Joining up nature across central Scotland

Action C8; Action C8; Innovative improvements at newly identified sites EcoCo new sites assessment: Low Moss

Description (How, what, where and when)
This activity will deliver management measures to improve ecological coherence in the East Ayrshire Coalfield area, specifically focusing on peatlands, blanket bog and including some element of woodland/farmland. It will be undertaken by East Ayrshire Coalfield Environment Initiative (CEI), in years 1-3.
Reasons why this action is necessary
The East Ayrshire Coalfield management zone includes a range of wetland, moorland and bog habitats, including blanket bog and lowland raised bogs which provide specialised habitat for biodiversity. While the bog habitats in the area represent some rich areas for wildlife, many have been damaged by drainage and fragmented by other land uses and this limits their value. Initial work to restore and enhance bog habitats has enabled improvement on individual sites and provided some benefit to the biodiversity of the region but the work proposed in this project is needed to create ecological linkages between areas of particular biodiversity value and to improve wider ecological coherence.
Beneficiary responsible for implementation
East Ayrshire Coalfield Environment Initiative (CEI)
Responsibilities in case several beneficiaries are implicated
N/A
Expected results (quantitative information when possible)
- Habitat assessment and restoration specification (with costs) **COMPLETED JUNE 2016** - Recommendations for ongoing management and monitoring - 25ha of bog enhancement - Community awareness event / training day - Installation of monitoring devices – dipwells and vegetation quadrats
How was the cost of the action estimated?
The costs for the action were estimated by an experienced contractor, Openspace Ltd, the same contractor that completed earlier phases of work at Airds Moss and Tappethill Moss.
Permissions/licences required
Landowner permission will be required to undertake the work. Depending on the activity, SEPA CAR licences may be required.

Ecological Coherence Assessment

This assessment follows the steps determined in the EcoCo Life “ecological coherence protocol” developed under Action A3

1. EcoCo Partner

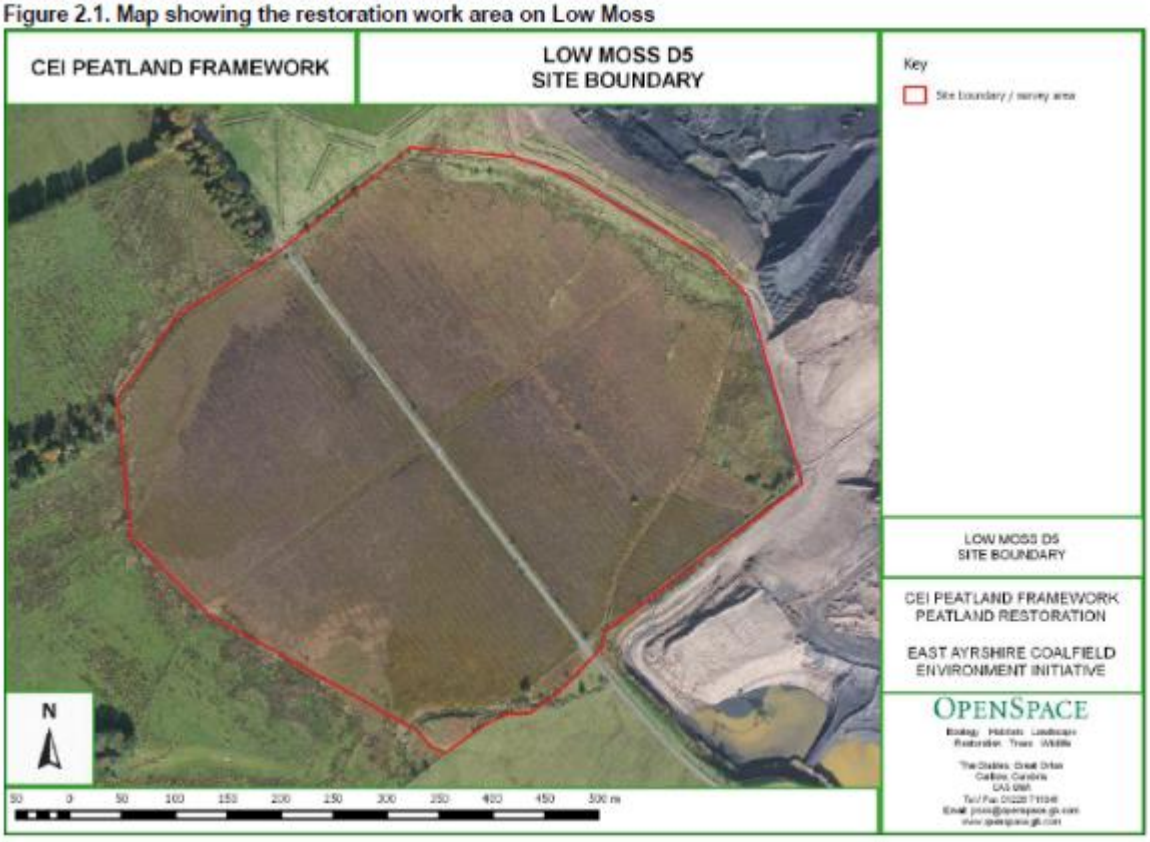
East Ayrshire Coalfield Environment Initiative (CEI)

