

Inch Cape Offshore Wind Farm

New Energy for Scotland

Offshore Environmental Statement:
VOLUME 2A
**Appendix 6B: Landfall Feasibility
Study**



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6B.1 INTRODUCTION

6B.1.1 Background

ICOL commissioned a Landfall Site Feasibility Study reported in this Appendix to assist in locating a suitable landfall for the Offshore Export Cables which provide the transmission connection to transport power generated by the wind farm to the national electricity grid.

The study provides an initial high level review of key baseline environmental information to inform the process of identification of a location for a preferred landfall location, and to assist in reducing the potential for environmental impacts. The study focused on:

- Natural Heritage (ecology including ornithology);
- Cultural Heritage (including archaeology);
- Landscape; and
- Land Use.

In addition to environmental considerations, engineering constraints relevant to any offshore works and the onshore connection from the landfall to the grid connection point have been taken into account in the study as follows:

Wind Farm Export Cable

The wind farm export cable provides the infrastructure to export the electricity generated by the offshore wind farm to land via a landfall.

Cable Landfalls

The cable landfall is the main area of interaction between the onshore and offshore components of the project, linking the subsea export cable to the onshore transmission cable. At the landfall a working area is required where the onshore and offshore cables are joined together in one underground jointing chamber. This accommodates the joint bays and other temporary construction equipment required to land the subsea export cable from the wind farm and connect it to the onshore underground cable.

Onshore Transmission Cable

Delivery of the electricity from the wind farm will be achieved via an onshore underground cable, connecting the landfall to the substation/converter station. The exact configuration of the onshore cable will be subject to detailed design analysis in consultation with specialist cable manufacturers and subject to a separate consent application.

Converter Station

The converter station will provide the means by which the electricity being transported via the offshore export cable and onshore underground cable will be transmitted to the national grid. The detailed design of the installation has yet to be determined and this will be undertaken as part of the onshore works.

It is important that the selection of an appropriate landfall for the Inch Cape Offshore Wind Farm, therefore, takes into account offshore and onshore influences and requirements, and these are discussed in further detail later in this Appendix.

6B.1.2 Purpose of the Study

ICOL has identified six potential landfall options for the Inch Cape Offshore Wind Farm based upon the consideration of the key elements of the proposed project, and engineering constraints. To refine and focus the identification of landfall options ICOL originally defined the end point (onshore grid connection) as the Cockenzie Power Station sub-station (NGR NT 39502 75381), with the offshore wind farm defining the 'starting point' of the project with respect to transmission.

The key purpose of this report is to assess the feasibility of the six landfall options from an environmental perspective. An overview of the option identification process is provided in Section 6B.3 below, which provides the basis upon which the environmental analysis of the six options has been completed.

Onshore transmission cable corridors will run from landfall options to the connection at Cockenzie using non-distinct broad corridor areas in a relatively direct route from landfall to grid connection. The onshore transmission cable corridor options assumed for the landfall study have not been assessed in detail in this report and are used at a high level to help inform the suitability of the different landfall options. The underground cable route and converter station location will be the subject of separate, more detailed, appraisals prior to environmental assessments being completed in support of a separate consent application.

6B.2 STUDY METHODOLOGY

6B.2.1 Approach

For the purposes of a high level environmental appraisal, with a view to appraising a range of options, the key guiding principle is to avoid as many critical constraints as possible. The ultimate goal of the site selection, and ultimately the iterative environmental assessment process, is to guide the selection of a proposed development to a location that provides an optimal solution when considered a balance between environmental, engineering and economic factors. Another important guiding principle is to ensure that the data collated and analysed is appropriately detailed for the level of review being undertaken.

Within this context, the following approach to environmental appraisal was adopted:

- Potential landfalls were identified considering the offshore and landfall routing options and engineering constraints for offshore export cables,
- Baseline data was collated for each landfall option within a stated area of search for each. This relates primarily to features afforded protection, primarily through legislation or primary policy.
- Data was captured on GIS to allow a review of all considerations and constraints (summarised in Section 6B.4 for each landfall option).
- Classification of the considerations/constraints was undertaken in order to define which landfall options are feasible with the aim of selecting a preferred site.

As discussed in Section 6B.1 above, analysis of landfall options has also been informed by potential onshore cable corridors. This ensures that, whilst the implications of each landfall option can be assessed in its own right, the additional impact that could result from making the onshore cable connection is also taken into account.

6B.2.2 Collation of Baseline

Baseline data relating to environmental considerations within each area of search have been collated from a range of publically available sources as indicated in Table 6B.1.

TABLE 6B.1: DATA SOURCES CONSULTED		
FEATURE	SOURCE	WEB LINK
Nature Conservation		
National Parks	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
Special Protection Areas	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
Special Areas of Conservation	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
RAMSAR	JNCC/SNH	http://jncc.defra.gov.uk/page-1390 http:// gateway.snh.gov.uk/sitelink
Sites of Special Scientific Interest	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
National Nature Reserves	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
Local Nature Reserves	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
Ancient Woodlands	Scottish Natural Heritage	http:// gateway.snh.gov.uk/sitelink
Protected Species	National Biodiversity Network	http://data.nbn.org.uk/
RSBP Reserves	RSBP	http://www.rspb.org.uk/reserves/
Cultural Heritage		
Scheduled Ancient Monuments, Listed structures, Gardens and designed Landscapes	Historic Scotland	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2000:10:0
Landscape & Land Use		
General	Google and Bing aerial maps	http://www.maps.google.co.uk http://www.bing.com/maps
National Parks	As above	As above
National Scenic Areas (NSA)	Historic Scotland	http://www.historic-scotland.gov.uk/
Local Landscape Designations (AGLVs/SLAs)	Historic Scotland East Lothian Local Plan 2008	http://www.historic-scotland.gov.uk/ http://www.eastlothian.gov.uk/downloads/file/2106/the_adopted_east_lothian_local_plan_2008_text

6B.2.3 Consultation

No specific consultations were undertaken during the screening stage. After the screening stage discussions took place with local stakeholders including East Lothian Council and relevant landowners both around the landfall locations and further inshore in and around potential onshore routes.

