

Abbey Consols

Environmental Constraints and Opportunities Record



Rev No 1

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1.0 Introduction

1.1 Background

Natural Resources Wales (NRW), in undertaking our work, are required to pursue the sustainable management of natural resources (SMNR) and to demonstrate the application of the principles of SMNR. We think that the environmental assessment process is well aligned with these principles as demonstrated in Table 1. The environmental assessment process provides a systematic and transparent tool for managing the environmental risks, avoiding, reducing or mitigating negative environmental impacts and identifying opportunities for delivery of multiple benefits.

Table 1: The role of environment assessment in demonstrating the principles of sustainable management of natural resources

Principle	Role of Environmental Assessment
Manage adaptively	To monitor and audit the environmental effects of existing projects in order to feedback into future projects.
Appropriate spatial scale	The options appraisal or consideration of alternatives can help determine the study area. Economic, technical and environmental aspects feed into this process to ensure that the options/alternatives and their environmental effects are considered at the appropriate scale.
Collaboration and engagement	Internal and external stakeholder engagement starts early and continues throughout project development.
Public participation in decision making	Public engagement through drop-in sessions at key stages in the project or engagement with community or user groups.
Relevant evidence	Considers broad environmental baseline and trends with and without project implementation.
Take account of benefits and intrinsic value of natural resources and ecosystems	Identify ecosystem services provided by the natural resources in the study area through internal and external stakeholder engagement. The environmental assessment should seek to maximise wider benefits provided by ecosystems and natural resources in the study area.
Short, medium and long term consequences	Consider environmental effects throughout the life of the project, this includes the planning, construction, operation, and decommissioning phases. The environmental assessment will take into account the future baseline.
Prevent significant damage to ecosystems	Identify ecosystem services provided by the natural resources in the study area through internal and external stakeholder engagement. The environmental assessment should aim to avoid, reduce or mitigate any negative effects.
Building resilience of ecosystems	The environmental assessment must consider the effects of a project on the resilience of ecosystems. Then, through options appraisal and input to

	design, aim to avoid, reduce or mitigate negative effects and maximise positive effects (multiple benefits).
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Environmental assessment is an iterative process that starts at the inception of a project and continues through options appraisal, detailed design, construction and operation. Good environmental assessment influences and challenges project options and design rather than being a paper exercise. However, there is a need for transparency and justification in the decisions and actions taken. This Environmental Constraints and Opportunities Record (ECOR) has been designed to document the work we have undertaken to provide internal and external stakeholders, regulators, approvers and permittees with a summary of the environmental assessment undertaken. The ECOR will demonstrate how we have applied the principles of SMNR in the development of the project. The ECOR will be reviewed and updated as the project progresses.

Part A of this ECOR will present:

- Section 1.1 provides a description of the surrounding scheme, the proposed works and objectives of the scheme;
- Section 2.0 provides the baseline environmental information within the project study area;
- Section 2.3 describes the process undertaken in screening for the requirement of a statutory Environmental Impact Assessment (EIA); and the process for how the project team has presented and discussed the Project with key consultees in order to inform design development and the scope of the environmental assessment;
- Section 3.0 provides a summary of the proposed options;
- Section 4.0 documents the Environmental Impact Assessment Screening opinion and the scope of additional environmental assessment to be undertaken.

1. 2 Site Description

The Abbey Consols Mine (the site) is located approximately 1km east of the village of Pontrhydfendigaid, Ceredigion (Grid Reference: SN 74319 66148). Strata Florida Abbey, a medieval Scheduled Monument, is located approximately 350m south-east of the site. The Afon Teifi flows from east to west along the southern boundary of the site. The Afon Teifi is designated as a Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) for its ecological importance. Further details of which are provided in Section 2.2.

Strata Florida Abbey was founded in 1164 and given its proximity to the mine, and the interest of the Cistercian Monks, it is likely that mining has taken place here since at least this time. However, the site has remained unused since 1913, and past reclamation schemes have destroyed many of the mines features. The mining activities are recognised today by the 32,000 tonne spoil tips, mine shafts and water wheel. The site is known to be leaching zinc, originating from both point and diffuse sources. The collapsed portal of a deep audit is potentially causing contaminated groundwater to emerge from the northern eastern corner of the site. The contaminated groundwater, which constitutes approximately 30% of the polluted water content, flows along the eastern and southern boundaries of the spoil tips which then discharges into the Afon Teifi. In addition, contaminated surface water from the tips is also discharging into the Afon Teifi, which constitutes approximately 70% of the polluted water content.

