3.0 Desk Based Review

3.1 Site Description

The proposed development is located within the Ochil Hills, approximately 2.9km north of the settlement of Alva. The nearest proposed turbine is 3.2km from Alva, 5.3km from the village of Blackford and 5.7km from Greenloaning. The proposed development would be located across the administrative boundaries of both Clackmannanshire, and Perth and Kinross Councils, centred on National Grid Reference (NGR) NN 87737 02889.

The proposed development is located on predominantly upland moorland that is managed as farmland grazing. There are areas of young forestry plantations in the north. The location and layout of the proposed development are detailed on **Figure 10.1.1** and **Figure 10.1.2**.

3.2 Topography

From review of Ordnance Survey (OS) mapping, the topography across the proposed development consists largely of the Ochil Hills plateau with rounded tops and moderate to steep slopes.

The ground elevation within the proposed development is at approximately 142m AOD near Blackford where the proposed development is accessed from the A9 near Longfauld and then increases in elevation as the access track climbs up to 268m AOD at the junction of the access to Carim Lodge. The access track then climbs steeply, rising to 520m AOD at Little Corum and into the main turbine areas located on the hill tops and plateau with the highest point within the development boundary located adjacent to the south eastern boundary at a height of 677m AOD at Ben Buck.

Photo 1: View facing north west from NGR NN 88705 03148, showing undulating open moorland, taken on 03/10/2023.

Photo 2: View facing east from NGR NN 88220 01788, showing areas of peat hagging, taken on 03/10/2023.

3.3 Geology

3.3.1 Artificial Ground

Based on the information available from the BGS Geoindex[12], no made ground deposits are present across the proposed development.

3.3.2 Superficial Geology

A review of the BGS Geoindex[12] indicates that peat is the most common superficial deposit mapped across the proposed development. There are localised areas of glacial till (Devensian) primarily situated on slopes and in valleys.

In addition, there are areas of the proposed development that are shown to be absent of any superficial deposits, particularly areas with steep slopes where bedrock may be exposed and in the north where the main access track and area of plantation forestry are located.

Figure 10.1.3 contained within this report details the superficial geology BGS mapping across the proposed development.

[12] BGS Online Viewer, available at [https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.133433804.376188765.1646739904-1030004651.1646739904]

Photo 3: Peat deposits with underlying glacial till substrate, taken at NGR NN 88137 01873.

3.3.3 Bedrock Geology

A review of the BGS Geoindex[12] indicates that the proposed development is predominantly underlain by the Ochil Volcanic Formation which consists of lava flows and volcaniclastic rocks. This unit is predominantly comprised of andesites and basalts, with localised areas of volcanic conglomerates and trachyandesites. The northern area of the site (along the Sheriffmuir road) is underlain by the Sheriffmuir Sandstone Member. This formation is comprised of early Devonian sandstones with minor mudstone units. Several dykes are noted primarily within the east of the proposed development, described as North Britain Siluro-Devonian Calc-Alkaline Dyke Suite.

Figure 10.1.4 contained within this report details the bedrock geology BGS mapping overlaid across the proposed development.

3.3.4 Structural Geology

A review of the BGS Geoindex[12] highlighted four faults located within the east of the site, all trending north to south.

3.4 Peatland Classification

The Scottish Government Carbon and Peatland Map 2016[13] indicates that the upland areas within the area of the site where the turbines and new access track are proposed to be located are predominantly underlain by Class 1 Peat. The proposed new section of access track from Carim Lodge to Little Corum is located on mineral soils and some Class 5 peatland. There are other more localised areas of Class 2, 3, 4 and 5 mostly located adjacent to watercourses.

[13] Scottish Government, Carbon and Peatland Map 2016, Available online at: map.environment.gov.scot/soil_maps/

Class 1 and 2 peatland are considered nationally important carbon-rich soils, deep peat and priority peatland habitat. These types of peatland are likely to be of high conservation value.

3.5 Geotechnical Hazards

The BGS Geoindex[12] indicates that there is no risk regarding the mass movement or instability of materials.

3.6 Mining and Quarrying

Information from The Coal Authority Online Viewer[14] indicates that there is no history of coal mining across the proposed development.

The BGS Geoindex[12] indicates that there are no quarries and pits located within the proposed development boundary.

There are various mines and quarries in relative proximity to the site. Upper Glendevon Dam is located adjacent to the eastern edge of the application boundary and approximately 2km east of the nearest proposed wind turbine. In addition, there are two mapped pits named Wharry Burn approximately 2.2km west of the western extent of the site.

