

13 Soils, Agriculture and Land Use

13.1 Introduction

1 This chapter considers the potential effects of the proposed Onshore Works for the Neart na Gaoithe Offshore Wind Farm on soils, agriculture and land use. It details the effects of the construction and operation of the Onshore Works on the soils and land uses within the Application Boundary and, in particular, on agricultural and related activities as this is the predominant land use. The soils, agriculture and land use assessment was undertaken by SAC Consulting.

2 The effects on soils from construction activities, storage and reinstatement are addressed in this chapter from the perspective of the productive agricultural use of those soils and their protection and management generally. This includes appropriate mitigation techniques to minimise damage to soils during construction and to prevent the spread of agricultural pests and diseases. The wider environmental effects of soil disturbance are addressed in other parts of this Environmental Statement, in particular in **Chapter 10: Landscape and Visual Amenity, Chapter 11: Geology, Ground Conditions, Groundwater and Coastal Processes and Chapter 12: Hydrology, Flood Risk, Water Resources and Surface Water Quality.**

13.1.1 Effects Assessed in Full

3 The following effects have been assessed and reported where appropriate within this chapter:

- the permanent loss of land or change in land uses due to construction of cable route infrastructure above ground;
- the direct loss of woodland and agricultural land, by type and activity;
- changes in agricultural (and woodland) activity and enterprise from temporary or permanent loss of land or changes in viability of fields and land holdings, including any change in access;
- effects on sporting uses and viability;
- effects of temporary and permanent changes in access on land management;
- effects on soil quality such as increased risk of compaction, erosion, sealing or contamination arising from construction works, soils storage, handling and reinstatement; and
- environmental effects such as increased risk of diffuse pollution from mobilisation of soils, and changes in agricultural/land drainage and/or effects on agri-environmental agreements.

4 The effects have been considered throughout this chapter with reference to the principal agricultural units and land holdings within the Application Boundary. These units are described in the baseline description section of this chapter (sections 13.6.1 to 13.6.6).

13.1.2 Effects Scoped Out

5 The Scoping Report did not identify particular effects which could be scoped out as a result of preliminary environmental assessment work. The EIA process has therefore considered all potential effects on land use, agriculture and soils and this chapter identifies those effects which are predicted to be significant.

13.2 Guidance and Legislation

6 National planning policy guidance on agriculture is set out in the Scottish Government's Scottish Planning Policy (SPP). This re-affirms previous commitments to the protection of the best and most versatile agricultural land for productive agricultural uses. The policy also draws stronger linkages between land use, agriculture, sustainability, renewable energy and climate change. The East Lothian Local Plan 2008 (Policy DC1) re-affirms the need to minimise loss of prime agricultural land for development affecting the countryside. Development planning policy is considered in more detail in this ES in **Chapter 6: Legislation and Planning Policy.**

7 A number of recent strategies published by the Scottish Government and other agencies also highlight the importance of agriculture, soils and forestry in helping to achieve the Government's priorities for sustainable economic growth. Those which deal specifically or extensively with such land uses include the following:

- Forward Strategy for Scottish Agriculture (2006);
- The Scottish Soil Framework (2009);

- The Scottish Forestry Strategy (2006);
- The Land Use Strategy for Scotland (2011);
- The Scottish Outdoor Access Code.

8 The protection of soils, prevention of diffuse pollution and controls over application of nutrients to soils are all issues which cut across the work of other agencies such as Scottish Natural Heritage (SNH) and the Scottish Environment Protection Agency (SEPA). Relevant legislation and guidance which has been referred to in this assessment includes:

- The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008;
- Guidelines for Farmers in Nitrate Vulnerable Zones (2008);
- Prevention of Environmental Pollution from Agricultural Activity (PEPFAA Code 2005);
- The Farm Soils Plan 2005;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011: A Practical Guide;
- Forestry Commission, Forest and Soils Conservation Guidelines 1998;
- Forestry Commission, Forest and Water Guidelines 2003;
- DEFRA, Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009);
- British Standards Institute, Trees in Relation to Construction – Recommendations (BS5837:2005) (2005); and
- Scottish Renewables/Scottish Environmental Protection Agency, Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (January, 2012).

9 No specific guidance on assessing the effects of underground cable development on agriculture and soils is available. Instead, reference has been made to the preceding policies and strategies, to the data sources presented in the next section of this chapter and drawing on the EIA experience of the assessment team from similar previous schemes and from SAC's knowledge of the study area and agricultural and soil management issues.

13.3 Data Sources

10 The following information has specifically been used to support the assessment of effects of the Onshore Works on land use, agriculture and soils:

- Ordnance Survey mapping of the corridor;
- serial and satellite photographs;
- Soil Survey of Scotland (Sheet 7) reports and maps at 1:250,000 scale;
- Macaulay land capability for agriculture maps at 1:50,000 scale;
- site visits to the project corridor in Summer, Autumn and Winter 2011;
- farm surveys completed through individual on-farm consultations with land owners and managers in 2011; and
- Scottish Government published agricultural census data.

11 The assessment also draws on responses from EIA consultees as set out in the next section of this chapter as well as further studies including the Neart na Gaoithe Substation and Cable Corridor Peat Stability Assessment' (URS, August 2012).

13.4 Engagement

12 Responses from consultees during the EIA process relevant to the assessment of effects on land use, agriculture and soils are summarised in **Table 13.1** below.

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
East Lothian Council	Scoping	Disturbance to boundary features such as hedgerows, trees and stone boundaries should be minimised with appropriate mitigation employed. Provision should be made for appropriate stockpiling of excavated materials and details provided of disposal methods for any surplus material.	Disturbance minimised through careful routeing. Mitigation measures incorporated to minimise residual effects.
National Farmers Union Scotland	Scoping	None	None
Scottish Government	Scoping	None	None
Scottish Land & Estates	Scoping	None	None

Table 13.1: Consultation Responses

13.5 Assessment Methodology

13.5.1 Approach

13 The approach to this assessment has been developed in accordance with the agreed methodology for the project overall which is set out in **Chapter 3: EIA Methodology and Approach**. This section sets out the specifics of the method of assessing land use, agricultural and associated soils effects.

