
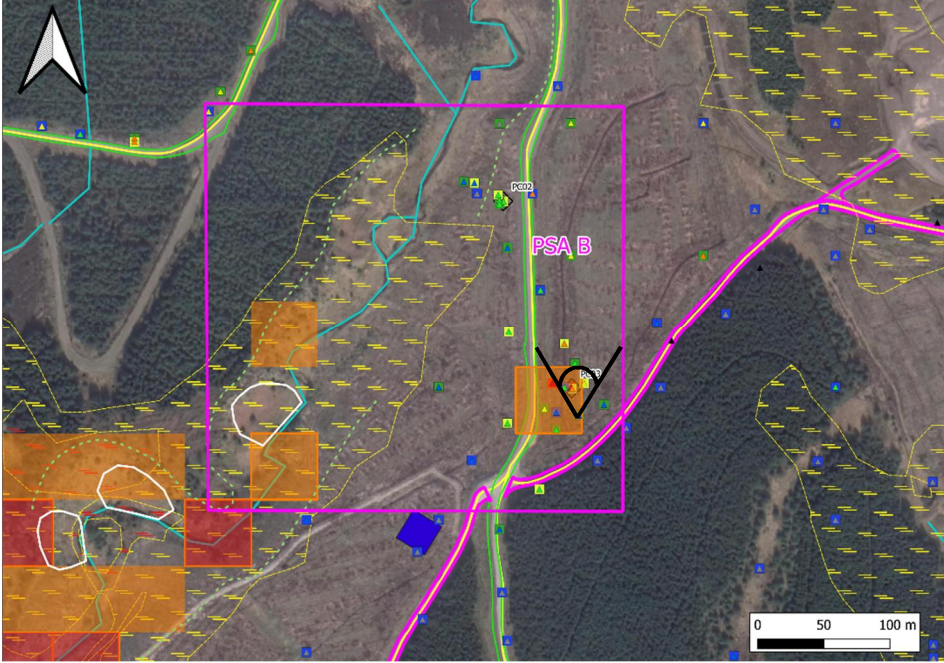


Annex B. Detailed Assessment Datasheet Descriptions

Legend for Detailed Assessment Datasheets

- Peat**
- Peat Stability Risk Areas
 - Potential Areas of Instability identified from Aerial Photograph
- Peat Depth (m)**
- ▲ 0
 - ▲ 0.0 - 0.5
 - ▲ 0.5 - 1
 - ▲ 1 - 1.5
 - ▲ 1.5 - 2.0
 - ▲ 2.0 - 2.5
 - ▲ 2.5 - 4.0
 - Break of Slope within Peat Stability Risk Areas
- Peat Constraints 1.5m+**
- ||||| 1.5 - 4.0
- FoS Grid**
- 0 - <1
 - 1 - <1.4
 - Photograph
- Initial Risk**
- High
 - Moderate
- Point FoS**
- 0 - 1
 - 1 - 1
 - 1 - 3
 - 3 +
 - Peat Cores
- Geosure**
- BGS Geosure Landslide Susceptibility Classifications**
- Class C
 - Class D
- Hydrology**
- OS Watercourse (1:10,000)
 - PWS Source
- Design**
- Application Boundary
 - Proposed Turbine Location
 - Proposed Crane Pad
 - Proposed Control Building
 - Proposed Met Mast
 - Proposed Borrow Pit Search Area
 - Operational Harestanes Access - To be Upgraded
 - Proposed New Access Track
 - Existing Forestry Track - To be Upgraded
 - Cable Route
 - Existing Construction Compound / Hardstanding
 - Existing Substation