3.7 Hydrogeology

Information from Scotland's Environment Online Map Viewer[15] indicate that the superficial deposits and bedrock present beneath the proposed development are unlikely to contain significant quantities of groundwater.

The BGS indicates two major bedrock aquifers present beneath the proposed development. The largest is comprised of unnamed Silurian to Devonian extrusive rocks, classed as low productivity aquifers, whereby small amounts of groundwater may be present within the near surface weathered zone or via secondary fractures. The Arbuthnott-Garvock Group underlies a localised area of the proposed development to the southwest of Upper Glendevon Reservoir.

This group is characterised as a moderately productive aquifer, comprised of sandstones, siltstones, mudstones, conglomerates and interbedded lavas that locally yield moderate quantities of groundwater.

The SEPA Water Classification Hub indicates that Ochils North (ID: 150499) and Ochils (ID: 150611) are the major groundwater bodies present beneath the proposed development. Both groundwater bodies are considered to have an overall quality status of 'good'.

3.8 Hydrology

Information from SEPA's Water Classification Hub[16] indicates that the majority of the proposed development is located within three main surface water catchment areas:

- The Allan Water (source to Greenloaning)
- The River Devon (source to Gairney Burn Confluence and the Gairney Burn confluence to estuary)

14 The Coal Authority, The Coal Authority Map Viewer, Available online at: https://datamine-cauk.hub.arcgis.com/

15 Scotland's Environment, Scotland's Environment Map, Available online at: https://map.environment.gov.scot/sewebmap/

16 SEPA, Water Classification Hub, available online at: https://www.sepa.org.uk/data-visualisation/water-classification-hub/

- The Wharry Burn

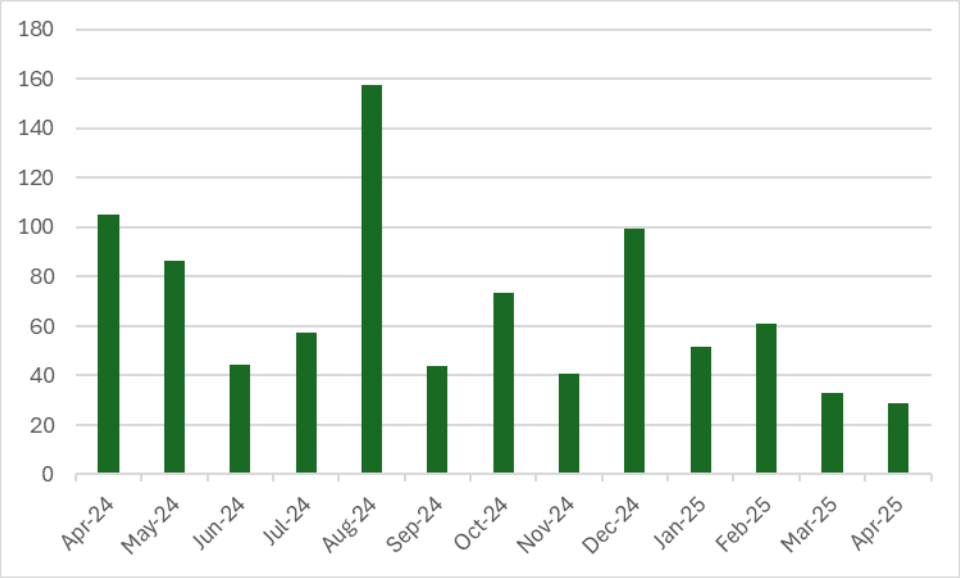
Parts of the central areas of the proposed development are drained by the Danny Burn and the Burn of Ogilvie to the north, both flowing north before discharging into the Allan Water.

The Finglen Burn drains part of the east of the site, before discharging into the River Devon further north, directly east of Turbine 12.

Alva Burn and its associated tributaries, including West, Middle and East Cameron Burn, are located in the south of the site adjacent to Turbines 1, 2 and 3. The Alva Burn flows southwards through Alva Glen, before discharging into the River Devon further south at Alva.

3.9 Rainfall

Periods of intense heavy rainfall are often seen as triggers for instability events. Rainfall data from one of closest SEPA weather stations (Tillicoultry Weather Station, Station Number 15158, approximately 5km south east of the application boundary, NGR NS 91638 96498) shows the average monthly rainfall in the region from April 2024 to April 2025. The highest monthly rainfall was 157.8mm recorded in August 2024.



3.10 Environmental Designations

Information from Scotland's Environment Online Map Viewer[17] indicates that there are no environmental designations (GAC, SAC and SSSI) located across the proposed development.