6B.2.4 Data Appraisal

Data were appraised for the six landfall options. The following criteria/principles were considered:

- Potential effects upon internationally/nationally protected/designated resources;
- Potential effects upon regionally protected/designated resources; and
- Potential land use effects.

The criteria above were used to appraise the relative merits of each alternative which were then categorised as defined below.

6B.2.5 Option Review Criteria

Once each site option was appraised and the key issues highlighted for each, the following criteria were used to categorise each site option:

TABLE 6B.2 OPTION REVIEW CRITERIA	
Category	Criteria
Satisfactory	Key issues should be capable of successful resolution through the adoption of standard mitigation measures. Good potential for development.
Possibility	Key issues that either in isolation or combination, could lead to a refusal if not mitigated for sufficiently. Although the issue should generally be capable of successful resolution (including for economic and engineering aspects), the issue may nevertheless require significant attention during construction and/or operation. Moderate potential for development.
Unsatisfactory	Key issues of such significance that it is highly likely that permission will not be granted or that costs and engineering constraints associated with mitigating such risks render the development as 'not viable'. Low to no potential for development.

6B.3 SITE OPTIONS DESCRIPTION

6B.3.1 Selection of Landfall Options

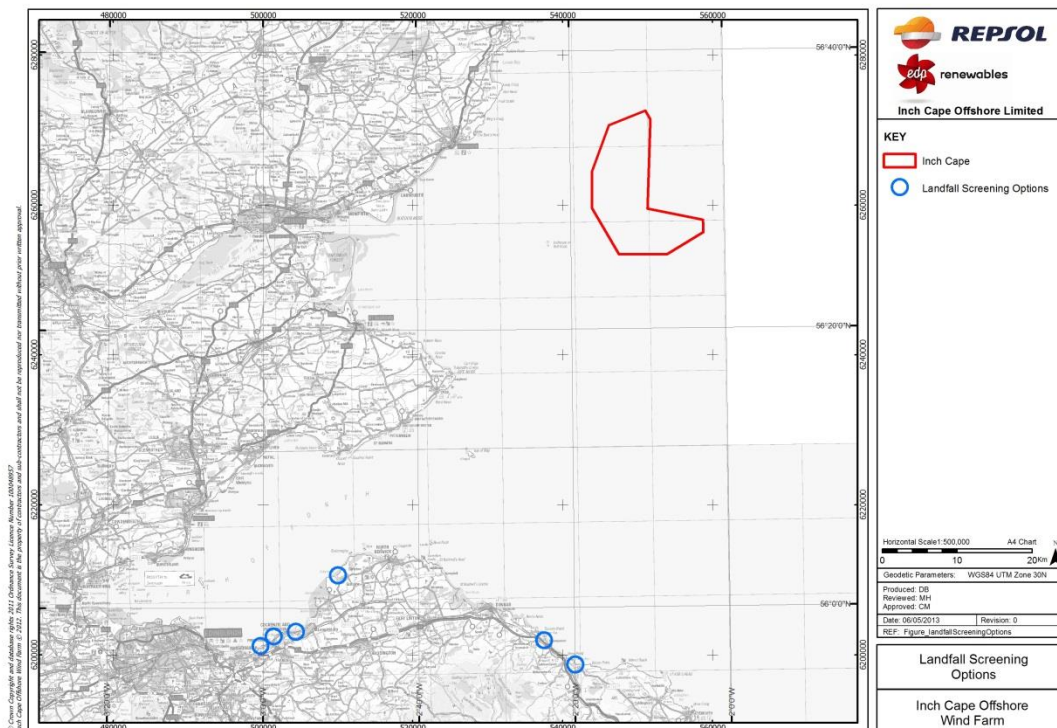
Initial Screening Exercise

As the first step of this study, a screening exercise was first conducted to identify candidate landfall areas along the coast. Available data were collated specific to physical and engineering constraints. As much of the coast line in this area is surrounded by hard rock and steep cliff faces the feasibility of trenching or drilling at these locations using known methods to bring the export cable onshore was a major consideration. Possible onshore and offshore cable routes were also considered in conjunction with other consultants, specifically cable length and route feasibility based on engineering and physical constraints. Consequently six general landfall locations (shown in Figure 6B.1) were identified as potentially suitable along the coast on the south side of the Firth of Forth.

The six potential landfall locations identified were:

- Cockenzie;
- Prestonpans;
- Seton Sands;
- Gullane;
- Thornton Loch; and
- Pease Bay.

Figure 6B.1 - Landfall Options



Assessment Criteria

An initial engineering feasibility study was undertaken to consider offshore routes, near shore approaches, and landfall (see Appendix 6A) considering a range of factors including:

- Third party constraints;
- Geology;
- Trenching and drilling feasibility;
- Onshore jointing and route length;
- Offshore route lengths; and
- Beach topography.