<p>PSA Area A: Initial Likelihood - Probable; Consequence - Extremely High; Risk - High Revised Likelihood - Unlikely; Consequence - Extremely High; Risk - Low</p>	<p>Area Details</p>
<p>Good Practice and Design</p> <p>Section 1.8 details standard good practice measures. The existing operational Harestanes Windfarm access track, planned for upgrade, is located within 100m of three Initial High Risk cells and two Initial Moderate Risk cells as it runs above and parallel to the breaks of slope of the Tor Linn's incised valley and in relatively close proximity to Wallace's House Scheduled Monument. The track planned for upgrade is located immediately adjacent to the Tor Linn watercourse's 50m buffer zone.</p>	<p>This area is primarily identified due to the steeply sloping incised valley of the Tor Linn on the south eastern slope of Pumro Fell. Wallace's House Scheduled Monument is located in the north west of PSA Area A, north of the confluence of the Black Linn and Tor Linn channels, with grid cells within 100m evaluated with 'Extremely High' consequence outcomes. Aerial imagery shows this area as afforested with no evidence of instability. PSA Area A images with OS background and DTM data are also provided in Annex C. BGS GeoSure mapping has identified this general area as Class C where 'slope instability problems may be present or anticipated', with a small area on the lower slopes of the Torr Linn valley classified as Class D where 'slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site'.</p>
<p>Specific Mitigation, Potential Scale and Receptor</p> <p>Section 1.8 lists standard mitigation measures. Additional peat depth surveys shall enable a better understanding of the area to reduce the risk of any small-scale peat instability. This area is not considered at risk of mass peat instability as non-peaty soils are predominant, however, there is potential risk of non-peat instability and should be recorded in the Geotechnical Risk Register. Care should be taken to avoid increasing loading of slope to the north of the track upgrade, with slope support to be maintained for slopes to the south of the upgrade. Slope monitoring should be instigated pre-construction to both sides of this track section and additional slope management measures considered, which may lead to a requirement for slope support or erosion protection, such as use of gabion terraces/mattresses or other measures. Track drainage should avoid converging large or high velocity flows onto slopes to north in order to avoid scour and/or bank collapse.</p> <p>Although considered unlikely, should peat slide occur; approximated width 30m, length 30m, volume of peat 500m³; receptors being slopes above Tor Linn channel, Tor Linn and/or access track.</p>	<p>Peat depths in PSA Area A are typically less than 0.5m, with some isolated results of up to 0.70m and a mean probing depth of 0.25m for PSA Area A. Peat depths were generally non-peat or shallow peat within 100m of planned infrastructure. Limited additional probing was collected within the Initial High and Moderate Risk cells due to survey safety concerns in relation to steep slopes combined with unstable fallen trees, with a further limitation applied to avoid potential probing damage to Wallace's House Scheduled Monument. Slope gradients are generally steeper in the area north of the planned track upgrade, with two distinct breaks of slope below the existing track noted, where slope angles ranging up to 47 degrees. Local slope angles are increased by the bankings immediately to the north of the existing track, presumably using material excavated during the original track construction (see Photograph 6.9 in Site Reconnaissance section). From observation, this material appeared to be a mix of peaty soil, mineral soil and boulder clay, with no obvious bank instability.</p> <p>A peat core was initially planned to the north of the existing track, however due to locally shallow depths and visual evidence of non-peaty soils recorded, including track banks, no peat core was collected.</p> <p>The factor of safety values for peat probes ranged from 0.83 to 15.80, with the closest Initial Moderate Risk cell to planned infrastructure recording a factor of safety value of 0.97, based on an indicative peat depth of 0.99m and mean slope angle of 25 degrees. It is likely that shallower peat is present than the 0.99m estimated value, however, as mentioned above, this area was not safely accessible. If applying a shear strength value of 4kN/m², as literature lower-bound value, to this FoS grid cell, the revised FoS outcome would be 1.07. If applying the lowest shallow hand shear vane outcome from Site investigations (6kN/m²), the cell FoS value would be revised further to 1.61.</p>
<div data-bbox="566 947 979 1472" data-label="Image"> </div> <p>Photograph 6.11: View west along the steep banks of Tor Linn, from NGR: 303506, 590792 Photograph taken at approximately 175mAOD, looking along the upper break of slope. Also see Photographs 6.1 and 6.9, in the Site Reconnaissance section.</p>	<div data-bbox="1546 989 2650 1770" data-label="Figure"> </div> <p>Illustration 6.5: Aerial Image of PSA Area A</p>
<p>Revised Risk</p> <p>The grid cells closer to the Scheduled Monument retain Extremely High consequence status, however, as this feature is located above the Black Linn / Tor Linn valley on the opposite side to the track upgrade it will not be influenced by construction activities. Although this general area is identified by GeoSure as Class C, it does not exhibit typical peatland characteristics or any evidence of peat instability including from previous track construction, with non-peat soil cover predominant.</p> <p>Taking account of the peatland morphology, individual peat probe FoS, design and mitigation (including micro-siting to avoid deeper peat), peat-related instability is reduced to Unlikely and the Revised Risk reduced to Low. This area remains highlighted for ongoing slope instability risk, rather than peat instability risk.</p>	