3.11 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

As described within **Chapter 10: Hydrology, Hydrogeology and Geology** the majority of potential GWDTE habitats are predominantly sustained by the high average rainfall, surface water runoff and water logging of low permeability bedrock and superficial deposits. However, some base rich groundwater flushes are recorded and support GWDTE habitat, and without appropriate safeguards are potentially at risk from the proposed development. Further details are provided within **Technical Appendix 10.6: GWDTE Assessment**.

17 Scotland's Environment, Scotland's Environment Map, Available online at: https://map.environment.gov.scot/sewebmap/

3.12 Private Water Supplies (PWS) and Licenced Sites

As described in **Chapter 8: Ecology** and **Chapter 10: Hydrology, Hydrogeology and Geology**, consultation with SEPA and local councils has identified private water supplies within the vicinity of the proposed development. It confirms that:

- no groundwater abstractions are located within the 250m of any element of the proposed wind farm infrastructure.
- three PWS source has been identified as potentially at risk from the proposed development, including a surface water abstraction for Tullibardine Distillery.
- three PWS sources are not at risk from the proposed development; and
- one property is confirmed to be supplied by mains but the distribution pipework may be at risk.

Measures required to safeguard the PWS's are given in **Technical Appendix 10.5: PWS Risk Assessment**.

3.13 Geomorphology

The site is generally characterised by an upland plateau with deep valleys and steep sided slopes. The main access from the north ascends steep slopes to reach the upland plateau. Areas of flatter expanses across the high elevation moorland exhibit an extensive blanket of peat deposits which have been subject to significant erosion due to a combination of land use pressures and the exposed nature of the proposed development and the network of surface water drainage and slopes.

The findings of the photographic review and site walkovers are summarised below in the following sections. Detailed geomorphology mapping is detailed on **Figure 10.1.5**.

3.13.1 Peat Instability

No evidence of pre-failure indicators or historic peat instability was noted during the walkovers and extensive surveys undertaken within the proposed development area. These features may include; tension cracks, tears in the acrotelm (upper vegetation mat), compression ridges, or bulges and thrusts. None of which were observed on site or from review of aerial imagery.

No evidence of instability was noted relating to natural/artificial drainage across the proposed development area during site walkovers or from review of aerial imagery.

If evidence of instability had been observed then further consideration of this would be included in Section 5.0 with a coefficient of 8 be used for the peat depth (see Table D).

The absence of any indications of instability and the presence of drainage, drained and actively eroding extensive peat hagging, gullying and bare peat may indicate that the site is actually less susceptible to large scale instability and the factors utilised in the assessment within Section 5.0 are considered appropriate to determine the likelihood of peat instability at the proposed development.

3.13.2 Peat Deposits

Peat deposits are most frequent across the central and eastern parts of the site. Deposits are typically localised and associated with topographic hollows, gentle slopes and flatter expanses that allow for the formation of peat. Peat is generally <0.5m along the main access track, from Carim Lodge to Little Corum.

Based on peat sampling during site visits (noted in Section 4.3), the peat across the site is typically fibrous and pseudo-fibrous with visible plant fibres and rootlets.

3.13.3 Peat Erosional Features

Peat haggs were frequently observed across the site during site visits and on aerial photography. Peat haggs are generally encountered within the central and eastern parts of the site where peat formations have formed. Peat haggs vary in size from approximately 0.5m to 2m in height. It is evident that the peat has been subject to both drainage and wind erosion, given the exposed nature of the area and interlinked network of surface water drainage and frequent slopes which allow for increased water runoff.

No areas of peat instability were noted where peat erosion was observed.

Photo 4: area of peat hagging resulting from drainage erosion, taken from NGR NN 88663 01057 facing north.

Photo 5: extensive area of eroded peat, taken from NGR NN 88138 01211 facing east.

3.13.4 Drainage

Drainage across the site is characterised by a network of streams and rivers, primarily located in the east, south and west of the site. Minor natural drainage pathways generally passed through eroded peatland and were observed to be mostly dry during walkovers. Larger watercourses are confined within steep sides valleys. Artificial drainage was noted within forestry plantations only.

No areas of peat instability were noted along artificial or natural drainage.

3.13.5 Forestry

There is a localised area of forestry plantation in the north of the site, comprising young coniferous trees. This is located within an area of predominantly organic soils. Shallow artificial drainage and furrows were observed within forestry plantations and noted to be dry at the time of walkovers.

No areas of instability were noted relating to forestry plantations.

3.13.6 Bedrock

The OS mapping and aerial photography do not indicate frequent bedrock exposures across the site. Site visits noted occasional bedrock outcrops, predominantly in the east and north of the proposed development.

No areas of peat instability were noted relating to bedrock exposures.