In addition consideration of environmental constraints was given to protected areas (including Natura sites and SSSIs and other high level environmental considerations).

All six landfall locations were found to be technically feasible when considering offshore and landfall approach issues.

This appendix reports landfall and relevant onshore environmental issues in more detail, including:

- natural heritage;
- ecology;
- cultural heritage;
- landscape; and
- land use.

The following section describes each landfall option in more detail and Figures 6B.1.2 to 6B.1.4 (included at the end of this report) show a location map.

6B.3.2 Landfall Site Options Description

Cockenzie

The potential landfall at Cockenzie, East Lothian, would be situated slightly west of the Cockenzie Power Station (approximate grid ref. NT 39395 75587). Prestonpans is situated 250m to the west of the power station. The town is separated from the power station by fields. The town of Cockenzie is situated immediately to the east of the power station. The area inland of the power station (i.e. south-east of the power station and in between Prestonpans and Cockenzie urban areas) mainly consists of a brownfield site (formerly the fuel storage area for the power station), bordered by small patches of fields and woodland strips.

Prestonpans

The potential landfall at Prestonpans, East Lothian, would be situated to the west of the town and the Royal Musselburgh Golf Club (approximate grid ref. NT 36914 73774). There is an "Ash Disposal Area" along the shoreline approximately 600m in length. The shoreline has an area of sandy beach (which is reduced in width along the Ash Disposal Area), with a mussel bed bordering the north-eastern edge of the Ash Disposal Area. To the west of the Ash Disposal Area there is Levenhall Links Leisure Park, which encompasses several small lakes which are used for wildlife watching, sports pitches, agricultural and recreational land and woodland. The shoreline adjacent to the golf course (north of a B road) is recreational land. The area immediately inland of the shoreline is mainly comprised of woodland, agricultural fields and some dwellings. There is also a caravan park bordering the western edge of the Royal Musselburgh Golf Club.

Seton Sands

The potential landfall at Seton Sands bay, East Lothian, is situated at the north-west edge of Longniddry (approximate grid ref. NT 42734 76093). Seton Sands bay is partially enclosed by rocky outcrops named 'Long Craigs' and has a wide intertidal area (approximately 600m at the widest point). Running along roughly half of the shoreline on the east side of Seton Sands bay is Longniddry Golf Club. Port Seton and Seton Sands Holiday Village are situated along the western half of the shoreline in Seton Sands bay.

Gullane

The potential landfall at Gullane, East Lothian, could be situated in Gullane Bay (approximate grid ref. NT 47795 83358). The intertidal area is mainly sand flats with some rocky outcrops to the western end. The beach is called Gullane Bents. The area immediately inland of the shoreline consists of recreational land with some woodland areas. The village of Gullane is situated along the southern edge of the recreational land approximately 260m away. The eastern edge of Gullane bay down to Gullane village is bordered by eastern edge of Muirfield Golf Course. The western edge of Gullane Bay down to Gullane village is bordered by Gullane golf club, which extends west and south and into Luffless Golf Club.

Thorntonloch

The potential landfall at Thorntonloch, East Lothian, would be situated along the sandy beach adjacent to Thorntonloch village, south of Torness Power Station (approximate grid ref. NT 75514 73879). The intertidal area on the eastern edge of Torness Power Station consist mainly of rocky outcrops, which turns into a sandy beach heading south-east for approximately 1km before returning to a rocky shoreline. On the northern edge of the sandy beach lies Thorntonloch Caravan Park. Inland from the intertidal area are mainly agricultural fields with the A1 road running roughly parallel to the sandy shoreline, ranging from 100m to 500m away.

Pease Bay

The potential landfall at Pease Bay, Scottish Borders, would be situated at the sandy intertidal area (approximate grid ref. NT 79223 71139). Pease Bay Caravan Park runs along approximately three quarters of the length of Pease Bay. Inland to the west of Pease Bay consists mainly of agricultural land with an area of woodland to the south-west (around Tower Burn and Pease Burn).

6B.4 SITE OPTIONS BASELINE

6B.4.1 Introduction

The following section summarises the relevant environmental considerations associated with each landfall option. The information relevant to each site option is then summarised at the end of this section.

6B.4.2 Environmental Considerations

Natural Heritage

The following statutory and non statutory designated sites have been given consideration in the feasibility study as a potential constraint:

- Special Protection Areas (SPA);
- Special Areas of Conservation (SAC);
- Ramsar;
- Sites of Special Scientific Interest (SSSI);
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR); and
- Royal Society Protection Birds (RSPB) Reserves.

The Firth of Forth SPA, Ramsar and SSSI cover the majority of the coastline (including intertidal areas) around Prestonpans, Cockenzie, Seton Sands and Gullane. The SPAs are European designations afforded protection under the EC Birds Directive (Directive 2009/147/EC). Ramsar sites (designated under the Ramsar Convention) are subject to the same legal protection as European designated sites as a matter of national policy. SSSIs are nationally designated sites of nature conservation under the Wildlife and Countryside Act 1981 (as amended).

To the west of Prestonpans the SPA/Ramsar/SSSI covers some inland areas around Levenhall Leisure Park which are also used for wildlife watching. The designated area around Prestonpans is narrower than that at Seton Sands. There are discrete areas of shoreline where there are no designations at Cockenzie Power Station and Gullane Bay. To the west of Gullane the designated area extends inland, covering Aberlady Bay and Gullane Links (consisting of two golf courses). Given the mobility of the notified features of the designations, consideration of impacts to the SPA and Ramsar sites will still be required if the landfall is located in these areas.