2. Vision

The site covers about 25ha and the peat habitat is an affinity to a raised bog. Raised peat bog is a priority habitat in Annex 1 of the EC Habitats Directive and priority habitats in the UK Biodiversity Action Plan. The protection and condition of the peat habitat is therefore of paramount importance.

Low Moss is a Provisional Wildlife Site (PWS) situated roughly 1 mile east of the village of Lugar in East Ayrshire. The bog habitat is degraded as a result of drainage, burning and possibly overgrazing. It is directly adjacent to Duncanziemere Open Cast Coal site (OCCS) and has been the subject of a recent planning proposal to extend the OCCS into the moss, although the application was subsequently rejected. Reports from monitoring surveys carried out on the east side of Low Moss suggest that the OCCS has caused little damage to the bog. The CEI have been exploring a potential project to enhance Low Moss by carrying out ditch blocking as part of EcoCo LIFE C2 actions. It is one of few sites near a settlement that could be accessed by visitor on foot. It is suggested that this site could be a valuable educational resource to local communities, schools and provide accessible nature to visiting walkers. The CEI aims to foster interest in this site with the local communities, perhaps establishing a “Friends of” group. Members of the group would be encouraged to take part in activities such as scrub clearance, installing plastic piling, and monitoring water levels, vegetation and record wildlife.

Figure 2.1. Map showing the restoration work area on Low Moss



3. Ecological coherence assessment

The following section follows the ecological coherence protocol, assessing each of the elements in turn to give a qualitative assessment of the likelihood of significantly improving ecological coherence in the management zone. The ECP GIS tool has been used, along with detailed reports and surveys, local knowledge, open data sources and SNH advice.

a) Ecological functionality

The peat habitat across Low Moss is a mix of deep peat with reasonably good peat habitats and drained and degraded peat. The peat depths vary across the site with maximum peat depths of about 6m in the centre-northern section of the site. Most of the site is on areas of relatively deep peat (approx. 3.5 to 4m) with the shallower peat around peat edges. There is a dense network of man-made ditches which have lowered general water levels by 0.5 to 0.75m below peat surface.

The mix of deep and shallow peat and drained surface has created both good peat habitat and degraded vegetation. The drainage has modified the surface topography with the generally undulating surface. The site watershed is dominated by the small watercourse along southern boundary that drops down into Glenmuir Water.

The vegetation across the site varies with moderate peat bog vegetation present across about 50% of the site. In the other areas there is a sliding scale of partly degraded vegetation to a high dominance of non-peat forming species including Heather, scrub (Hawthorn and Rowan) and grassland species. These species have higher evapotranspiration rates and are impacting on the peat surface. The peat surface in these areas was dry even in the winter months and is assessed as highly degraded peat.