<p>PSA Area B: Initial Likelihood - Probable; Consequence - High; Risk - Moderate Revised Likelihood - Unlikely; Consequence - High; Risk - Low</p>	<p>Area Details</p>
<p>Good Practice and Design</p> <p>Section 1.8 details standard good practice measures. The existing operational Harestanes Windfarm access track, planned for upgrade, passes through part of a single Initial Moderate Risk cell. The track to be upgraded is located immediately downslope of an area of level ground which includes a relatively small deposit of very deep peat. The existing track crosses the Glenkiln Burn in the north of PSA Area B and is within the watercourse's 50m buffer zone.</p>	<p>This area is primarily identified due to deep peat deposits on the lower slopes to the north of Whitefauld Hill, above the existing track. Given the proposed control building within 100m, the consequence value for the Initial Moderate Risk grid cell, with peat core PC03 within, is 'High'. Aerial photography identified slope instability and the site visit verified that this occurs adjacent to the incised watercourse channel on the left bank (north of channel), with active channel erosion and unvegetated slopes along this corridor, with more notable breaks of slope to the north. These instability features are not considered as peat-related, with fluvial erosion as the causal factor of local ground failure. BGS GeoSure mapping has identified large parts of the steeply sloping incised valley of the Glenkiln Burn as Class C where 'slope instability problems may be present or anticipated'. There were no instability signs within the area to the east of the existing track.</p>
<p>Specific Mitigation, Potential Scale and Receptor</p> <p>Section 1.8 lists standard mitigation measures. Additional peat data would be recommended, with peat characteristics recorded and micrositing considered to minimise peat disturbance. The upgrade of the existing track will require care to avoid removal of slope support to east or increased loading of slope to west. Slope monitoring should be undertaken of slopes close to the Initial Moderate Risk cell, which may lead to a requirement for slope support or erosion protection, such as use of gabion terraces/mattresses or other measures. Track drainage design should avoid converging flows into areas potentially prone to failure, such as the area adjacent to the Glenkiln Burn where active erosion and bank failure is evident. Blasting at BP01 to consider peat stability. This location should be recorded in the Geotechnical Risk Register. Although considered unlikely, should peat slide occur; approximated width 20m, length 20m, volume of peat 600m³; receptors being local hillside and/or access track.</p>	<p>This location has been clear-felled, with stumps retained <i>in situ</i> and large drainage channels flowing to north. These features have modified the peat body and limited potential for instability by reducing water content and anchoring peat via retained tree roots, also confining the extent of any mass movement. Deep peat of up to 3.0m was recorded on the level ground to the east of the existing track as an isolated deposit with nearby peat depths generally 0.5 to 1.5m, with a mean probe depth of 1.27m for PSA Area B. Further north, peat depths were generally less than 1.0m and non-peat soil was recorded below the break of slope to the west of the existing track, near PC02. At this location, there was exposure evidence of boulder clay / mineral soil underlying shallow surface peat on the Glenkiln Burn left bank (see Photograph 6.10 in the Site Reconnaissance section). Slope angles are generally less than 7 degrees to the east of the existing track, steepening west of the track to approximately 20 degrees below the break of slope above the incised Glenkiln Burn valley. Local to the track route, slope angles are increased by the embankment sections immediately to the west. This material appeared to be a mix of peaty soil, mineral soil and boulder clay, with no obvious bank instability.</p>
	<p>Peat core location PC03 had 2 cores taken (PC03a and PC03b) at a slope angle of 5 degrees, collected at depths of 1.5m and 3.0m, respectively, each recording Von Post humification class H4; Weakly Decomposed. This data suggests that amorphous catotelmic peat is not generally found at depths less than 3.0m locally. The hand shear vane's lowest recorded value, within a drainage channel at a depth of 1.0m, was 6kN/m². A peat core was also collected at PC02 on a 6 degree embankment slope below the existing track; H5 Von Post and lowest shear vane of 11kN/m².</p> <p>The factor of safety values for peat probes ranged from 0.98 to 7.41, with the Initial Moderate Risk cell crossed by the track to be upgraded recording a factor of safety value of 1.29, which included a 3.0m peat depth record (with an FoS point value of 0.98) and a mean slope of 5 degrees. This location was surrounded by shallower peat records and would be suggested as an outlier and precautionary depth value for calculations. If applying a shear strength value of 4kN/m², as literature lower-bound value, to this FoS grid cell, the revised FoS outcome would be 1.43. If applying the lowest hand shear vane outcome from PC03 (6kN/m²), the cell FoS value would be revised to 2.14.</p>
<p>Photograph 6.12: Looking north from PSA Area B at NGR 302172, 593616. Photograph taken at approximately 320m AOD, looking north toward existing track planned for upgrade. This photo shows the deep peat pocket on level ground to the east and the incised valley of the Glenkiln Burn to the west, as well as the existing track embankment. Also see Illustration 6.1 and Photographs 6.3, 6.4 and 6.10, in Sections 1.2 and 1.3.</p>	
<p>Revised Risk</p> <p>The existing track planned for upgrade retains 'High' consequence status. An isolated pocket of deep peat has been identified at the PC03 location, however, no peat instability evidence was observed at this location or identified on GeoSure data. The steep gradients and breaks of slope relating to the Glenkiln Burn are within the west of PSA Area B and identified as GeoSure Class C, however, all planned infrastructure avoids these fluvial erosion features. Taking account of the peatland morphology, existing drainage network, <i>in situ</i> retained tree roots, individual peat probe FoS, design and mitigation (including micrositing to avoid deeper peat), the Likelihood is reduced to Unlikely and the Revised Risk reduced to Low.</p>	<p>Illustration 6.6: Aerial Image of PSA Area B</p>