The Firth of Forth SPA and Ramsar sites are designated for the internationally and nationally important populations of non-breeding passage birds, wintering wildfowl and waders and associated habitats. The birds associated with the SPA are primarily wintering birds, with passage birds using the area during autumn, through winter and into spring. The Firth of Forth SSSI has 49 notified features, including birds, habitats and plant species, invertebrates and geology.

The Firth of Forth SSSI extends inland to the west of the Gullane settlement bordering the A198 road. Aberlady LNR is situated approximately 1km to the west of Gullane Bay. It is designated for its habitats and bird species.

There is an Ancient Woodland inland of the Ash Disposal Area at the Prestonpans landfall location and along the eastern edge of agricultural fields by the Seton Sands landfall location. Ancient Woodland sites also exist within 2km of the Thorntonloch and Pease Bay landfall locations. These could be avoided through careful routeing in the project design phase.

Pease Bay Coast SSSI, which is designated for geology and palaeontology, covers the western third of Pease Bay. There are no designations around Thorntonloch to the east of Torness Power Station. Barns Ness SSSI (designated for habitats and geology) is situated immediately to the west of Torness Power Station.

There are a number of designated features inland between the grid connection point at Cockenzie substation and Seton Sands, Gullane, Thorntonloch and Pease Bay. These include SSSIs designated for habitats, plants and geology. Inland features could be avoided however through cable micro siting.

No SACs, NNRs or RSPB reserves are within the areas of the landfalls or possible corridor routes.

Other Potential Ecological Considerations

There are several rivers, streams, woodlands (including Ancient and Long-established Woodland and Semi-natural Ancient Woodland) and hedgerows that lie between the grid connection point at Cockenzie substation and Gullane, Thorntonloch and Pease Bay. Although they are not included in specific designations, they are included as priority habitats under the UK Biodiversity Action Plan (UKBAP). These features may have ecological importance for birds, bats and other protected species, small mammals and fish. All of these features would need to be considered in the detailed design stage and where possible impacts avoided or mitigated.

Where there is greater land take for a development (whether temporary or permanent), there is generally more potential for environmental impact. It is therefore considered that those landfall options that require longer corridors are likely to encounter a greater number of environmental constraints than shorter corridors.

Cultural Heritage

This appraisal also includes consideration of protected archaeological features, specifically Scheduled Monuments, Gardens and Designated Landscapes and Listed Buildings (category A only). Table 6B.3 below summarises the features located within a 2 km radius of each landfall site.

TABLE 6B.3 CULTURAL HERITAGE FEATURES LOCATED WITHIN 2KM OF THE LANDFALL OPTIONS			
Site	Scheduled Monuments	Garden and Designated Landscape	Listed Buildings (Cat. A)
Cockenzie	3	1	15
Prestonpans	2	1	4
Seton Sands	3	2	3
Gullane	1	2	8
Thorntonloch	3	1	0
Pease Bay	0	0	7

It is considered that direct impacts on these could be avoided through careful cable routing and appropriate construction techniques. This will be particularly important for the Seton Sands option which has potential constraints immediately inshore of the landfall option and the detailed design of the route would need to take any constraints into account in the detailed planning of the route.

There are a number of scheduled monuments, Gardens and Designated Landscapes and listed buildings lying between the landfalls at Gullane, Thorntonloch and Pease Bay and the grid connection point at Cockenzie. These features could be avoided through project design and micro siting. John Muir Country Park is situated north-west of Thorntonloch and Pease Bay landfall locations, although it is again considered that this could be avoided through careful routing of cable corridors and route.

Landscape and Land Use

The landfall options do not fall within any National Parks or National Scenic Areas and they also avoid regional landscape designations. Seton Sands, Gullane and Thornton Loch landfall options fall within local designations for Areas of Great Landscape Value.

Given that the export and onshore cables will be buried underground, there will be limited permanent changes to the landscape and any potential impacts will be associated with construction activities and therefore temporary in nature.

Table 6B.4 below summarises a high level appraisal of land use for each landfall option.