Figure 3.2. Map showing location of peat coring with survey values and peat depth projections across the site

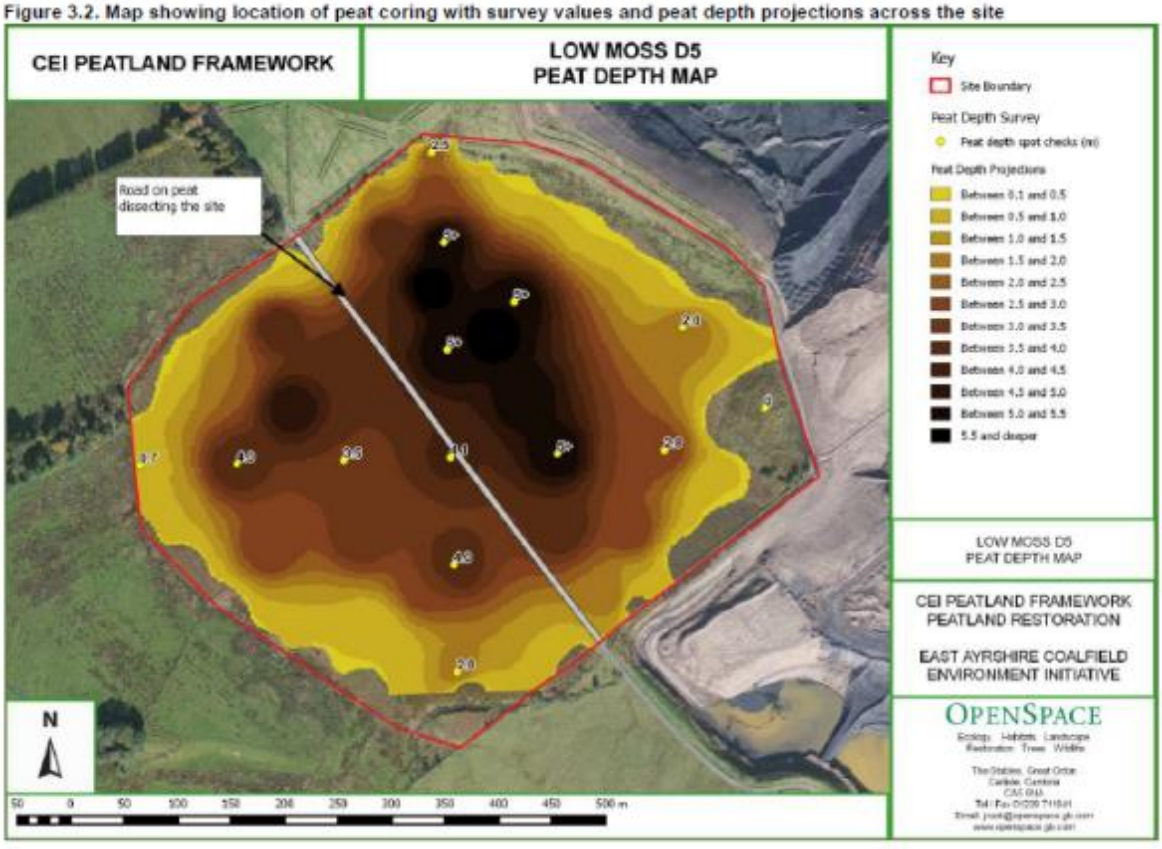
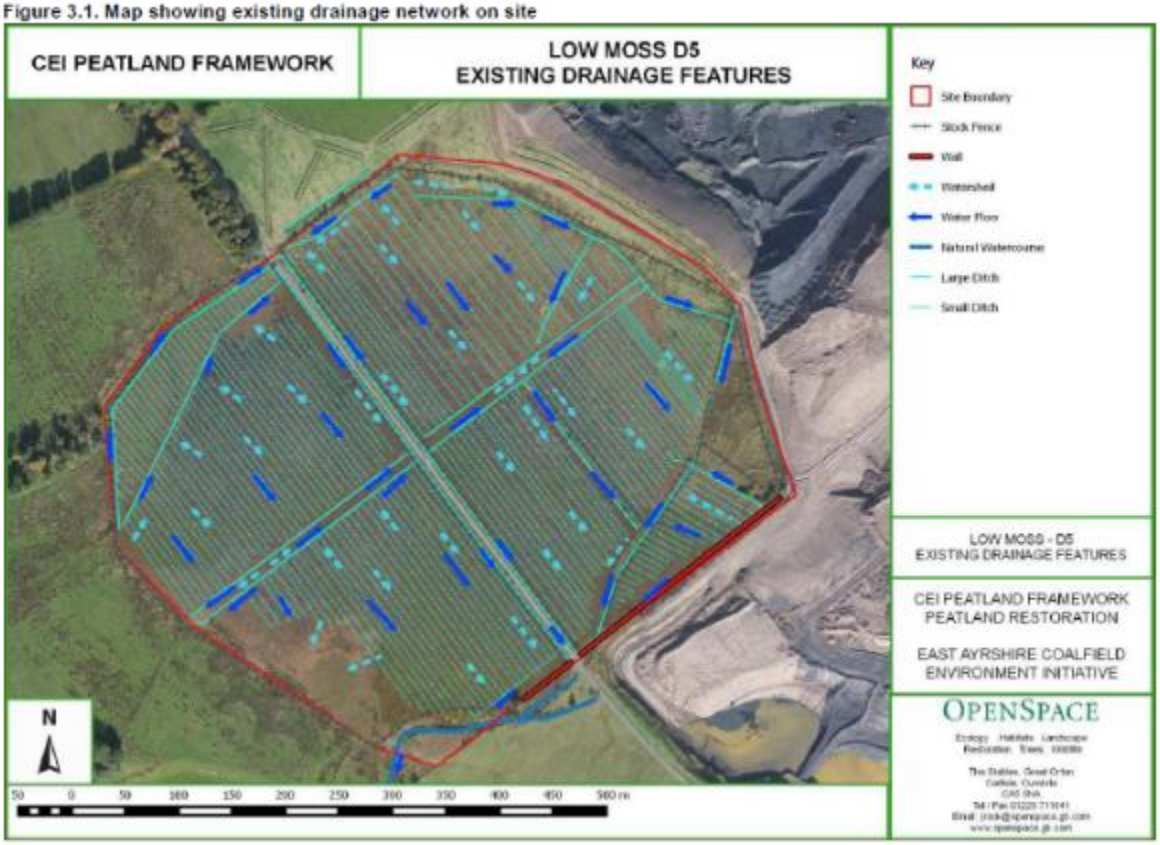