The water quality of the Afon Teifi, including levels of zinc, is monitored as part of the European Water Framework Directive (WFD) and the discharge of zinc from the site via groundwater and surface water courses is causing the Afon Teifi to fail the required standards for zinc at this location.

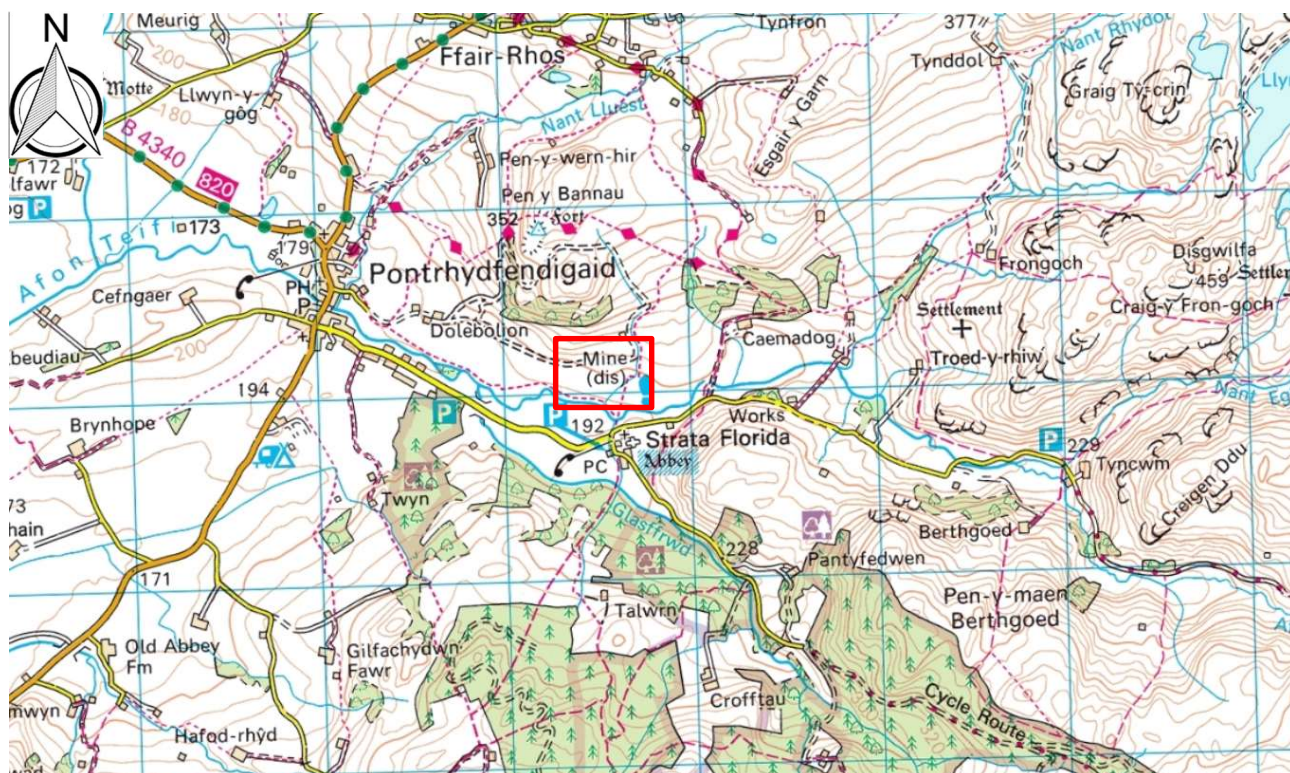


Figure 1: Site Location indicated by red box (Gridlines = 1km).

1. 3 Project Description

The scheme includes remediation of the Strata Florida mine site with the potential inclusion of groundwater control onsite and capping.

1. 4 Project Objectives

The main aim of the project is to improve the water quality of the Afon Teifi by remediating the land, improving the land drainage, and removing the zinc contamination which is leaching into the surrounding area and water courses. The following objectives have been assigned to the project:

- Prevent metal pollution, in particular zinc, entering the Afon Teifi;
- Improve the ecological habitat for protected species associated with the statutory sites of nature conservation interest;
- Improve the WFD classification of the Afon Teifi by improving runoff from groundwater and surface water by up approximately 80%;
- Improve the ecological status of waterbodies situated further downstream; and
- Remediate existing ground conditions and improve drainage across the site.