TABLE 6B.4 OVERVIEW OF LANDFALL OPTIONS BY LAND USE	
Landfall Option	Comments
Cockenzie	Cockenzie Power Station (not operational) is situated adjacent to the coastline, with a sea defence wall separating the power station from the sea. The coal-fired power station site covers approximately 24 ha. Aside from two fields to the east of the power station, it is bordered by industrial buildings to the south and Prestonpans and Cockenzie settlements to the west and east respectively.
Prestonpans	The beach situated to the west of Prestonpans settlement is bordered by a strip of recreational land, consisting of paths through grassland/scrub and woodland. To the west of this, the Ash Disposal Area borders the sea with a sea defence wall which significantly reduces the 'beach' in this area. Immediately inland of the recreational land is Royal Musselburgh Golf Club and a caravan park. South of the Ash Disposal Area consists mainly of agricultural land and woodland strips.
Seton Sands	Seton Sands has two public car parks, with facilities, and holds a Seaside Award (Longniddry 1&2) for high standards of cleanliness, safety and water quality. There is a track running the length of Seton Sands close to the beach. Adjacent to the track to the south is Longniddry golf course and Seton Sands Holiday Village. Outwith the urban areas of Longniddry and Port Seton and the caravan park, the main land use is agriculture, with dwellings and some woodland strips.
Gullane	Gullane Bents beach is popular with tourists. Gullane Bents beach holds a Seaside Award (for high standards of cleanliness, safety and water quality) and is a Marine Conservation Society (MCS) Recommended Beach (for bathing waters that meet the European guideline for water quality standard). Running adjacent to the beach is a strip of recreational land containing a number of public paths through grassland/scrub, woodland and sand dune habitats. There is a public car park situated in this strip approximately 150m from the beach. Gullane Bents and the recreational strip of land are encompassed by a golf course to the east and west of the bay and the settlement of Gullane to the south.
Thorntonloch	Thorntonloch contains a sandy beach which is used by surfers throughout the year. The beach is also used for other recreational activities by locals and visitors to Thorntonloch Caravan park. Aside from Torness Power Station to the north of the site, the main land use surrounding Thorntonloch is agricultural land, with the A1 running north-west to south-east 100-500m from the beach.
Pease Bay	Pease Bay is a popular surfing location throughout the year. The majority of the Bay is bordered by Pease Bay Caravan Park which is focused around the recreational aspects of the Bay. Land around Pease Bay and the caravan park rises up sharply before turning into mainly agricultural land, with a broad-leaved woodland south-west of the Bay.

Table 6B.5 provides a high level overview of the land use that may be present for the associated onshore cable corridors for each landfall option. It should be noted that the

most direct corridor is assumed for the purposes of this report, avoiding urban areas; actual onshore cable corridors are yet to be defined by ICOL.

TABLE 6B.5 OVERVIEW OF LAND USE ALONG POSSIBLE CABLE CORRIDORS

Landfall Option	Comments
Cockenzie	The area inland of the power station (i.e. south-east of the power station and in between Prestonpans and Cockenzie urban areas) mainly consists of a brown field site (formerly the Blindwells opencast site which fed into the power station by an over-road conveyor), bordered by small patches of agricultural fields, woodland strips and minor B roads. The straight line distance from the landfall area to the Cockenzie grid connection is approximately 0.66km and a likely route minimum length is approximately 1.1km.
Prestonpans	The potential onshore cable corridor would have to run to the south of Prestonpans settlement, taking into account the Royal Musselburgh Golf Club. The east coast main railway runs along the southern edge of the town and the A1 road runs approximately 400m south, parallel to the railway until the Cockenzie grid connection area. Between the urban area and the A1 road are agricultural land and a small number of B roads. The settlement of Tranent is situated immediately south of the A1 road opposite the Cockenzie grid connection area. The straight line distance from the landfall area to the Cockenzie grid connection is approximately 2.6km and a likely route minimum length is approximately 4.8km.
Seton Sands	The area inland of Seton Sands bay is bordered by Seton Sands Holiday Village along the western half and Longniddry Golf Course along the eastern half. To the south of Seton Sands Holiday Village and the western half of Longniddry golf course are agricultural fields and dwellings. The area between Seton Sands and the Cockenzie grid connection mainly comprises of agricultural fields, broad-leaved woodland strips, dwellings and farm buildings, bordered on the south by the A198 road and east coast main railway line (roughly 1km south of the high tide line). The straight line distance from the landfall area to the Cockenzie grid connection is approximately 3.1km and a likely route minimum length is approximately 3.5km.
Gullane	The potential onshore cable corridor between Gullane and the Cockenzie grid connection would run south from Gullane to below Aberlady village, before heading west towards Cockenzie (but situated south of Longniddry). Whether the cable corridor bypasses Gullane to the east or the west, the corridor route will encounter either Gullane or Muirfield golf courses (to the east and west respectively). The majority of the remainder of the land in this area is agricultural, with a significant amount of woodland areas. The corridor would cross several roads and the east coast main railway line (at least twice). The straight line distance from the landfall area to the Cockenzie grid connection is approximately 11.5km and a likely route minimum length is approximately 15km.
Thorntonloch	The potential onshore cable corridor connection would mainly consist of agricultural fields interspersed with many woodland areas. There are a variety of watercourses that would require crossings, including Thorntonloch Burn, Dry Burn, Whittinghame Water and the River Tyne. There are also a number of lochs; however, these could be avoided through the design phase. There are a large number of settlements (from individual dwellings to small towns), A and B roads (including the A1 dual carriage way) and the east coast main railway line that would also require crossing. The straight line distance from the landfall area to the Cockenzie grid connection is approximately 35.6km and a likely route minimum length is approximately 40km.
Pease Bay	The potential onshore cable corridor between Pease Bay and the Cockenzie grid connection would be similar to that described above for Thorntonloch. The straight line distance from the landfall area to the Cockenzie grid connection is approximately 39.9km and a likely route minimum length is approximately 45km

6B.4.3 Summary

Table 6B.6 below presents a summary of the main environmental considerations and constraints identified above in relation to each site option. Figures 6B.2 to 6B.1.4 show the landfall options and associated Natural and Cultural Heritage environmental considerations.