14 The method of assessment of effects on agricultural and sporting interests has involved the following:

- characterisation of the baseline land use, soils and agricultural conditions and determination of the sensitivity, based on literature review, consultations and site surveys;
- review of specific aspects of the project, including the type of infrastructure to be installed, methods of construction, and operational effects (including maintenance and repair of faults), leading to the prediction and classification of effects from each key stage of the project; and
- evaluation of the significance of the predicted effects, taking account of the magnitude of the effect (before and after mitigation) and the sensitivity of the baseline environment.

15 To assess the overall significance of the potential effects of the project on land use, soils and agricultural interests, an objective assessment involving sensitivity to effects and magnitude of effects has been adopted. This provided an assessment framework and ensured overall consistency of reporting.

13.5.2 Assessing Significance

16 Sensitivity of the baseline land uses, soils and agricultural activity has been determined on the basis of the following criteria.

Sensitivity	Characteristics of Receptor
High	Intensive arable cropping and/or intensive livestock systems. Prime land quality (Class 1, Class 2 or Class 3 ₁) as defined by the Macaulay Land Capability for Agriculture Classification system. Land farmed according to organic standards or under other Agri-Environment Schemes/Rural Priorities. Driven shoots. Soil or catchment designations (e.g. Nitrate Vulnerable Zones (NVZ)) and soils with extensive peat deposits.
Moderate	Mixed livestock and crop systems of moderate intensity. Moderate land quality (Class 3 ₂ or 4). Land farmed conventionally. Stalking. Soils with moderate peat deposits.
Low	Extensive livestock system. Low land quality (Class 5, Class 6 and Class 7). Land farmed conventionally. Rough shooting.

Table 13.2: Baseline Sensitivity Criteria

17 The magnitude of change has been assessed with reference to the criteria set out in the following table.

Magnitude of Effect	Description of Effect (one or more criteria)
High	A permanent restriction on the choice or level of land operations and/or requiring major management adjustments affecting a moderate or large part (>5%) of the holding. A temporary restriction on the choice or level of land operations requiring major management adjustments. Potential for high degree of change in permanent or seasonal employment.
Medium	A temporary restriction on the choice or level of land operations and/or requiring moderate management adjustments, or a permanent restriction on a small part (<5%) of the holding. Potential for moderate degree of change in permanent or seasonal employment.
Low	A temporary restriction on the choice or level of land operations and/or requiring small management adjustments. Potential for low degree of change in permanent or seasonal employment.
Negligible	Negligible change to any of the above factors.

Table 13.3: Magnitude of Effect

18 The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of change. The following table presents a description of the different scales of effect significance for effects on agriculture and soils.

Significance of Effect	Description
Major	An effect of high magnitude on high or moderately sensitive land holdings or soil resources
Moderate	An effect of high magnitude on resources of low sensitivity or effects of medium magnitude on resources of high or moderate sensitivity
Minor	An effect of medium magnitude on a resource of low sensitivity or an effect of low magnitude on a resource of high or moderate sensitivity
Negligible	A negligible effect on agricultural operations or soils in areas under extensive farming and typically with poorer land quality and non sensitive soils.

Table 13.4: Significance Criteria

19 Major and moderate effects are considered significant in the context of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.

13.5.3 Study Area

20 The study area for land use and agricultural effects broadly accommodates the area within the Application Boundary (extending to the limits of each landowner’s holding). To fully consider the potential effects of the Onshore Works on agricultural and related enterprises, the assessment has taken account of each complete land holding regardless of the extent to which the farm lies within or outwith the defined study corridor.

13.5.4 Cumulative Effects Assessment Approach

21 For the purposes of this chapter, the cumulative effects of the nearby Aikengall II and Crystal Rig III Wind Farm schemes (and their associated substations) as well as the SPT works to connect this proposed scheme to the grid have all been considered in respect of the effects on land take.

13.6 Baseline Description

13.6.1 Corridor Land Uses

22 The key land use within the Application Boundary is agriculture. At the eastern end of the corridor, the cable route would come onshore onto agricultural land south of Thorntonloch House and the nearby farm and caravan park, crossing the line of the John Muir Way long distance trail which follows the coast at this point. The cable will then cross the A1 trunk road and follows the southern side of this road in a westerly direction for approximately 2 km along the edge of several fields currently devoted to arable uses. The route then turns inland to the south west across arable land and crossing two C class roads running uphill and crossing another minor road 100 m west of the village of Innerwick.

23 From Thurston, the route continues uphill over sloping arable land before reaching more level ground and crossing a minor road immediately to the south of a residential property called Ogle Lodge. The alignment then follows the edge of farmland along the line of the C class road between Innerwick and Woodhall Farm for approximately 2.5 km crossing occasional woodland shelterbelts. The last 4 km of the route from Woodhall Farm to the proposed substation at Crystal Rig Wind Farm follows the line of the access track to the wind farm, initially past High Wood then across rough open grazing and over an increasingly steep gradient. This section of the cable route is crossed twice by and broadly parallels the line of a 400 kilovolt (kV) electricity transmission line associated with the wind farm. The cable route reaches flatter ground on the elevated site of the wind farm (c 300 m Above Ordnance Datum (AOD)) and terminates at the point of the existing substation at Crystal Rig.

13.6.2 Agricultural Activity

24 The cable corridor contains a wide range of farming enterprises. Near the coast, the land is used to grow vegetables and potatoes as well as cereals and oilseeds. As the route progresses inland and uphill, the land is capable of a more limited range of crops and the proportion of grass increases, stocked with cattle and sheep. West and uphill

from the Woodhall Farm area, the agriculture is based on permanent pasture and rough grazing used for extensive livestock systems.

25 The land capability for agriculture varies along the length of the Onshore Works. Close to the coast, the lower lying land is generally prime agricultural land with plots of land in Classes 1, 2 and 3₁. Westwards from the Innerwick and Thurston Manor areas, the land is predominantly in Classes 3₁ and 3₂. South and west of Woodhall Farm, the rising topography has soils generally in Class 4 which changes to Class 5 on the moorland areas on Dunbar Common. Areas of woodland and shelter belts are typically located on areas of limited soils falling in Class 6, particularly in the western part of the corridor. A summary of the length of cable route by land capability is provided in **Table 13.5**.