2.0 Environmental Baseline

2.1 Introduction

This section of the report identifies all the potential environmental constraints within 2km of the site. It also recognises local challenges, gaps in data knowledge, and identifies and recommends further survey requirements.

2.2 Ecology and biodiversity

2.2.1 Statutory Sites of Nature Conservation Interest

The site is located within a rural setting, surrounded by predominantly agricultural fields and a large area of mature woodland to the south and south east of the site, with a smaller section of woodland situated to the north of the site. A review of statutory designations within 2km of the site was undertaken, the results are presented in Table 2.

Table 2. Statutory Designations within 2km of the scheme boundary

Designated Site	Designation	Distance & Direction from the site	Summary of Qualifying Features
Afon Teifi	SAC	10m south of the site.	Designated for presence of Annex II species including salmon, bullhead and three UK lamprey species and annex I habitats including water courses of plain to montane levels with the <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> .
	SSSI	10m south of the site.	
Coed Mynachlog-Fawr	SSSI	400m south east of the site.	Designated for the presence of Annex II species.
Elenydd	SSSI	1.7km east of the site.	Site of breeding Peregrine Falcons and Red Kites.
Elenydd Maellen	SPA	1.7km east of the site.	Site is designated as it supports Merlin Falco and Peregrine Falco populations of European importance.
Rhos Gargoed	SSSI	1.4km north east of the site.	Designated for the presence of Annex II species.

The desk study was undertaken by using MAGIC website www.magic.gov.uk, and www.lle.gov.wales/home which provides authoritative geographic information about the natural environment from across the government.

2.2.2 Non-statutory Site of Nature Conservation Interest

There are no non-statutory sites within 2km of the site.

2.2.3 Site Characteristics and Habitats

The woodland (Coed Penybannau) north of the shaft, is designated as semi ancient natural woodland. The area surrounding the mine is predominately grazed.

2.2.4 Protected and Notable Species

Ecological surveys have been undertaken between 1992 and 2016. The site has been surveyed for lichens on only three previous occasions (S.P. Chambers 1992; A.M. Fryday & S.P.Chambers 1993, Chambers and Forster Brown 2016, Sam Bosanquet 2016), the surveys have identified the following species of interest:

- Bryophyte species including; *Polytrichum piliferum*, *Hypnum cupressiforme*, *Dicranum scoparius*, *Rhytidiadelphus squarrosus*;
- *Ditrichum lineare* was present within the sludge area to the south of the site¹;
- *Polytrichum piliferum*, *Pogonatum aloides*, *Grimmia donniana* and *Diplohyllum albicans*; and
- Notable and nationally rare lichen *Rhizocarpon cinereovirens*²;

2.2.5 Ecological Walkover

An Extended Phase 1 habitat survey was undertaken on the 24th May 2018. During the site visit the following observations were recorded:

- Potential badger sett (confirmed as a rabbit burrow);
- An otter spraint identified along the banks of the Afon Teifi within approximately 100m of the site;
- Several trees with low potential to support bat roosts within the southern wooded area surrounding the Afon Teifi however this area is not anticipated to be affected by the proposed works. The Proposed Treatment Works currently suggests covering the shafts therefore sealing entrances that may be used by bats to access the mine. Further surveys including hibernation and swarming surveys are therefore required;
- Several habitats with potential to support reptiles; and
- Interesting botanicals with several notable flora species.

A follow up survey has been conducted by NRW on the 6th, 21st and 28th August 2018 including both a site desktop study and a series of appraisals from site walkovers. This survey was following up recommendations in relation to bats, badgers and otters along with a small area of marshy grassland identified onsite. The following were identified:

- Marshy grassland corresponding to the Environment Wales Act Section 7 Priority Habitat – Purple Moor grass rush pasture. Mitigation measures should be implemented in order to safeguard this habitat as dictated by the NRW Ecological Report 2018;
- No suitable water vole habitat was observed during the site survey;
- Significant signs of otter activity were found including regular spraints and the presence of a resting sites. The NRW Ecological Report 2018 states that “Should works be required alongside or within 10m of

¹ Survey for *Ditrichum plumbicola* Lead Moss on three disused mines in eastern Ceredigion, Sam Bosanquet, NRW Non-vascular Plant Ecologist, 2016

² Dyfed Wildlife Trust Mid- Wales Metal Mine Survey, 1993

the river corridor then an adequate buffer and working methods will need to be agreed with the ecologist. Pre-commencement checks, a tool-box talk and ongoing monitoring will be required”;

- Adit in woodland and air shaft - It is understood there are no proposals to undertake works in the vicinity. Should this change then bat survey and assessment would be required;
- It is recommended that any ground clearance operations should be undertaken outside the bird breeding season (February to August); and
- We recommend that vegetation clearance is undertaken during the late autumn/early winter and completed by March. This is to minimise the impacts to any reptiles present on site. Any ground disturbance should be undertaken in the active reptile season (March – September).