TABLE 6B.6 SUMMARY OF MAIN ENVIRONMENTAL CONSIDERATIONS	
Site	Environmental
Cockenzie	<p>Landfall</p> <p>Natural Heritage:</p> <p>The Firth of Forth SPA, Ramsar and SSSI designated areas border both sides of Cockenzie Power Station but the area between adjacent to the power station is not designated.</p> <p>Land Use:</p> <p>Settlements of Prestonpans and Cockenzie to the west and east of the Power Station.</p>
	<p>Cable Corridor</p> <p>Very small number of agricultural fields and woodland strips.</p>
	<p>Landfall</p> <p>Natural Heritage:</p> <p>The Firth of Forth SPA, Ramsar and SSSI stretches across the coastline, plus some inland areas to the west of the landfall. Ancient Woodland strip running along the south of the B1348 road.</p> <p>Land Use:</p> <p>The beach and area immediately inland is used for recreational purposes. This area is bordered by a golf course and caravan park. Prestonpans settlement is situated to the east of the landfall and the Ash Disposal Area is situated to the west.</p>
Prestonpans	<p>Cable Corridor</p> <p>Prestonpans settlement, Musselburgh Golf Club, the east coast main railway, minor B roads and agricultural land.</p> <p>Mainly agricultural fields with woodland strips, with some dwellings and farm buildings.</p>

TABLE 6B.6 SUMMARY OF MAIN ENVIRONMENTAL CONSIDERATIONS

Site	Environmental
Seton Sands	<p>Landfall</p> <p>Natural Heritage:</p> <p>The Firth of Forth SPA, Ramsar and SSSI stretches across the coastline. Ancient Woodland strip on the eastern edge of agricultural fields bordering Longniddry.</p> <p>Cultural Heritage:</p> <p>There are three Scheduled Monuments near Seton Mains although all can be avoided by micro siting.</p> <p>Landscape / Land Use:</p> <p>Within Area of Great Landscape Value (local designation). Beach used for recreational purposes and holds a Seaside Award. Longniddry Golf Club and Seton Sands Holiday Village are adjacent to the bay.</p> <hr/> <p>Cable Corridor</p> <p>Mainly agricultural fields with woodland strips, with some dwellings and farm buildings.</p>
Gullane	<p>Landfall</p> <p>Natural Heritage:</p> <p>The Firth of Forth SPA, Ramsar and SSSI designated areas cease either side of Gullane bay, but extend inland to the west of Gullane bay; with the SSSI extending to Gullane settlement and south to the A198 road.</p> <p>Landscape / Land Use:</p> <p>Within Area of Great Landscape Value (local designation). Beach and area immediately inland used for recreational purposes and holds Seaside Award and is a MCS Recommended Beach.</p> <hr/> <p>Cable Corridor</p> <p>Potential pinch point: Gullane settlement is situated to the south of the landfall with Muirfield and Gullane golf courses encompassing this area on the east and west respectively. Luffless Golf Club is situated adjacent to Gullane Golf Club. Firth of Forth SSSI extending from the western edge of Gullane bay to the south to Gullane settlement and the A198 road. There are a large number of cultural heritage features.</p> <p>Remainder of corridor mainly agricultural land with woodland areas. Other considerations include crossing the east coast mainline railway, several A and B roads.</p>
Thorntonloch	<p>Landfall</p> <p>Natural Heritage:</p> <p>No designations at landfall (Barns Ness SSSI to the west of Torness Power Station).</p> <p>Landscape / Land Use:</p> <p>Within Area of Great Landscape Value (local designation). Beach used by surfers and other recreational users. Caravan Park situated on coastline.</p>

TABLE 6B.6 SUMMARY OF MAIN ENVIRONMENTAL CONSIDERATIONS

Site	Environmental
	<p>Cable Corridor</p> <p>Mainly agricultural fields interspersed with many woodland areas (including Ancient Woodlands), with a variety of watercourses that would require crossings. There are a large number of cultural heritage features. Large number of settlements (from individual dwellings to small towns), A and B roads (including the A1 dual carriage way) and the east coast main railway line.</p>
Pease Bay	<p>Landfall</p> <p>Natural Heritage:</p> <p>Pease Bay Coast SSSI covers the western third of the Pease bay coastline. Ancient Woodland to the south of landfall.</p> <p>Land Use:</p> <p>Beach used by recreational users; Pease Bay Caravan Park covers majority of land around the bay. Popular surfing location throughout the year.</p> <hr/> <p>Cable Corridor</p> <p>As above for Thorntonloch.</p>

6B.5 SITE OPTIONS APPRAISAL

6B.5.1 Summary of Option Appraisal

The main environmental considerations are the Firth of Forth SPA and Ramsar European designated sites. These designations are for wintering and passage birds and their associated habitats.

Landfalls at Seton Sands, Gullane and Thornton Loch are within Areas of Great Landscape Value which is a local designation under the East Lothian Local Plan 2008. Land use associated with recreation and tourism is a key constraint for five of the options but not for Cockenzie. Two of the landfall locations are associated with beaches that hold awards for the high standards of water quality, cleanliness and public facilities. Five beaches are used for recreation purposes and four have a leisure/caravan park in the immediate vicinity. The peak tourist season is during the summer and other school holidays. Surfers tend to use Thorntonloch and Pease Bay all year round.

There are also a number of Scheduled Monuments within the vicinity of most landfalls, although the majority of these could be avoided through project design and micro siting. More detailed consideration would be required for those situated by the Seton Sands landfall given the narrower cable corridor around the landfall.

Table 6B.7 below provides a summary of the appraisal for each site option and the overall classification in accordance with the methodology.