Figure 3.1. Map showing existing drainage network on site



b) Diversity

Despite a history of damage, the raised bog habitat retains characteristic structural features including a deep store of peat, remnant lagg fen vegetation, dome and micro-topographical features (hummocks and hollows).

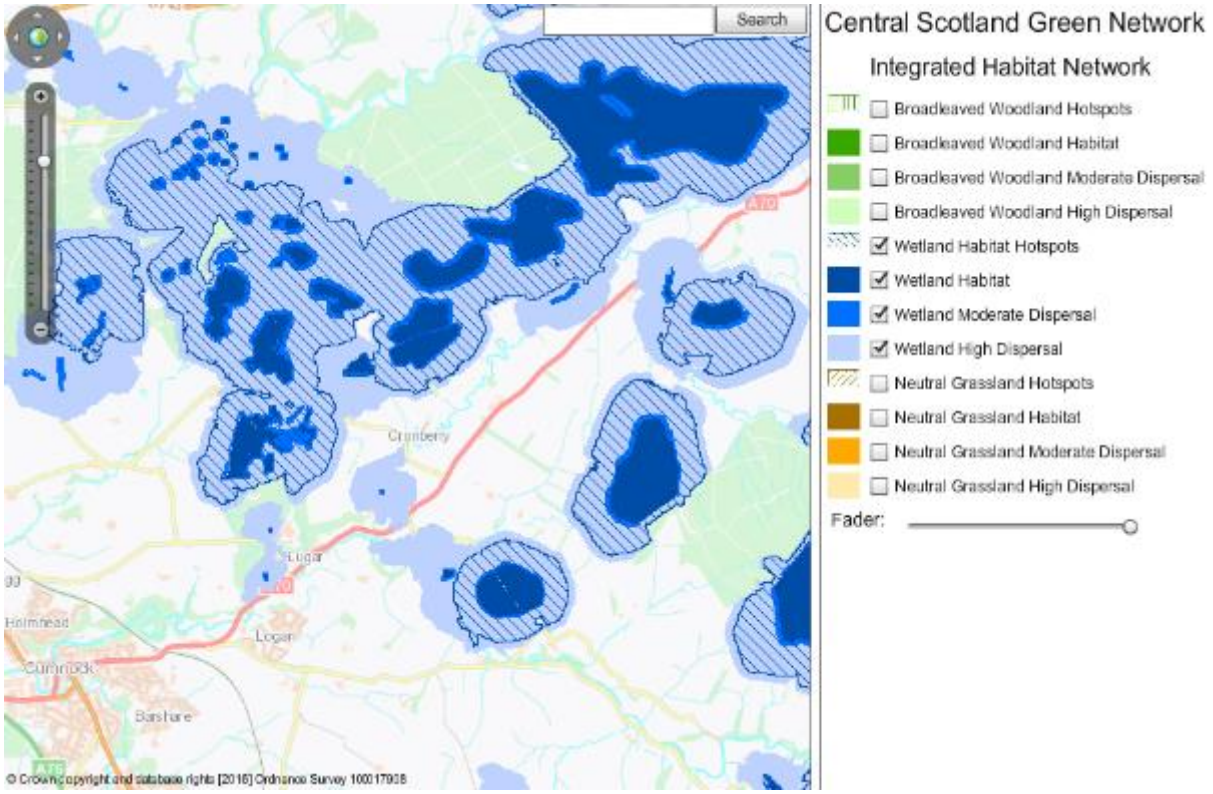
The bog vegetation is moderate, including NVC community M18a *Erica tetralix-Sphagnum papillosum* raised and blanket mire, *Sphagnum magellanicum-Andromeda polifolia* sub-community. This is surrounded on the direr edges by Purple Moor-grass *Molinia caerulea* mire (NVC community *Molinia caerulea-Potentilla erecta, Erica tetralix* sub-community). Within the mire community some areas are dominated by *Juncus effusus* rush on the mineral soil and adjacent to the improved farmland. The habitat within the centre of each section of the site, on both sides of the road, is of moderate quality with a mix of *Sphagnum* species present with other typical peat bog species including Cross-leaved heath *Erica tetralix*, Hare's-tail cottongrass *Eriophorum vaginatum*, Common Cottongrass *Eriophorum angustifolium*, and bog rosemary *Andromeda polifolia.* The site is generally free of scrub since most of the site has historically been grazed. There are small areas of scattered scrub with willow sp. rowan and birch. Heather *Calluna vulgaris and Molinia caerulea* are dominant across most of the site.

Fauna species have not been explored in depth at this stage, but the site is known to have a population of large heath butterfly (*Coenonympha tullia*), a specialist of deep peat habitat.

c) Connectivity

The integrated habitat network (IHN) map below shows the connectivity of Low Moss to the wider network of peatland (wetland) sites, including a large area of blanket/intermediate bog within the Airds Moss SAC. Low Moss is a raised bog and has naturally formed an isolated peat unit. The surrounding fen and marshy grassland habitat offers permeable habitat through which species can disperse to nearby wetland sites. The adjacent area of peatland to the north-east of Low Moss has now been lost to opencast coal mining at Duncanziemere

OCCS, which is currently undergoing (limited) restoration as coaling ceases at this site. There may be later opportunities to create ecological linkages to nearby peatland through habitat creation projects.



d) Patch size

25ha

e) Habitats/species of conservation interest

The habitat of interest is lowland raised bog.

Low Moss has a population of large heath (*Coenonympha tullia*) butterfly. This species features on the Scottish Biodiversity List and is a UK BAP status priority species.

Bog specialist plants include cranberry (*Vaccinium oxycoccos*), bog rosemary (*Andromeda polifolia*) and the large heath's food plant hare's-tail cottongrass (*Eriophorum vaginatum*). Bog-forming sphagna such as *Sphagnum magellanicum, S. papillosum and S. capillifolium* are also found.