Land Capability for Agriculture	Length Present Along Cable Route	Proportion of Cable Route Length
Class 1	0.92 km	7.5%
Class 2	1.00 km	8.1%
Class 3 ₁	4.08 km	33.1%
Class 3 ₂	0.98 km	7.9%
Class 4	1.73 km	14.0%
Class 5	3.30 km	26.7%
Class 6	0.03 km	0.2%
Woodland	0.09 km	0.7%
Other non agricultural land	0.22 km	1.8%
Total	12.35 km	100%

Table 13.5: Land Capability

13.6.3 Sporting Activity

26 Sporting activity can be found from the Innerwick area through to the moorland area on Dunbar Common. Shooting for pheasant, partridge and duck is prevalent on the lower lying land with grouse shooting on the moorland. Stalking for roe deer is also undertaken in the area.

13.6.4 Forestry Activity

27 The largest area of forestry is High Wood, situated to the south of the cable route, at the western extent. Other areas of trees follow a linear form and are concentrated within the mid-section of the cable corridor, between High Wood and Thurston. On the most part, these stretches of trees connect to the network that lines the banks of Dry Burn which flows north of the cable route. These woodland belts are already intercepted by the existing road which the cable route is proposed to follow over this section of the corridor.

13.6.5 Soils and Environmental Sensitivity

28 The majority of the Cable Corridor, from the coastal strip to the area as far west as Woodhall, comprises brown forest soils with some gleys. The soils in the eastern part of the corridor as far west as Innerwick are predominantly soils from the Eckford/Innerwick Association which derive from fluvioglacial sands and gravels and are typically sandy loams which are productive for arable agriculture. The soils from Innerwick to Woodhall belong partly to those of the Eckford/Innerwick Association and partly to the Lauder Association whose parent materials are drifts derived from sandstones and conglomerates. A small section of the route corridor between Thorntonloch and

Innerwick is underlain by alluvial soils derived from riverine and lacustrine alluvial deposits. These soils are highly productive for agriculture and coincide with the only area of Class 1 land for agricultural land capability in the Cable Corridor.

29 Between Woodhall Farm and the western end of the corridor at Crystal Rig, the soils change slightly with the more elevated topography, slope and climate. This section of the route is underlain by humus-iron podzols and brown forest soils from the Lauder Association which have developed on stony sandy loam drift material. All of the soils and sub-soils in the route corridor are generally well drained with very localised areas of gleying and poorer drained land.

30 The baseline sensitivity of soils in the eastern part of the corridor (from the coast to Woodhall) is defined as moderate to high. West of Woodhall, the soils are considered to have a baseline sensitivity of moderate. The geological character of the route is described separately from this section in **Chapter 12: Geology, Ground Conditions, Groundwater and Coastal Processes**.

31 The majority of the Onshore Works corridor lies within an area of the Lothian and Borders Nitrate Vulnerable Zone (NVZ) which places controls over the extent and timings of application of nitrogen fertilisers to land by farmers. The cable corridor is not located in any SEPA monitored priority catchment (a catchment with a particular focus on minimising diffuse pollution and improving water quality).

13.6.6 Agricultural, Sporting and Forestry Land Interests

32 This section describes the principal agricultural land holdings and associated enterprises along the proposed Onshore Works route corridor. The baseline conditions are structured by farm/land holding within each section. A plan of the land holdings is shown in **Figure 13.1**.

33 **Table 13.6** presents a summary of the land uses, soils and farm enterprises along the Onshore Works route corridor. The description refers to the land uses in each land holding generically rather than what is specifically crossed by the application boundary (for which see the assessment of effects later in this chapter).

Land Holding	Land Use and Enterprise	Land Classifications
Thorntonloch	Predominantly arable (80 ha): wheat, barley, potatoes and vegetables No sporting interests	NVZ Mix of prime and non prime land
Area: 35 ha	<i>Baseline agricultural sensitivity: Moderate</i>	
Linkshead	Predominantly arable, small area of grazing by Thornton Burn	NVZ Mix of prime and non prime land
Area: 170 ha	<i>Baseline agricultural sensitivity: Moderate</i>	
Eweford	Predominantly arable (370 ha): wheat, barley, potatoes and vegetables No sporting interests	NVZ Prime land
Area: 390 ha (120 ha of which rented)	<i>Baseline agricultural sensitivity: High</i>	
Innerwick	Mixed arable (120 ha): wheat, barley, potatoes, hay and forage Pasture (50 ha) and rough grazing (80 ha) for breeding cows, bulls and sheep grazing Shooting for partridge, pheasant and duck. Roe deer	NVZ, Rural Development Contract (RDC) and Land Managers Option (LMO) agreements Prime land

Land Holding	Land Use and Enterprise	Land Classifications
	shooting	
Area: 320 ha (50 ha of which rented)	<i>Baseline agricultural sensitivity: High</i>	
Thurston Mains (with Aikengall II)	Mixed arable (320 ha): barley Pasture (120 ha) and rough/hill grazing (450 ha) for suckler cows and breeding ewes Farm woodland (40 ha). Extensive grouse, driven and rough shooting	NVZ, part Less Favoured Area (LFA), Organic, SSSI, RDC and LMO agreements Prime land
Area: 930 ha	<i>Baseline agricultural sensitivity: High</i>	
Spott Estate	Mixed arable: barley, wheat and let ground for potatoes Pasture for small herd of suckler cows and sheep grazing (let) Farm woodland. Driven shooting and rough shooting. Roe deer stalking	LMO, NVZ, Native Woodland planting Mix of prime and non prime land
Area: 910 ha	<i>Baseline agricultural sensitivity: High</i>	
Woodhall Farm	Predominantly permanent pasture for beef and sheep with small forage. 10 ha mixed woodland, some private small scale shooting and stalking	NVZ, LFA Mostly non prime land
Area: 210 ha (60 ha of which rented)	<i>Baseline agricultural sensitivity: Moderate</i>	
Weatherly	Upland permanent pasture and rough grazing for suckler cows and grazing cattle, and sheep in winter. Private pheasant shooting Small woodland	NVZ, LFA Non prime land Peat
Area: 240 ha	<i>Baseline agricultural sensitivity: Moderate</i>	
Halls	Mixed arable (200 ha): barley, wheat and oilseed rape Pasture (200 ha permanent pasture and 800 ha rough grazing) for suckler cows, cattle, breeding ewes and sheep grazing (let) Farm woodland. Grouse shooting	LFA, NVZ, SSSI (Woodhall Dean) Non prime land Peat
Area: 1,295 ha	<i>Baseline agricultural sensitivity: Moderate</i>	

Table 13.6: Summary of Land Holdings, Land Use and Enterprise and Land Classification within the Cable Corridor

- 34 The route therefore traverses a total of nine agricultural land interests. With the exception of Thorntonloch Farm, all of the land interests are substantial in area and typical of agricultural enterprises in this part of East Lothian. The total farmed area extends to 4,500 ha.
- 35 Of the nine agricultural land interests, four are assessed as being of High sensitivity with the remaining five land interests assessed as Moderate sensitivity.

