land may be disturbed temporarily as a result of the excavation of cable trenches. Approximately 271 ha of Class 3 agricultural land and 36 ha of Class 4 agricultural land will be temporarily unavailable as a result of the excavation of cable trenches and the substation.

Except for the land required for construction of the substation the land would be returned to its former use following construction and it is considered in the Revised ES that short term impacts on agricultural land use are not significant in terms of the EIA regulations. To minimise impacts on land use throughout the cable route, a Construction Environmental Management Plan (CEMP) will be produced. Biosecurity will be a key consideration during the construction of the cable route given the movement of vehicles between different farms. In order to prevent the spread of diseases and invasive plant species, good practice measures will be implemented and specific details on biosecurity measures will be included in the CEMP.

A number of tourism and recreational receptors were identified with regard to the Project. These include the Carnoustie Golf Links, Carnoustie Shore (Barry Sands), Panmure and Monifieth Golf Clubs, Barry Mill and Barry Downs Mobile Park. Carnoustie Golf Links is considered to be the most high profile and therefore sensitive tourist and recreational receptor as it includes an attraction for visitors on a national and international scale. The Carnoustie Golf Links comprises 3 courses, The Championship Course, The Burnside Course and The Buddon Course. The Carnoustie Golf Links will host The Senior Open Championship in July 2016 and The Open Championship golf tournament in 2018.



*Carnoustie Golf Course
Photo © Shutterstock*

The assessment in the Revised ES did not identify any significant impacts on tourism and recreational receptors, including walking and cycling routes, as a result of the Project following the application of mitigation measures including the use of an Access Management Plan to detail proposals for the management of public access on core paths, rights of way, Carnoustie Beach/Seafront and Barry Links during construction works.

With regard to Carnoustie Golf Links, the Championship Course will not be affected by the Project which will only have a temporary impact on the Buddon Course. In addition, construction works will be scheduled in winter to minimise disturbance and will be undertaken so play can be maintained throughout. The Applicants will continue to liaise with the operators of the golf course prior to and throughout the construction phase. With regard to land use and utilities, no significant impacts have been identified after the application of mitigation. Potential was identified for impacts on utilities, however at the detailed design stage when the route of the cable is finalised, the Applicants will identify appropriate technical solutions in relation to all the utility crossings and interactions.

It is relevant to note that securing the wider positive socio-economic benefit of the Seagreen Offshore Phase 1 Project is reliant on the successful development of the Project. The development of Seagreen Offshore Phase 1 Project would contribute towards the development of the renewable energy industry and the cost of construction for the offshore element is likely to be in the region of £3.15 Billion with over £75 million per year operational expenditure over the 25 year life of the offshore developments, providing up to 200 jobs. This represents significant socio-economic benefits.

CONCLUSION

The Project is an integral part of the development of the Firth of Forth Round 3 Zone by Seagreen and will make a significant contribution to national targets for renewable energy. The Project will make a significant positive contribution to the local economy. The Project has been designed to minimise environmental impacts, and includes mitigation measures to further reduce adverse impacts. The vast majority of the assessed impacts of the Project will be not significant in EIA terms.

It is predicted that there will be potentially significant impacts on landscape and visual receptors during the construction phase. However, these impacts will be temporary in duration and will be fully reversible upon completion of the construction phase. Longer term impacts on landscape and visual receptors during the operational phase, are limited to specific receptors and are associated with the substation element of the Project, reducing with distance from the substation, with a negligible and not significant impact on the character within the wider landscape.

Overall, given the successful implementation of the stated mitigation measures committed to by Seagreen, combined with ongoing dialogue with interested stakeholders and the regulatory authorities, it is predicted that the Project will not have any long term impacts that are unacceptable. The precautionary nature of the assessment approach, which is based on worst case scenarios also means that any impacts are, in reality, likely to be less than predicted.

FURTHER INFORMATION

Copies of the Environmental Statement may be obtained from Seagreen (+44 (0) 141 224 7192 or info@seagreenwindenergy.com) at a charge of £350 per hard copy and £10 for a copy on DVD. Copies of this short non-technical summary are available free of charge.

Any representations to the application should be made by email to: Angus Council, Communities Directorate, Planning and Place, County Buildings, Market Street, Forfar, DD8 3LG, identifying the proposal and specifying the grounds for representation.

This ES can be viewed during the statutory consultation period at the following locations:

**SEAGREEN WIND
ENERGY LIMITED**

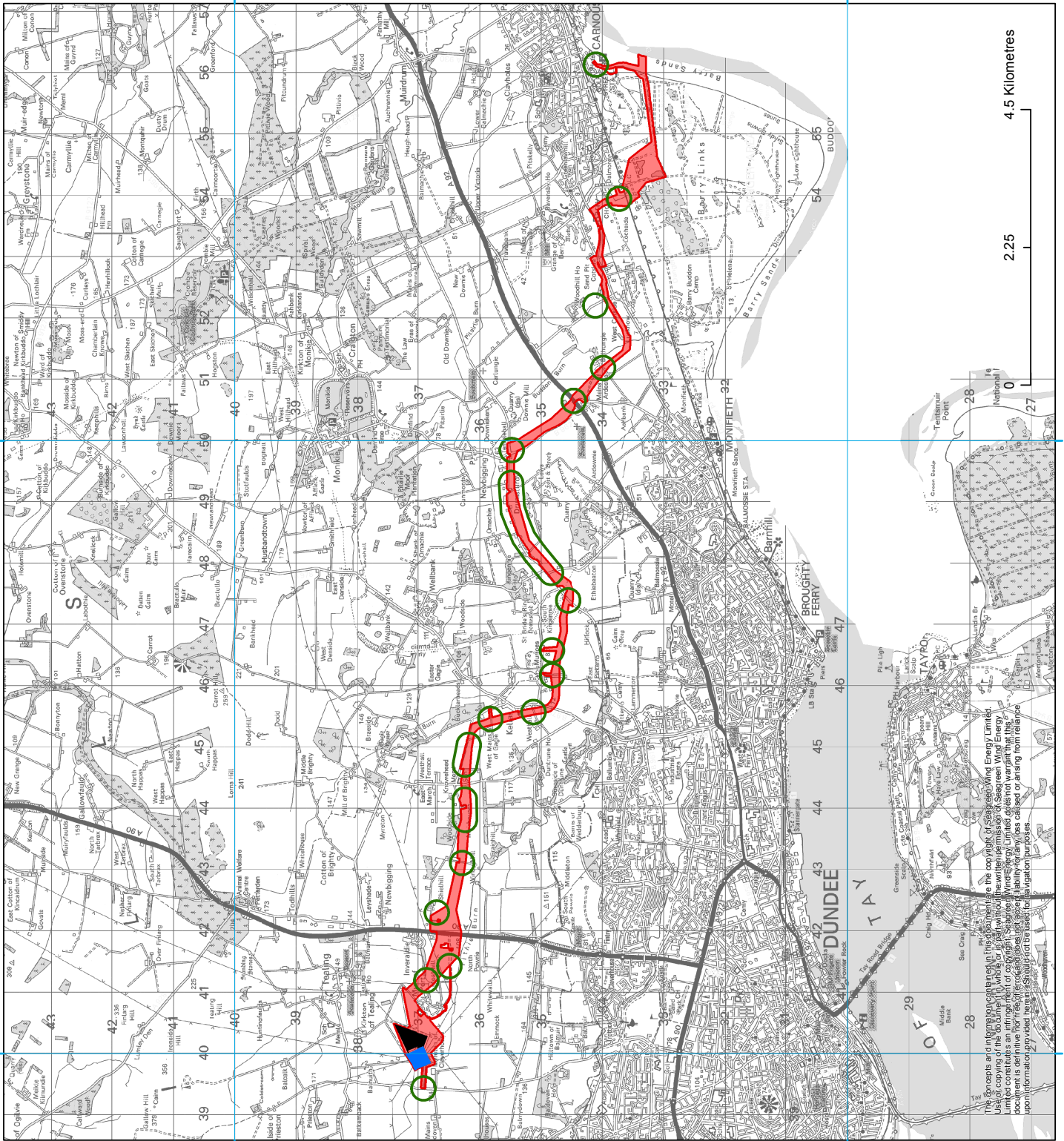
C/o SSE Renewables
1 Waterloo Street
Glasgow
G2 6AY

**ANGUS COUNCIL
COMMUNITY
DIRECTORATE**

Planning and Place
County Buildings
Market Street
Forfar
DD8 3LG

340000

350000



000000

000000

4.5 Kilometres

2.25

0

27

28

29

30

31

32

33

34

35

36

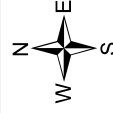
37

38

39

40

- Application Site
- Potential Construction Access Points
- Proposed New Substation Area
- Existing Substation Area



Coordinate System
 British National Grid (OSGB36)
 Projection: Transverse Mercator
 Central Meridian: -2.0000
 Latitude of Origin: 49.0000
 False Easting: 400000.0000
 False Northing: -100000.0000
 Reference Spheroid: OSGB36

Project:
Firth of Forth Offshore Wind Farm



Figure / Drawing Title:
ONSHORE CABLE ROUTE

Figure/Drawing Number: NTS FIGURE 1

UNLESS THE REVISION IS FOR HIGHER THE DRAWING IS NOT TO BE USED FOR DESIGN OR CONSTRUCTION

REV	DATE	DESCRIPTION	BY	CHKD	APPR	APPR
B2	27 JUN 16	FOR FORMAL SUBMISSION	LH	KM	DS	NB
B1	23 JUN 16	DRAFT	LH	KM	DS	NB
B0	14 MAY 13	FOR FORMAL SUBMISSION	SC	DT	NB	KB

The concepts and information contained in this document are the copyright of SeaGreen Wind Energy Limited. Use or copying of the document (in whole or in part) without the written permission of SeaGreen Wind Energy Limited is prohibited. This document is not to be used for any other purpose, and no liability can be accepted for any loss or damage arising from reliance upon information provided here in. It should not be used for navigation purposes.

340000

350000

000000

000000



REGISTERED OFFICE:

Seagreen Wind Energy Limited
55 Vastern Road
Reading
Berkshire
RG1 8BU
Company No. 06873902

www.seagreenwindenergy.com



For corporate social responsibility and environmental mindfulness, Seagreen Wind Energy Limited has used 80% recycled NAPM registered coated paper for this report.