Annex C. Detailed Assessment GIS Images

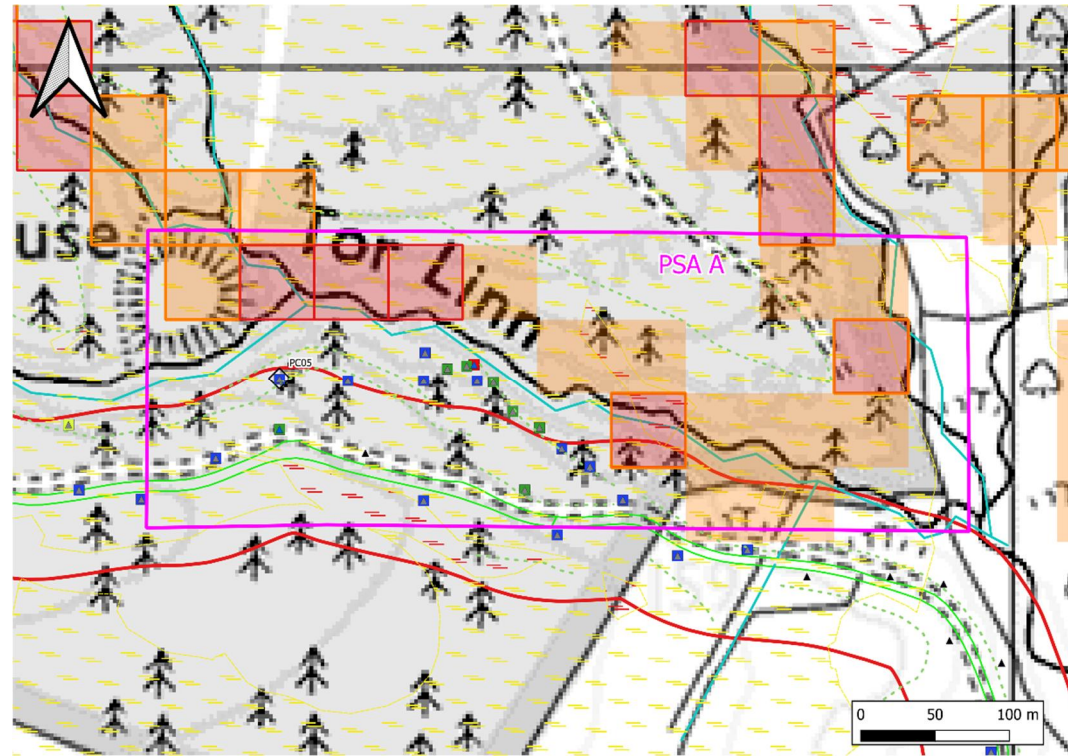


Illustration 6.7: OS overview of PSA Area A

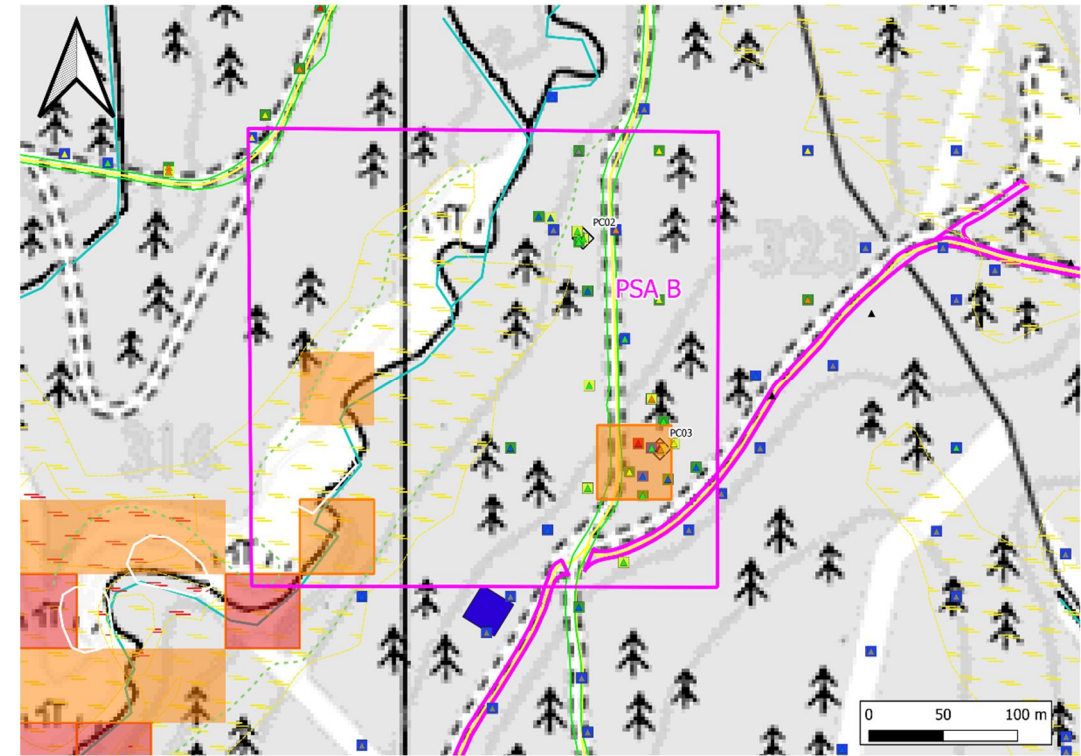


Illustration 6.9: OS overview of PSA Area B

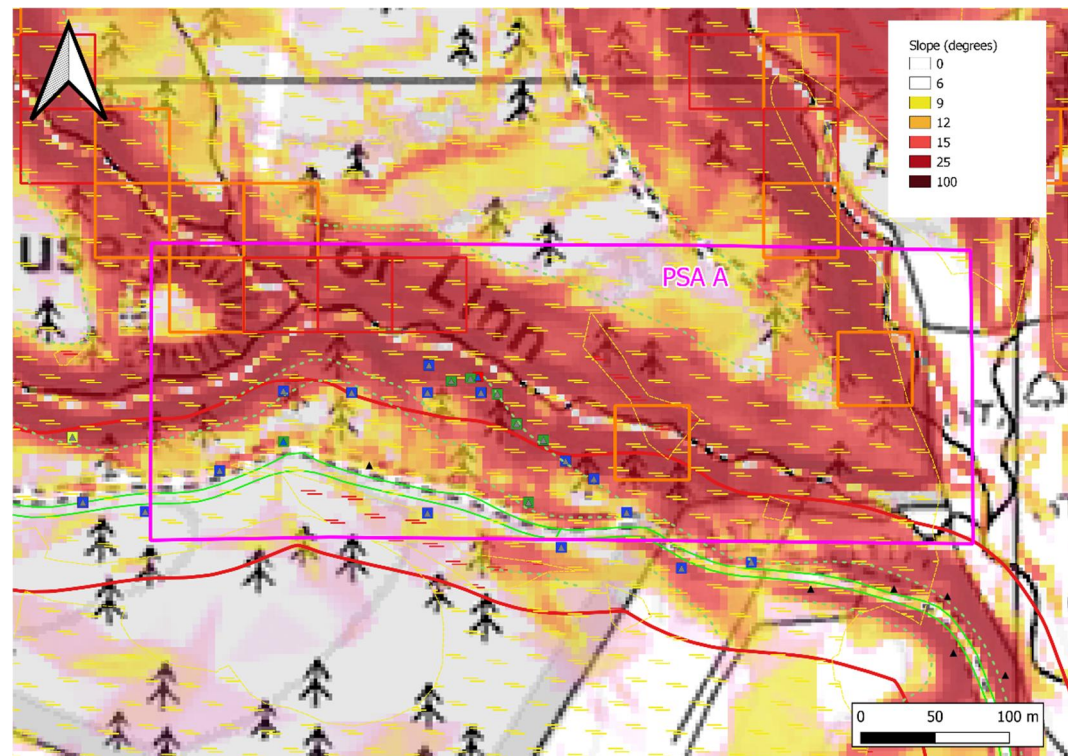