4. Ecosystem services assessment

Service	Provided in management zone?
Accessible nature	√
Education	√
Green travel	
Carbon	√
Local climate regulation	
Air purification	
Noise regulation	
Water purification	√
Pollination	√

Accessible nature: Low Moss is a walkable distance from the settlements of Lugar and Logan and a short drive from Cronberry. It is an ideal site to visit for education sessions with local primary schools, as it has the characteristic features of a raised bog habitat yet is accessible and relatively easy to walk across. The local communities have stated in their Community Action Plan that they would like to establish local footpaths for recreation and these could be planned so that they tie in with access to the bog.

Carbon: there is up to 6 metres of peat stored at this site; preventing further damage to the bog would prevent loss of carbon. A moderately good cover of peat-forming vegetation indicates an active mire surface and the potential to sequester atmospheric carbon. Enhancement of the bog would maximise its potential as a carbon sink.

Water purification and storage: the drainage network at Low Moss discharges water into the roadside ditches which occasionally flood the road and require the ditches to be dredged. Restricting water run-off by ditch blocking and bunding will retain water on-site, re-wetting the peat surface and reduce flow into watercourses.

5. Opportunity assessment

The drainage network map (above) demonstrates substantial opportunity to carry out ditch blocking at this site. The main water loss features are:

- Man-made small ditches extensive over most of the area
- Large ditches cut across the site and along the roadside
- Peat slope with water moving across the surface and below peat surface
- Small area of former hand peat cutting creating a small cut peat face
- Adjacent boundary ditches taking water off-site. This increases the water movement from the boundary of the site
- Hydraulic conductivity of peat is high with the upper layers very dry and loose Seepage is both lateral and vertical
- Vegetation is dominant high evapotranspiration species the being heather, grasses and trees
- Surface topography undulating
- Ground water loss for the adjacent surface mine

a) Feasibility

The proposed work (see outputs section below) is feasible as it is relatively straight-forward ditch blocking and bunding work and the site is accessible to excavators and ATVs. The estimated costs are lower than the available CEI budget for C2 actions.

The main barrier to completing this work is the available timescale and the need to secure landowner agreement.

b) Achievability

The CEI has submitted a proposal to the site owners (Hargreaves), which is being reviewed by the company board and project team.

The CEI is confident in winning support from the local communities as staff have been promoting the project at community meetings and will liaise with key community members.

c) Sustainability

The CEI aim to achieve a high standard of peatland enhancement at Low Moss, with the objective of restoring ecosystem function. Particular attention will be given to restoring a functioning hydrological regime to support long-term ecosystem health and resilience against the effects of climate change.

By engaging with the local communities, the CEI aim to encourage members and school pupils to get involved in the longer-term management and enjoyment of Low Moss. A secondary outcome of this will be increased awareness and appreciation of peatlands, their value and threats.

Outputs (for costings see financial annex)