Site	Appraisal	Classification
Cockenzie	Minimal onshore cable route with little in the way of environmental constraints. The existence of an area of brownfield land provides potential for risks during construction but this area could be avoided.	Satisfactory
Prestonpans	Goes through European protected Firth of Forth SPR/Ramsar and Nationally protected SSSI. Recreational use of beach. Short onshore cable route.	Possibility
Seton Sands	Goes through European protected Firth of Forth SPR/Ramsar and Nationally protected SSSI. Within local designation for Area of Great Landscape Value. Recreational use of beach and facilities. Seaside Award. Short onshore cable route.	Possibility
Gullane	Within local designation for Area of Great Landscape Value. Recreational use of beach and facilities. Seaside Award/MCS Recommended Beach. Medium length onshore cable route and associated number of environmental features.	Possibility
Thorntonloch	Within local designation for Area of Great Landscape Value. Recreational use of beach, including surfers. Extensive onshore cable route and associated number of environmental features.	Possibility
Pease Bay	Nationally protected Pease Bay Coast SSSI adjacent to landfall. Recreational use of beach, including surfers. Pease Bay Caravan park. Extensive onshore cable route and associated number of environmental features.	Possibility

As can be seen from Table 6B.7, all the landfall options are considered to be either a 'Possibility' or 'Satisfactory' and thus feasible options when considering Natural and Cultural Heritage, Landscape and Land use. However, in concluding the assessment of feasibility for the six options, the relative location of the Gullane, Thorntonloch and Pease Bay to the proposed grid connection at Cockenzie represent significantly longer routes and will therefore have a proportionally higher environmental impact and a higher cost and technical risk as summarised below.

6B.5.2 Commercial and Engineering Summary

Gullane, Thorntonloch and Pease Bay require extensive onshore cable lengths to reach the connection point at the Cockenzie sub station. The onshore cable length ranges from approximately 15 to 45km for the three options mentioned. The corridor areas encounter significantly more physical and third party constraints such as transport corridor crossings (road and rail) and environmental obstacles consequently leading to a negative impact on feasibility and cost. By comparison, Prestonpans, Cockenzie, and Seton Sands all have relatively short onshore cable lengths ranging from approximately 0.66 to 5km. Therefore the number of onshore constraints is reduced which in turn impacts positively on the commercial aspect of the cable routing.

6B.6 CONCLUSION

Of the six landfall options appraised, all are considered to be feasible on the basis of Natural and Cultural Heritage, Landscape and Land Use aspects. When considering commercial and engineering constraints however, Gullane, Thorntonloch and Pease Bay are not considered viable (primarily due to potential onshore cable corridor length and associated constraints). The options at Prestonpans, Cockenzie and Seton Sands remain as feasible landfall options.

The remaining three landfall options will require further consideration particularly in relation to engineering constraints, availability of land, land agreement constraints, planning constraints (i.e. the consideration of other committed development in the area), and also risks and liabilities associated with brownfield land. In addition, potential onshore substation/converter station site options and onshore cable route options should be considered in conjunction with this analysis.

6B.7 REFERENCES

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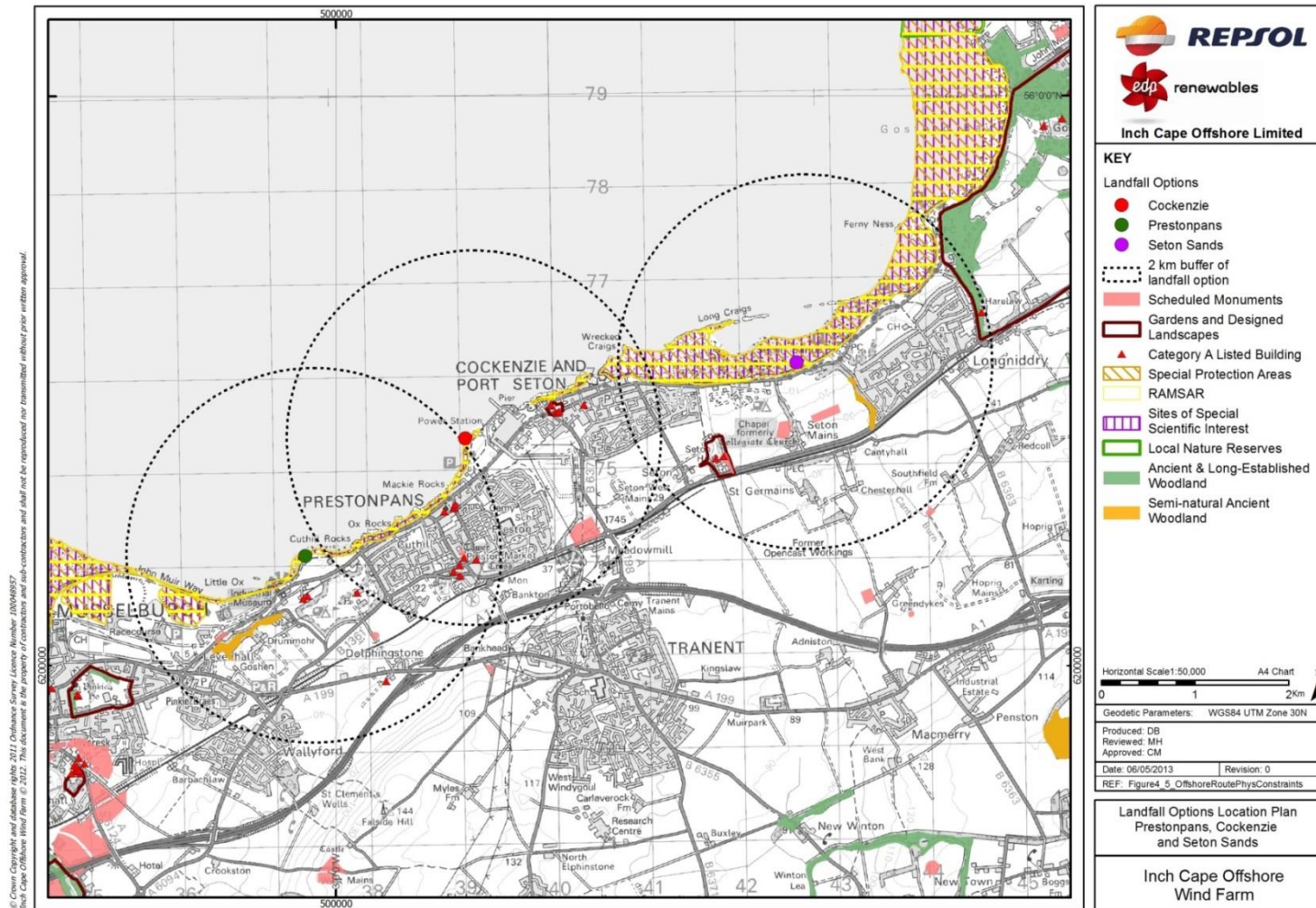
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Figure 6B.1.2 – Landfall Options Plan (Prestonpans, Cockenzie and Seton Sands)