13.6.7 The 'Do Nothing' Scenario

- 36 Without development of the Neart na Gaoithe Offshore Wind Farm and hence the need for the Onshore Works, it is not predicted that land uses within the corridor between the coast at Thorntonloch and the substation would change significantly. In the eastern half of the corridor where agricultural activity is primarily arable, there will be annual rotations and other changes in enterprise; however, it is not anticipated that the overall mix of crops and land uses would change significantly. In the western part of the corridor, arable gives way to permanent grazing land and then rough grazing and hill land and these land uses would not be expected to change significantly. The baseline land uses in the corridor are therefore also anticipated to be broadly the same for the proposed construction year for the project as they are at the time of the land use assessment (late 2011).

13.6.8 Routeing and Design Considerations

- 37 The application boundary has been developed in consultation with land owners and agricultural interests. This has enabled a preferred route to be developed which minimises the severance of farm units, the fragmentation of individual fields and smaller land interests, avoidance where possible of woodland parcels and minimised disturbance of field boundary features. In many sections of the route corridor, the cable route closely follows the alignment of the existing transportation corridors.

13.7 Assessment of Effects

13.7.1 Construction

13.7.1.1 Assessment of Effects: Land Use and Soils

Cable Route Construction

- 38 Cable route construction, whether by trenching or trenchless techniques, will require access for plant, vehicles and operatives in a temporary working corridor of approximately 20 m wide. As discussed in earlier chapters, the main Onshore Works corridor is 30 m wide in total for the majority of the route. A maximum total area of 43.2 ha is therefore temporarily required to undertake project construction. Within this corridor a smaller area (20 m wide) will be subject to direct soil stripping and excavation works to form the trenches necessary to lay the transmission cables and joining pits. The overall area of land subject to direct excavation works is estimated to be 24.7 ha. With the exception of road and railway crossings, the land affected by construction is almost entirely undeveloped agricultural land including land under arable cultivation, permanent pasture, rough grazing or associated land uses such as hedges, dykes and field margins.
- 39 The significance of effects on soil quality and land capability for agriculture is closely related to the procedures for managing, handling, storing and restoration of soils in all areas where works are temporary and land is being returned to agriculture. The soils in the Onshore Works corridor are generally of good quality and are well drained. The construction process will affect soils through compaction by vehicles and plant in the working corridor, from soil excavation and storage and from the potential erosion effects of wind and water during soil storage on site. Soils also have the potential to be contaminated by spillage of fuels and oils. A moderate to major effect on the soils within the construction corridor is predicted from the effects of compaction, excavation and re-instatement without mitigation.

13.7.1.2 Temporary Construction Compound

- 40 Formation of the temporary construction compound will require occupation of an area of 0.65 ha of arable land in the corner of a large field in the central section of the corridor (NGR NS706736). Following construction, after an estimated period of 12 months, the compound will be removed and the site will be restored to agricultural use. The use of the site for a construction compound will cause compaction of the soil which can result in reduced hydraulic conductivity and biological activity of the soil. This is predicted to reduce its long term capability for agriculture and

affect the soil's drainage capacity. A moderate to major effect on the soils affected by the construction compound is therefore predicted without mitigation.

13.7.1.3 Substation

- 41 The proposed new substation at Crystal Rig will require the temporary occupation of 14.54 ha of land which is currently rough hill grazing land located adjacent and immediately to the north of the existing wind farm substation (NGR NS664694). A minor effect on the soils affected by the substation is predicted.
- 42 A Peat Stability Assessment has been prepared (refer to **Appendix 11.1** of this ES) and is discussed in **Chapter 11: Geology, Ground Conditions, Groundwater and Coastal Processes**. This study identified the amount and depth of peat in and around the substation site.

13.7.1.4 Assessment of Effects: Agriculture and Sporting Activity

- 43 The proposed Onshore Works cross a total of nine agricultural land interests. Temporary land take will be required within each land holding to construct the cable and associated infrastructure. **Table 13.7** presents a breakdown of the length of the application boundary in each land interest, the estimated temporary land take and the land classification.

Land Holding	Route Length & Land Affected	Temporary Land Take by Land Classification
Thorntonloch	Cable Corridor length 230 m bisecting one small arable field adjacent to the foreshore (for transition pits) and crossing the corner of another arable field adjacent to A1 road.	Total of 0.98 ha (3%) from holding: 0.50 ha from Class 3 ₁ 0.48 ha from Class 5
Linkshead	Cable Corridor length 712 m bisecting two small arable fields either side of Thornton Burn and following the edge of one arable field adjacent to A1 road.	Total of 2.79 ha (2%) from holding: 0.69 ha from Class 2 1.3 ha from Class 3 ₁ 0.80 ha from Class 5
Eweford	Cable Corridor length 2,295 m following the edge of four arable fields adjacent to A1 road then bisecting one arable field.	Total of 8.46 ha (2%) from holding: 3.13 ha from Class 1 2.61 ha from Class 2 2.72 ha from Class 3 ₁
Innerwick	Cable Corridor length 1,268 m bisecting two large arable fields north and west of Innerwick and one small arable field south west of Innerwick.	Total of 6.19 ha (2%) from holding: 0.59 ha from Class 2 3.42 ha from Class 3 ₁ 2.17 ha from Class 3 ₂
Thurston Mains	Cable Corridor length 982 m bisecting two large arable fields, one either side of Ogle Lodge.	Total of 3.25 ha (<1%) from holding: 2.99 ha from Class 3 ₁ 0.26 ha from Class 3 ₂