2.3 Areas of Populations, Community Resources and Infrastructure

The village of Pontrhydfendigaid is located 1km to the west of the site and contains several community facilities, including:

- a local convenience shop, pubs and restaurants, Bed and Breakfast accommodation, holiday homes, and a caravan park;
- Strata Florida Abbey is situated 1.5km south east from the site; and
- There is one public right of way (PROW) within proximity of the site which is located to the east of the site boundary adjacent to the Afon Teifi. The footpath then heads north west and follows the river towards Pontrhydfendigaid.

The main noise sources in the area include traffic and background noise from cars using Abbey Road, Terrace Road (B4343) and local amenities within Pontrhydfendigaid.

2.4 Water Environment

The Afon Teifi water quality is monitored to aim to achieve good quality status of the waterbody under the Water Framework Directive 2000 (WFD).

The river is subject to contaminated run off from the site which is having an impact (based on the WFD assessment scale) on the receiving watercourses and is therefore lowering the WFD Classification of the River. The Water Framework Directive Cycle 2 Extended Waterbody Summary Report has defined the overall classification of the site as moderate with an aspiration to have a good status by 2021.

The site is not within a designated Flood Zone, however the land south of the mine surrounding the Afon Teifi is designated High Risk of flooding from Rivers, and low risk of flooding from surface water.

The site is not located within any Source Protection Zones³, however, the south west of the site is located just within a Secondary A Aquifer. There is one sampling point, south west of the site where water quality is measured as required.

2.5 Historical Land use

There are no historical or recorded landfill sites within 1km of the site and no significant urbanisation within the immediate surroundings during the last 130 years as its predominately agricultural land.

³ <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>. Date accessed: 12/06/2018

There are three British Geological Survey (BGS) Recorded Mineral Sites within the site. A large area of the site is designated as a potential contaminated risk due to its historical land use⁴.

2.6 Air Quality

There are no AQMAs within 2km of the scheme and therefore the air quality in this area is therefore considered to be good. There are no heavy industry activities nearby and only one main road (B4343) present.

2.7 Cultural Heritage, Historic and Landscape Designations

The following Cultural Heritage and Historic and Landscape Designations are within 2km of the site:

- Upland Ceredigion Landscape of Outstanding Special Historic Interest which covers the site and extends from Tregaron to Tywi Forest in the south, heading north to Tal-y-bont and the Nant-y-moch Reservoir. The site is also within the Ystrad Fflur Historic Landscape Character (HLC)⁵;
- The Abbey Consols mine is listed by the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMS) in the National Monument Record for Wales (NMRW) and within the site are 11 recorded non-designated archaeological features which range from Wheelpit remains, fine tips, ruined tanks, site of ore bins, and development rock tips⁶;
- There are no listed structures at the site. The closest listed structures are at Strata Florida Abbey located approximately 450m south-east of the site, and several within Pontrhydfendigaid which include those listed in Table 3;
- There are four Scheduled Monuments within 2km of the site, which include those listed in Table 3; and
- There are no World Heritage Sites, Conservation Areas or Historic parks and gardens within proximity of the site⁷.

Table 3. Listed Structures within 2km of the scheme.

Listed Structure	Designation	Distance & Direction from the site
Church of St Mary	Grade II Listed Building	450m south east of the site
Strata Florida Abbey Ruins	Grade I Listed Building	450m south east of the site
Great Abbey Farmhouse including Front Garden Wall	Grade II* Listed Building	450m south east of the site
Outbuilding to south of Great Abbey Farmhouse	Grade II Listed Building	450m south east of the site

⁴ Envirocheck Maps, May 2018.

⁵ Metal Mines Remediation Project Part 1: Abbey Consols, DAT Archaeological Services, March 2016.

⁶ Metal Mines Remediation Project Part 1: Abbey Consols, DAT Archaeological Services, March 2016.