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Figure 6B.1.3 – Landfall Options Plan (Gullane)

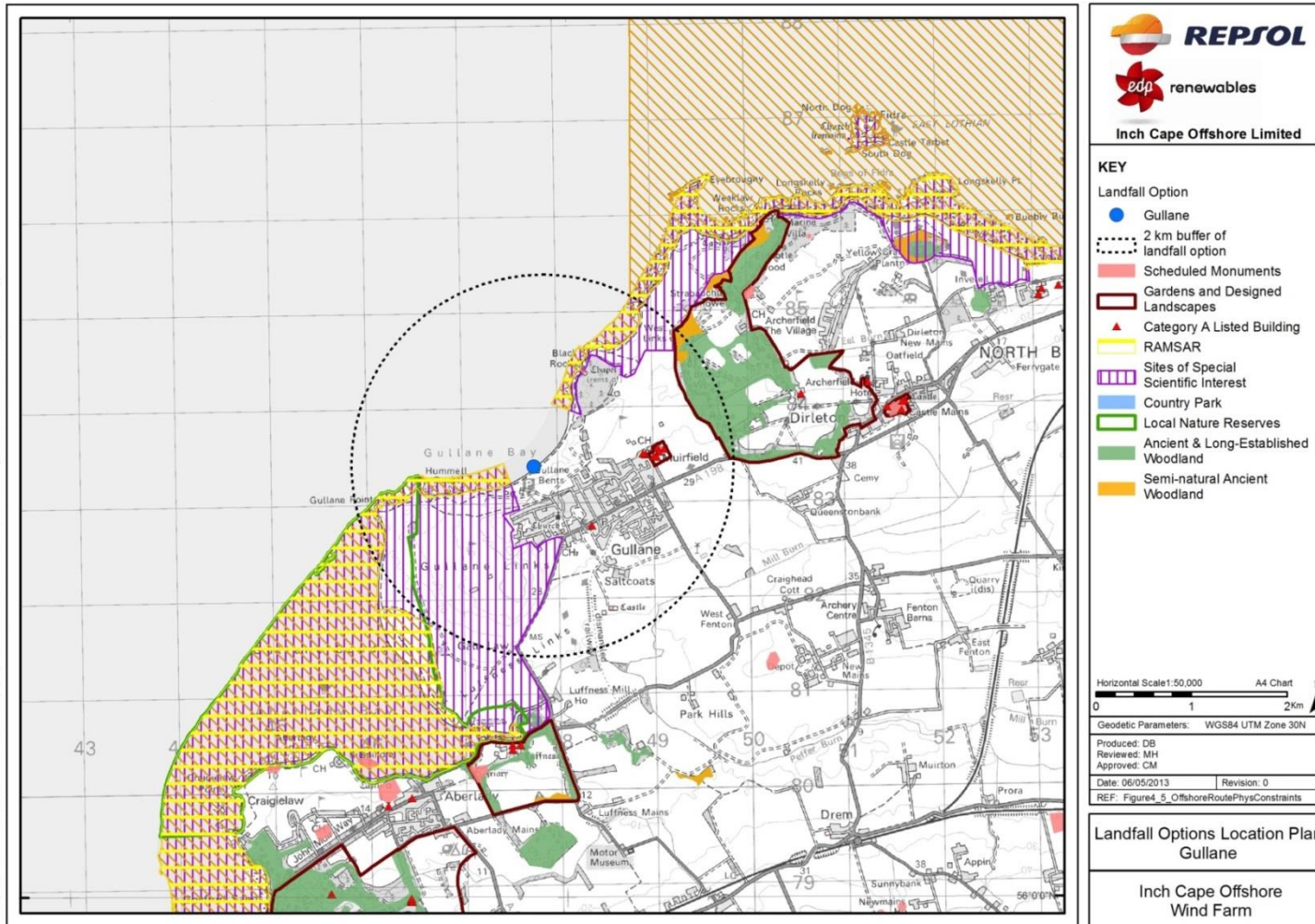


Figure 6B.1.4 – Landfall Options Plan (Thorntonloch and Pease Bay)