Land Holding	Route Length & Land Affected	Temporary Land Take by Land Classification
Spott Estate	Cable Corridor length 1,989 m bisecting three large arable fields and following the edge of one arable field adjacent to a minor road. The most easterly field provides the site for the construction compound. Cable bisects two woodland shelterbelts.	Total of 6.88 ha (1%) from holding: 4.50 ha from Class 3 ₁ 1.70 ha from Class 3 ₂ 0.65 ha from Class 3 ₁ for compound (included in overall total for 3 ₁) 0.45 ha from Class 4 0.23 ha from Forestry & Woodland
Woodhall Farm	Cable Corridor length of 808 m following the edge of two arable fields then across grassland adjacent to the access track to Crystal Rig Wind Farm. Corridor bisects one woodland shelterbelt.	Total of 4.57 ha (2%) from holding: 3.25 ha from Class 4 1.32 ha from Class 5
Weatherly	Cable Corridor length of 3,481 m across grassland then hill grazing in five land parcels adjacent to the access track to Crystal Rig Wind Farm.	Total of 11.17 ha (5%) from holding: 2.95 ha from Class 4 7.87 ha from Class 5 0.35 ha from Class 6
Halls	Cable Corridor length of 368 m across hill grazing land in one land parcel adjacent to the access track to Crystal Rig Wind Farm. New substation on area of rough hill grazing adjacent to existing wind farm substation.	Total of 14.54 ha (1%) from holding: 14.54 ha from Class 5 for substation (of which 8.76 ha permanent loss)
TOTAL	Total Cable Corridor length across agricultural land and woodland of 12.13 km. Total 31 field parcels and three woodland parcels.	Total temporary land take of 50.07 ha. Total permanent land take of 8.76 ha for substation

Table 13.7: Land Take from Onshore Works

- 44 The total temporary agricultural land take of 50.07 ha and permanent land take of 8.76 ha (total 58.83 ha) represents 1% of the total land farmed by the affected land interests. The highest proportion of land affected is on Weatherly Farm at 5%. A further 4.76 ha of other land and inter tidal area will be affected by the scheme to give a total affected area of 63.59 ha. None of this land is of agricultural, sporting or farm interest and hence is not included in the totals above.
- 45 In total, 22.45 ha of prime land would be temporarily affected which represents 38% of the total land affected (45% of the temporary land affected). Of this prime land, 7.02 ha (31%) is classed as either Class 1 or Class 2 land.

- 46 The potential effects on agricultural activities from construction of the Onshore Works include:
- temporary reduced productive area from the affected fields directly through land occupied for construction and indirectly where areas of land cannot be accessed;
 - temporary field severance and fragmentation;
 - temporary access difficulties for agricultural machinery and operations;
 - temporary interruption to sporting activities;
 - temporary disruption to existing drainage schemes and provision of water to farm buildings and fields;
 - temporary loss of, or gaps in hedges, dykes and other boundary features;
 - temporary and in some cases permanent disruption to commitments under existing or future agri-environmental agreements;
 - potentially increased risk of introduction and/or spread of agricultural pests including potato cyst nematode (PCN) and clubroot; and
 - permanent loss of agricultural land for the substation at Crystal Rig.
- 47 The potential effects on sporting activities from construction of the Onshore Works include:
- temporary displacement and disturbance of natural and introduced bird and game populations within vicinity of the construction corridor;
 - temporary cessation to driven and rough shooting within the vicinity of the construction corridor; and
 - temporary cessation to stalking within the vicinity of the construction corridor.
- 48 The potential effects on woodland activities from construction of the Onshore Works include:
- temporary disturbance to woodland operations and access during construction; and
 - limited loss of woodland.
- 49 The construction of the scheme will be staged over a period of 18-24 months. This assessment has assumed that the programme for cable construction will effectively render the affected land areas unproductive for a period of 12 months. Whilst the cable works over an individual land interest will be completed in substantially less time than this in most areas, the season in which the land will be reinstated cannot be forecast with accuracy and on a worst case basis it is therefore assumed that a full year's agricultural activity will be lost to the affected land interest.
- 50 Predicted effects on agricultural land and enterprises have been undertaken on a land interest basis. **Table 13.8** below presents the predicted effect on the agricultural viability of each land interest in the corridor taking account of baseline activity, the construction method and the extent of construction activity in each holding identified from **Table 13.7**.

Land Holding	Predicted Temporary Effects
Thorntonloch	3% of land holding affected, all of which is productive arable land, largely of prime quality. Temporary disruption to agricultural operations and access in two fields. Field boundary dyke affected. Limited effect on land drainage or water supplies. Sensitivity: Moderate Magnitude: Medium Significance: Moderate
Linkshead	2% of land holding temporarily affected, all of which is productive arable land (partly prime quality and including Class 2 land). Field fragmentation may increase the area of temporary land take in two fields. Temporary disruption to agricultural operations and access and known field drainage in four fields. Field boundary dyke affected. Limited effect on water supplies. Sensitivity: Moderate Magnitude: Medium Significance: Moderate
Eweford	2% of land holding affected, all of which is productive arable land of prime quality, including Class 1 and Class 2 land. Field fragmentation may increase the area of temporary land take in two fields. One field severed. Temporary disruption to agricultural operations, access and field boundaries affecting five fields. Three field boundary dykes and one hedgerow affected. Temporary disruption to land drainage including open main field drain. Limited effect on water supplies. Sensitivity: High Magnitude: Medium Significance: Moderate to Major
Innerwick	2% of land holding affected, all of which is productive arable land, largely of prime quality. Three fields temporarily severed. Temporary disruption to agricultural and sporting operations, access and field boundaries in three fields. Limited effect on known land drainage or water supplies. Sensitivity: High Magnitude: Medium Significance: Moderate
Thurston Mains	<1% of land holding affected, all of which is productive arable land, mainly of prime quality. Two fields severed. Temporary disruption to agricultural and sporting operations, access and field boundaries in four fields. Four hedgerows affected subject to agreement under agri-environment scheme. Limited effect on known land drainage. Route crosses mains water pipe. Sensitivity: High Magnitude: Low Significance: Minor
Spott Estate	1% of land holding affected, much of which is productive arable land (partly prime quality). Field fragmentation may increase the area of temporary land take in one field. Land take also