⁷ lle.gov.wales/ Date accessed: 12/06/2018

Cowhouse at east End of Farmyard at Great Abbey Farm	Grade II Listed Building	450m south east of the site
Barn Range at west End of Farmyard at Great Abbey Farm	Grade II Listed Building	450m south east of the site
Farm Building on North Side of Farmyard at Great Abbey Farm	Grade II Listed Building	450m south east of the site
Dolgoed	Grade II Listed Building	450m south west of the site
Dol Teifi	Grade II Listed Building	450m west of the site
Islwyn	Grade II Listed Building	1.2km west of the site
Railings to Rhydfendigaid Calvinistic Methodist Church	Grade II Listed Building	1.2km west of the site
Strata Florida Churchyard Cross	Scheduled Monument	450m south west of the site
Strata Florida Abbey	Scheduled Monument	500m south west of the site
Pen y Bannau Camp	Scheduled Monument	500m north west of the site
Gilfach Y Dwn Fawr Defended Enclosure	Scheduled Monument	1.3km south west of the site

A site visit was completed by WSP's Heritage Team on the 5th June 2018 (Appendix 4) in addition to assessing the previous information contained within the Dyfed Archaeological Trust Assessment Report 2016. The site visit identified a number of archaeological assets including the remains of walls and launders (timber channels for carrying water) associated with the historic mining activities. The remains of walls and launders are considered to be of high value and will need careful consideration as part of the design and construction of the Project. In general, the archaeology identified as part of the site visit was considered to be in good condition.

2.8 Landscape and Visual Resources

The site is situated within a rural agricultural field and is predominately screened from the road by mature trees and hedgerows which line Abbey Road. There is an access track road which runs behind the site to the Mid Wales Activity Centre, and the views from here are more open and take in the rolling hillsides and mountains which surround the gentle sloping valley. The wider landscape comprises predominately agricultural fields which are separated by mature trees and hedgerows which contain larger pockets of woodland and small track roads which provide access to the local farms.

There are several residential dwellings further west on Abbey Road, however the views from here are restricted due to the vegetation lining the road.

2.9 Baseline: Challenges and Opportunities

Table 4 below discusses the baseline and associated challenges and opportunities for environmental receptors / topics.

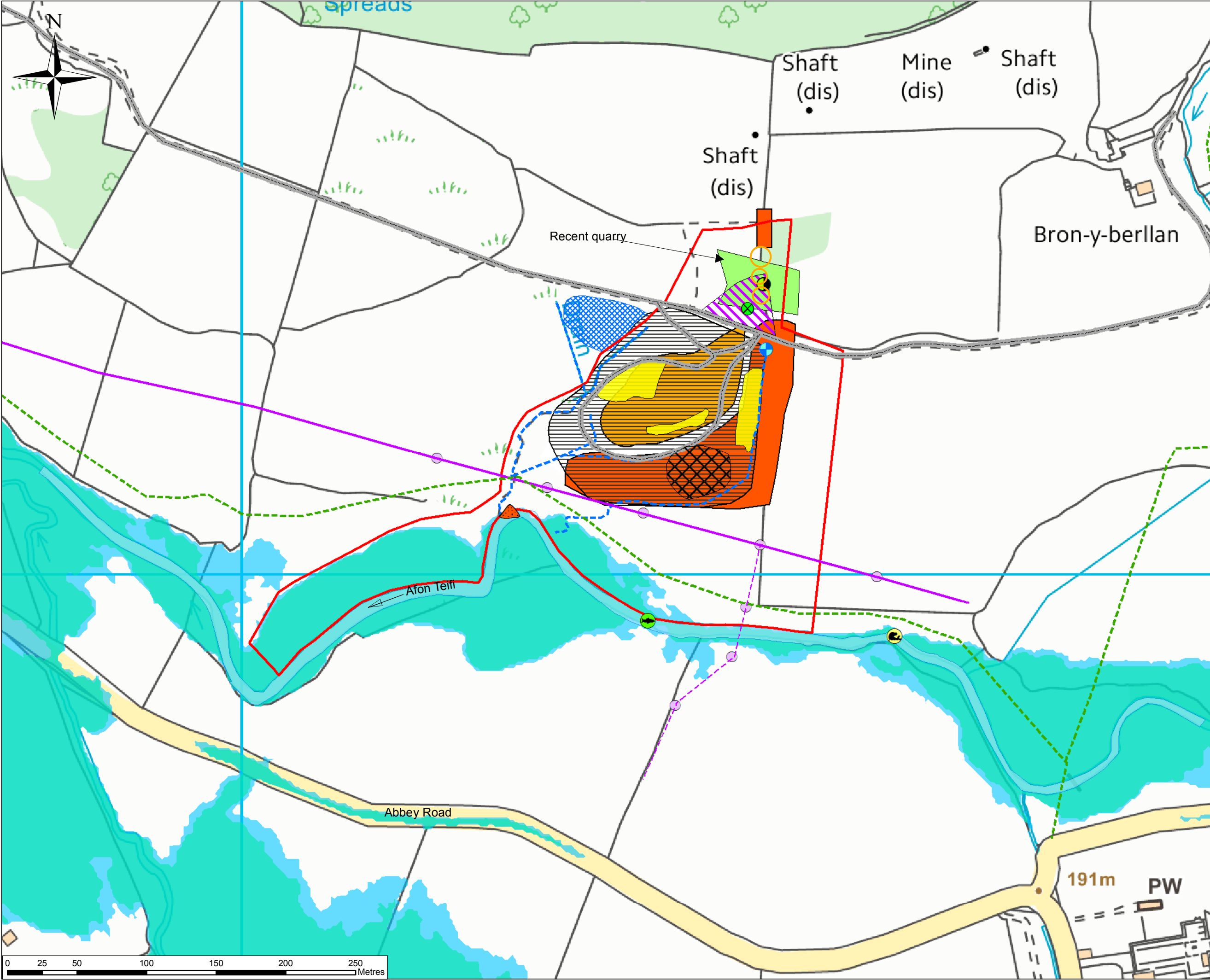
Table 4 – Baseline: Challenges and Opportunities