Illustration 6.8: OS overview with DTM of PSA Area A

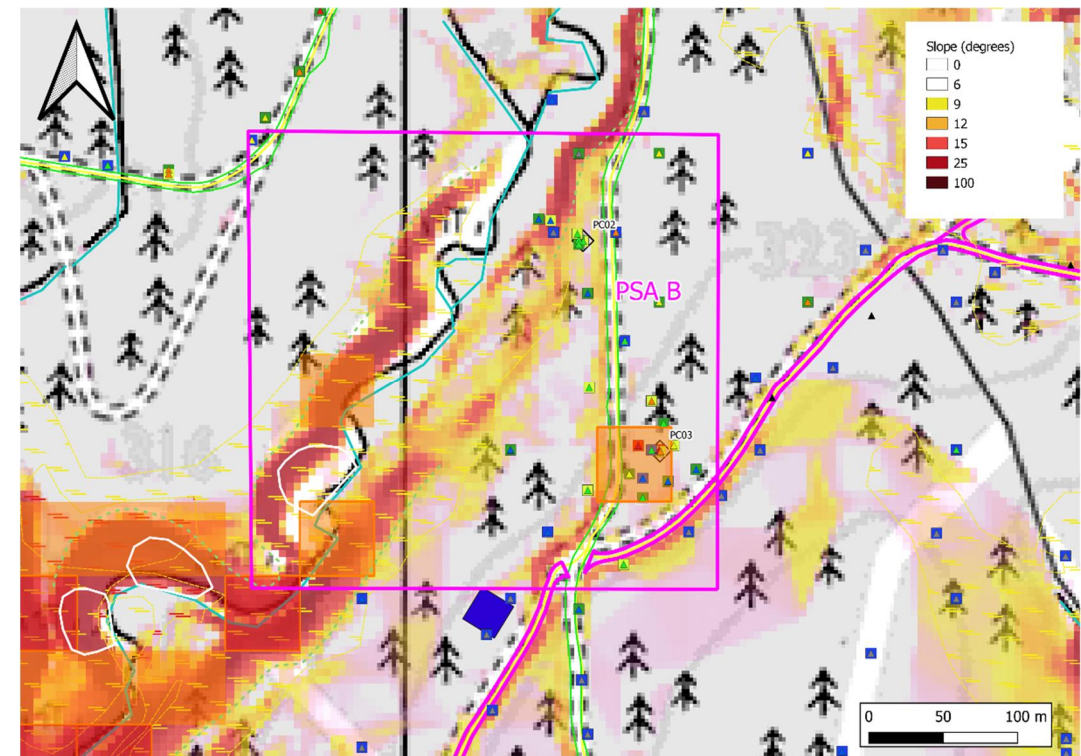


Illustration 6.10: OS overview with DTM of PSA Area B

Annex D. Peat Core Photographs



Photograph 6.13: Peat Core PC01a (shallow), NGR 300492, 593418



Photograph 6.14: Peat Core PC01b (deep), NGR 300492, 593418



Photograph 6.15: Peat Core PC02, NGR 302120, 593758



Photograph 6.16: Peat Core PC03a (shallow), NGR 302172, 593616



Photograph 6.17: Peat Core PC04, NGR 302338, 592685

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