Land Holding	Predicted Temporary Effects
	increased by siting of construction compound. Two further fields severed. Temporary disruption to agricultural operations and access and known field drainage in four fields and two woodland parcels. Disruption to field boundary hedge and two shelterbelts. Disruption to known field drainage. Limited effect on field water supplies. Sensitivity: High Magnitude: Low Significance: Moderate
Woodhall Farm	2% of land holding affected, most of which is permanent pasture. Field fragmentation may increase the area of temporary land take in one field. Temporary disruption to agricultural and sporting operations, access and field boundaries in three fields and one woodland shelterbelt. Crosses private water supply to farm house. Limited effect on known land drainage. Sensitivity: Moderate Magnitude: Medium Significance: Moderate
Weatherly	5% of land holding affected, most of which is current access track, permanent pasture and rough hill grazing. Temporary disruption to agricultural and sporting operations and access in five land parcels. Crosses private water supply to farm house. Limited effect on known land drainage. Sensitivity: Moderate Magnitude: Medium Significance: Moderate
Halls	1% of land holding affected, most of which is current access track and rough hill grazing. Permanent land take on footprint of proposed substation. Temporary disruption to agricultural and sporting operations and access in one land parcel. Limited effect on known land drainage. Sensitivity: Moderate Magnitude: Medium Significance: Moderate

Table 13.8: Agricultural Effects during Construction

13.7.1.5 Mitigation: Land Use and Soils

51 A Soil Resource Management Plan (SRMP) will be developed in detail prior to construction to ensure that soil resources are managed in accordance with best practice¹ and soil mitigation measures are fully implemented on a specific basis within each section of the route corridor. This will form part of an overall Construction Environmental Management Plan. The principles that the SRMP will follow are:

- a Soil Resource Survey will be completed prior to any earthworks operations to inform the plan and map, delineate, quantify and characterise the topsoils and subsoils within the route corridor;

¹ Including DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and British Standards Institute (2005):BS5837:2005 Trees in Relation to Construction - Recommendations.

- stripping, stockpiling or placing of soil will be done in the driest conditions possible using tracked equipment where possible to reduce compaction;
 - traffic movement will be confined to designated routes;
 - soil storage periods will be kept as short as possible;
 - stockpiles of different soil materials will be clearly defined; and
 - methods will be employed at all times to limit the risk of spread of pests and soil borne diseases.
- 52 The SRMP will also include information on acceptable standards and soil handling techniques:
- a pre-disturbance record of soil physical characteristics will be prepared for each land parcel disturbed;
 - a restoration specification will be prepared for each land parcel affected;
 - a topsoil and subsoil stripping methodology including stripping depth assessment will be developed to protect soil types (topsoil and subsoil) and its quality and fertility;
 - guidance will be included on assessing suitability for handling based on soil wetness and plastic limit;
 - guidance will be included on the most suitable equipment for soil handling;
 - advice will be provided on soil storage and stockpiling reflecting soil moisture and soil consistency, stockpile location and stability as well as stockpile protection and maintenance; and
 - a replacement and aftercare scheme will be developed, particularly to alleviate compaction and ensure the integrity of field drainage systems.
- 53 Construction practices will adhere to other commitments within the Construction Environmental Management Plan (see **Chapter 5 Project Description**) which will reduce the risk of damage and contamination to soils. A person responsible for supervising soil management will be identified.
- 54 The effect of the construction compound on soils and agricultural land capability will be mitigated through the establishment of the site with appropriate soil protection measures such as geogrids which will limit the compaction effects of storage of plant and materials and accommodation buildings. Similar procedures will be adopted to mitigate the compaction potential of vehicles and plant tracking across agricultural land to reach the cable corridor and along the working tracks to be used for trenching work adjacent to the cable alignment.
- 55 Stripping and soil stockpiling are critical processes in the protection of soil quality, the soils physical condition and in avoidance of soil erosion, pollution to watercourses and increased flooding risk. In accordance with the SRMP, all soil stripping, excavation and storage will be managed during the construction process to prevent compaction, mixing of subsoils and topsoil and erosion from wind and water. Measures will include:
- soil stripping, handling and storage activities will be avoided as far as possible during periods of very wet weather (e.g. >10mm in 24hrs);
 - where wet plastic soils are stripped, soils will be dried out in windrows prior to stockpiling and/or replacement;
 - soil storage mounds will be limited in height (no higher than 3 m for dry topsoil and 5 m for dry subsoil) and in slope (maximum side slope of 1 in 2 or 25°) and seeded to avoid erosion where they will be required for a substantial period of time (6 months or more);
 - construction machinery will be tracked to minimise compaction from regular movements across the same area of land.
- 56 Peat has been identified in the study area and is limited to the substation site and 400 m of cable corridor adjacent to the substation. The baseline hazard rank and subsequent hazard rank has been assessed as insignificant. The potential for a peat slide occurrence is considered unlikely. Suitable engineering will be employed to ensure the stability is maintained. This will be ensured through the development of a Peat Management Plan (PMP) in accordance with the document 'Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste' (it is intended that the PMP also forms part of the overall CEMP). Reuse options for surplus peat will include:
- blending for use as a reinstatement material;
 - landscaping (e.g. through creation of berms around the substation);
 - use in the substation base; and
 - cable backfilling.
- 57 Other uses may include:
- peatland restoration such as ditch blocking; and
 - dewatering for use as a horticultural product.
- 58 Scottish soils are a very valuable store for carbon, particularly the more peaty soils. Soil carbon can be lost through exposure of soil organic matter to oxygen, decomposition of soil organic matter or through erosion. The methods outlined in the SRMP will limit the levels of nitrous oxide emissions arising from the works and consequently soil carbon reserves will be protected as far as practically possible.
- 13.7.1.6 Mitigation: Agriculture and Sporting Activity**
- 59 Mitigation measures to avoid or reduce effects of construction on agricultural and sporting activity will include:
- pre construction consultation with landowners and occupiers to agree farm specific procedures, dates of entry and schedules of condition relating to land affected;
 - maintenance of access for farming operations including for movement of machinery, vehicles and stock;
 - the exclusion of livestock from all working areas through erection of appropriate fencing from the works;
 - maintenance of water supplies for livestock or alternative provision made;
 - full reinstatement of all field/farm boundary features (including hedges and dykes) to be temporarily removed, and any farm roads and tracks affected by construction works;
 - reinstatement of agricultural land to a condition as near as reasonable practicable to that existing prior to commencement of works;
 - minimising of disruption to field drains and securing the integrity of all drains to be intercepted during construction through installation of cut-off drains. All drainage will be fully reinstated following cable installation.
 - through programming of construction in consultation with land owners and managers, minimisation of disruption to agricultural livestock activity as far as possible and in particular relating to timing for lambing and calving in the western part of the corridor; and
 - through programming of construction in consultation with land owners and managers, minimisation of disruption to shooting based sporting activity as far as possible.
- 60 In locations where the presence of agricultural pests such as PCN has been identified, plant and vehicles which are used to track and work across areas of arable land will be subject to wheel washing and disinfecting procedures wherever they move on/off public roads and whenever they cross between separate land interests. These procedures are necessary to avoid the introduction or spread of agricultural pests into areas which are free of such infestation.
- 13.7.1.7 Mitigation: Woodland**
- 61 In locations where the route corridor crosses the line of three shelterbelts, to the south of the minor road connecting Woodhall with Innerwick, the Application Boundary has been locally diverted to minimise the effect on woodland loss and a trenchless crossing technique will be used at all three locations. Consequently, no loss of woodlands is expected. Further details are provided in **Chapter 8: Terrestrial and Inter-tidal Ecology and Ornithology** and **Chapter 11: Landscape and Visual Amenity**.
- 13.7.1.8 Residual Effects**
- 62 The project will not result in any significant permanent change or effect to agricultural land use. With the exception of the new substation at Crystal Rig Wind Farm, all land within the cable corridor will be returned to its previous (primarily agricultural) use after construction. No significant residual effects on woodlands or shelterbelts are predicted.
- 63 The temporary construction compound will result in some compaction and deterioration in soil quality and land capability in an area of prime land. This is not predicted to have a significant effect on the viability of either the larger field within which the compound will be located or the farm business at Spott Estate. A minor residual effect on soil quality is predicted over the 0.65 ha area affected by the compound. In the longer term, this effect may be reduced through the soil improvement effects of agricultural activities such as tillage and crop rotation.