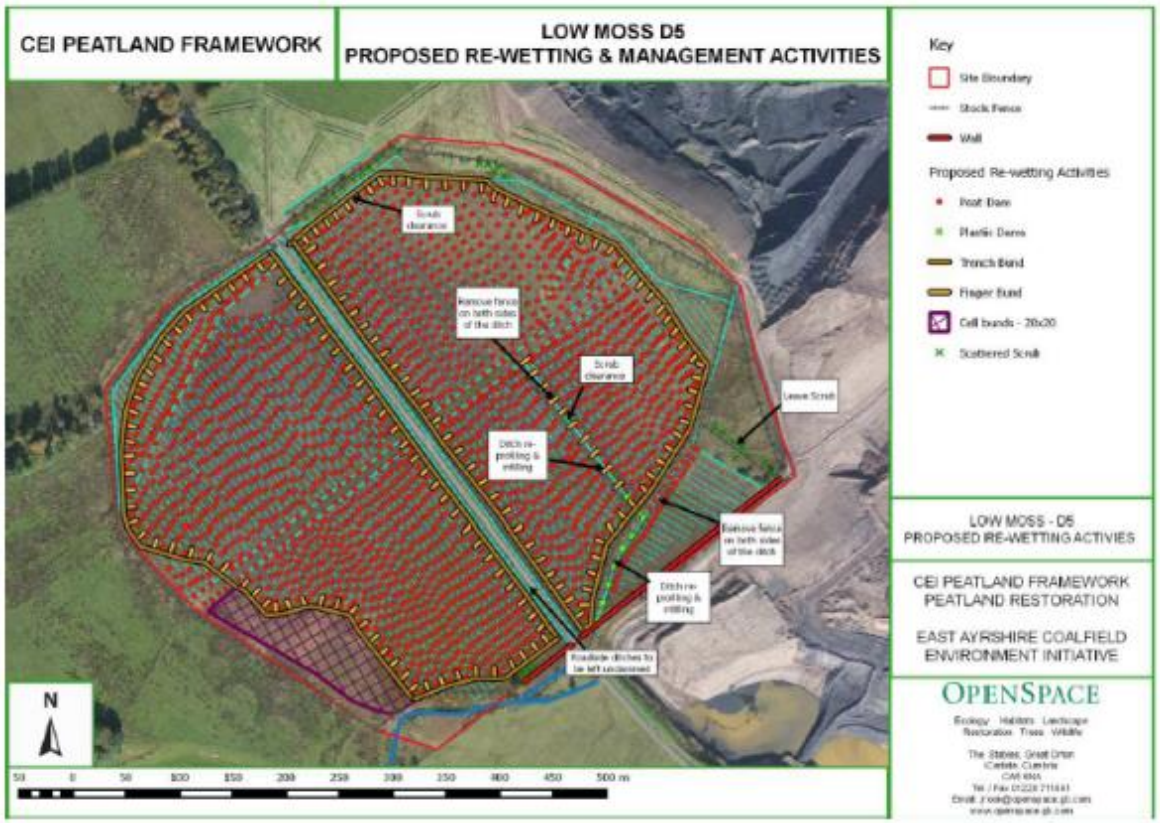
The overall objective is to create conditions on site to allow peat forming vegetation to thrive and begin the process of laying down new peat layers over 90% of the site. This would be achieved within a 25 year timeframe with some noticeable results within the first 10 years. The second objective is to enhance the site biodiversity by creating conditions for other associated habitats on peat to develop.

The main aim for peatland restoration is to restrict, reduce or slow water loss from the peat bog through the ditch network, natural features, sub-surface flow and surface run-off. This to achieve a raise in general water levels to within 10cm of the peat surface and maintain these levels. This will create conditions for peat forming vegetation to colonise and the conditions for new peat layers to be laid down.

To achieve the objective a series of restoration techniques will be proposed across the site. Proven re-wetting techniques using agreed specifications and methods of installation will be proposed. Each techniques will aim to achieve the main objective with a number of measureable outcome to determine success, these are:

- Re-hydrate the peat surface to achieve general raise in peat water levels to within 10cm over 90% of the restoration area within 5 years.
- Re-hydrate the acrotelm to create suitable conditions for active peat forming vegetation within 10 years.
- Re-hydrate the peat surface to allow for the laying down of new peat layers within 25 years.
- Encourage the growth and colonisation of *Sphagnum* species within the ditch network within 5 years.
- Encourage the growth of *Sphagnum* species, especially hummock and carpet forming species on the peat surface (beyond the ditches) within 15 years.
- Reduction of dominant vegetation creating negative evapotranspiration affects over 90% of the restoration area (e.g. dense heather, grasses sp., dense scrub or trees) within 15 years.

Figure 5.1. Map showing proposed peatland restoration work and management activities on Low Moss



Outputs (for costings see financial annex)
1. Remove scattered birch / rowan / willow scrub over 25ha 2. Remove 760m of old wire fencing 3. Install small peat dams along 23,385m of ditches 4. Install large peat dams along 4,059m of ditches 5. Install plastic piling along 230m v large ditches 6. Reprofile 740m two large ditches 7. Install deep trench bund 2655m either side of road 8. Block off lower area of peat cutting over 0.85ha