- 64 The residual effect of construction works throughout the cable corridor on soils and agricultural land capability is predicted to be **minor** and not significant. Mitigation measures will reduce the potential effects on soils from construction and provided restoration is effective; the soils replaced above the cable pits will not be significantly damaged from their disturbance.
- 65 The residual effect on soils from the development of the substation is **minor** and not considered to be significant in the context of their prevalence and agricultural uses.
- 66 The mitigation measures presented in this chapter, whilst minimising disturbance during construction, are not expected to reduce the significance of temporary residual effects during construction. This is because the mitigation does not reduce the degree of land take. The predicted significance of residual effects for each land interest is presented in **Table 13.9**.

Land Holding	Predicted Temporary Residual Effects
Thorntonloch	Significance: Moderate
Linkshead	Significance: Moderate
Eweford	Significance: Moderate to Major
Innerwick	Significance: Moderate
Thurston Mains	Significance: Minor
Spott Estate	Significance: Moderate
Woodhall Farm	Significance: Moderate
Weatherly	Significance: Moderate
Halls	Significance: Moderate

Table 13.9: Temporary Residual Effects on Land Holdings during Construction

13.7.2 Operation

13.7.2.1 Assessment of Effects: Land Use and Soils

- 67 High voltage underground electricity cables can cause localised increases in soil temperature through dissipation of heat from the underground cables. The heat output will be proportional to the current in the cables at any time. The degree of soil heating is influenced by: the number, size and type (capacity and type of conductor material) of cables; the type of backfill material; the characteristics of the reinstated soil, (type, structure, organic content, compaction, water content, drainage); and ambient air temperature. Together, these factors affect the specific heat capacity of the soil, the heat insulation properties of the soil, and the temperature gradient/rate at which heat is transferred through the soil. As there are a number of different soil types along the route of the cable, increases in soil temperature from the underground cable will vary. Local increases in soil temperature dissipate up to 6.5 m from the trench centreline.
- 68 Six 220kV electric cables in two circuits (each circuit contains three cables), will be laid along with two communication (fibre optic) cables (one with each circuit). The electric cables will be made of aluminium conductor material and will have a maximum anticipated current flow of 590A under normal operating conditions. The cables will be laid on a sand bed and the trenches will be backfilled with a stabilised material (cement bound sand/sand) with concrete protection covers laid on top of the stabilised material and marking the delineation between it and native material backfill. The cables will be laid at a depth of 1100 mm on 100 mm of sand in either a trefoil or flat arrangement.
- 69 Soil temperature has an effect on seed germination, root and shoot growth, nutrient and mineral uptake and plant growth. These processes reach their maximum level at an optimum temperature and are reduced both above and

below this point. Increases in soil temperature provide a competitive advantage for some species due to the effects on seed viability and growth responses. An increase in soil root zone temperature can stimulate plant growth by enhancing metabolic activity and by changing the length of the growing season. Observable patterns of differential growth are possible across the width of an underground Cable Corridor.

- 70 Excavation and installation of cables is known to have an effect on soil properties, predominantly compaction, loss of soil structure and alteration of soil water content. This can lead to reduced germination success. Compaction reduces soil insulation properties and increases heat transmissivity.
- 71 The in-combination effects of soil disturbance, soil temperature, soil types and climatic conditions may result in unpredictable effects on vegetation response as a consequence of operation of the proposed transmission cable. Evidence of change in vegetation (growth and diversity) associated with Extra High Voltage cables is more commonly seen in environments where there is already a naturally high species diversity, species are present that are adapted to early and rapid germination and/or have a vigorous plant growth response to temperature. The combination of effects can lead to changes in species diversity in comparison to surrounding vegetation. This effect is most likely seen in uncultivated rather than cultivated land.
- 72 Following restoration of soils and return of the land affected to its previous, primarily agricultural uses, operation of the cable and any associated maintenance is not predicted to have significant effects on land uses, soil quality and integrity or the residual agricultural land classification of the soils. However, changes in species diversity may be seen in some parts of the proposed route (for example in the uncultivated upland areas).

13.7.2.2 Assessment of Effects: Agriculture, Sporting and Woodland Activities

- 73 Following restoration works, there may be a slight decline in the productivity of arable agricultural land which was in the construction corridor due to the disruption of soils and drainage systems. As discussed above, this may be offset, at least in part, by localised variation in plant growth response. However, this effect is not predicted to have a significant effect on agricultural operations or the business viability of any of the land interests in the corridor. Routine cable maintenance activity in the operational phase of the development is also not predicted to have a significant effect on agriculture, sporting and farm businesses.
- 74 There will be no significant effects from operation of the Onshore Works on woodlands or shelterbelts. **Chapter 8: Terrestrial and Inter-tidal Ecology and Ornithology** and **Chapter 11: Landscape and Visual Amenity** provide more details on this.

13.7.2.3 Mitigation

- 75 Occasional access across agricultural land for maintenance purposes will be required. The potential effects of vehicle movements on soils and agricultural operation will be mitigated through following agreed access routes/approaches and protocols regarding contact with landowners to avoid interference with farming and sporting operations or stock management.

13.7.2.4 Residual Effects

- 76 No significant residual effects are predicted from operations and maintenance on land use, woodland, soils or agricultural and sporting activity in the Onshore Works corridor.

13.7.3 Decommissioning of the Cable, Transition Pits and Other Related Components

- 77 Potential effects during decommissioning of the cable, transition pits and other related components are likely to be similar to those predicted during construction (the significance of effects is not anticipated to be any greater than at construction). Effects anticipated include:

13.7.3.1 Land Use and Soils

- temporary loss of land required to undertake decommissioning (anticipated to be no more than predicted for construction i.e. a maximum total area of 43.2 ha) with a total of nine agricultural land interests affected;
- damage to land and soils through compaction, re-excavation, re-instatement;
- contamination of land and soils through accidental spillage of fuels/oils;

13.7.3.2 Agriculture

- temporary reduced productive area from the affected fields directly through land occupied for decommissioning and indirectly where areas of land cannot be accessed;
- temporary field severance and fragmentation;
- temporary access difficulties for agricultural machinery and operations;
- temporary disruption to existing drainage schemes and provision of water to farm buildings and fields;
- temporary loss of, or gaps, in hedges, dykes and other boundary features;
- temporary and in some cases permanent disruption to commitments under existing or future agri-environmental agreements;
- potentially increased risk of introduction and/or spread of agricultural pests including potato cyst nematode and clubroot.

13.7.3.3 Sporting and Woodland Activity

- temporary interruption to sporting activities;
- temporary displacement and disturbance of natural and introduced bird and game populations within the vicinity of decommissioning activities;
- temporary cessation to driven and rough shooting within the vicinity of decommissioning activities;
- temporary cessation to stalking within the vicinity of the decommissioning activities;
- temporary disturbance to woodland operations during decommissioning.

78 As for construction, effects are predicted to be of **moderate** to **major** significance, albeit for a temporary period.

13.7.3.4 Mitigation: Land Use and Soils

79 Mitigation would include the implementation of a range of measures set out in Management Plans for Soil Resources and Peat as proposed for the construction phase.

13.7.3.1 Mitigation: Agriculture, Sporting and Woodland Activities

80 Mitigation to limit effects on agriculture, sporting and woodland activity during decommissioning would include the range of measures put forward during construction, for example, pre-decommissioning consultation with landowners and occupiers to agree farm specific procedures, dates of entry and schedules of condition relating to land affected.

13.7.4 Decommissioning of the Substation

81 The substation would be decommissioned at the end of its life. This process would allow the return of 3.30 ha of land to agriculture (grazing). The decommissioning process would involve removal of all the substation infrastructure, levelling the site, and the importing of subsoil and topsoil material of sufficient quality to reinstate the land to the same land capability for agriculture classification as before construction (LCA Class 5).

82 Once the topsoil is reinstated, appropriate grassland cover would be sown to blend with the species mix in the surrounding land. Monitoring of the reinstated land would continue for two years to identify any further remedial reinstatement works such as drainage.

13.8 Monitoring

83 Monitoring will be undertaken during construction by the Ecological Clerk of Works (or equivalent) to ensure that soil stripping, excavation works, soil storage and protection measures are effectively implemented to prevent damage to soils and erosion. General construction activities will also be monitored to ensure that plant and vehicles follow designated routes and do not cross or cause compaction of soils and agricultural land which has not been specifically allocated to the construction corridor. Where measures are necessary to control agricultural pests and diseases such as wheel washing of plant which need to access different farm units and fields, these will also be monitored to ensure that procedures are followed effectively.

84 The construction team will appoint a liaison manager who will maintain regular dialogue with farmers and agricultural contractors in the corridor during the construction works, the period of land reinstatement and for an agreed period of time following reinstatement to ensure that land is returned to its former uses in the best possible condition. Land managers and farmers will be kept advised by the liaison manager throughout the construction

process of significant activities which may affect their land management and agricultural activities, including any changes to construction operations and schedules.

13.9 Assessment of In Combination Effects

85 In combination effects are not predicted from the 'Project' on Soils, Agriculture and Land Use as the Offshore Works do not affect any areas of agriculture. Potential in combination effects on coastal erosion are considered in **Chapter 11: Geology, Ground Conditions, Groundwater and Coastal Processes**.

13.10 Assessment of Cumulative Effects

13.10.1 Construction

86 The cumulative effects of this proposed development with the Aikengall II and Crystal Rig III wind farm schemes (and associated substations) has been considered. Estimated land take for the Aikengall II scheme has been estimated in the ES (which accompanies this scheme) as 0.90 ha temporary and 11.00 ha permanent. A further 1.35 ha permanent land take would result from the SPT substation development adjacent to the substation site to allow grid connection for Neart na Gaoithe Offshore Wind Farm. No similar figures are available for Crystal Rig III. However, it can be assumed that there will be both temporary and permanent land take arising from the development. Cumulative effects that can be quantified are therefore temporary land loss of 50.97 ha and further permanent land loss of 19.76 ha.

87 The cumulative effects on soils, land use and agriculture are assessed as being **minor**.

13.10.2 Operation

88 Operational effects on soils, land use and agriculture are assessed as being **minor**.

13.11 Summary

89 **Table 13.10** below summarises the predicted significant effects of the development on Soils, Agriculture and Land Use.

Predicted Effects	Significance	Mitigation	Significance of Residual Effects
Construction			
Temporary loss of 50.07 ha of agricultural land during construction period, of which 22.45 ha is prime land	Eight land interests moderate or above, one minor	Consultation, good practice construction methods, programming of works and best practice re-instatement	Eight land interests moderate or above, one minor .
Temporary reduction in productivity arising from land disturbance	Moderate to major	Good practice re-instatement and aftercare	Minor
Cumulative & In-combination Effects			
Temporary land loss of 50.97 and further permanent land loss of 19.76 ha.	Minor to major	Design, consultation, programming, good practice construction, re-instatement and aftercare.	Minor

Table 13.10: Summary of Predicted Significant Effects

13.12 References

90 The principal references used to support the assessment of effects on soils, agriculture and land use have been previously cited at the start of this chapter under 'Guidance and Legislation' and 'Data Sources'.