Topic – Receptor / Resource	Summary of Baseline (Constraints)	Local Challenges	Opportunities	Knowledge Gaps / Surveys Required
Population & Human Health	<ul style="list-style-type: none"> There are several sensitive receptors within proximity to the site comprising residential dwellings and commercial businesses. There is a PRoW which passes along the site boundary in parallel to the Afon Teifi and forms part of a circular walk promoted by Ceredigion County Council and the Strata Florida visitor centre. The road passing through the site is currently being used for motorsports. 	<ul style="list-style-type: none"> The discovering Britain website is advertising the Strata Florida trail as a short walk within the Teifi Valley. 	<ul style="list-style-type: none"> Potential to improve PRoW and connectivity between the surrounding villages. Educational opportunities through engaging local schools and interpretive boards as part of the walking route. 	<ul style="list-style-type: none"> Undertake Stakeholder/Community engagement events to minimise impacts on sensitive receptors and promote awareness of the improvements the scheme is hoping to make. Identify a delivery route for engagement with schools through the Public Services Board.
Biodiversity & Resilience of Ecosystems	<ul style="list-style-type: none"> Within proximity to six designated sites comprising 1 SAC, 4 SSSI and 1 SPA. Large areas of semi ancient woodland north of the site and situated around the Afon Teifi to the south of the site. Afon Teifi SAC within 10m of the site, designated for the presence of protected species. Marshy grassland corresponding to the Environment Wales Act Section 7 Priority Habitat – Purple Moor grass rush pasture. Mitigation measures should be implemented in order to safe guard this habitat as dictated by the NRW Ecological Report 2018. Significant signs of otter activity were found including regular spraints and the presence of a resting sites. The NRW Ecological Report 2018 states that “Should works be required alongside or within 10m of the river corridor then an adequate buffer and working methods will need to be agreed with the ecologist. Pre-commencement checks, a tool-box talk and ongoing monitoring will be required”. Adit in woodland and air shaft - It is understood there are no proposals to undertake works in the vicinity. Should this change then bat survey and assessment would be required. It is recommended that any ground clearance operations should be undertaken outside the bird breeding season (February to August). We recommend that ground clearance is undertaken during the late autumn/early winter and completed by March. This is to minimise the impacts to any reptiles present on site. 	<ul style="list-style-type: none"> The Natural Resources Wales Well-Being Objectives include: improve the resilience and quality of our ecosystems which is a challenge for this scheme to deliver. The NRW management objectives for the SAC need to be delivered as part of this scheme. 	<ul style="list-style-type: none"> Enhance biodiversity opportunity by improving the water quality of the Afon Teifi. The PEA report also identified the following enhancement opportunities: Reopening the Abbey Consols zinc mine entrance would create additional roosting opportunities for bats including hibernation sites. Provision of bird and bat boxes on retained trees. Provision of invertebrate hotels, habitat piles. Avoid herbicide/pesticide use. Natural regeneration using topsoil from the Site containing seed bank (using soil salvage and storage techniques to be identified in a Mitigation Strategy) as well as separation of top soil based on grassland type (acid grassland stored separately from neutral grassland). Good horticultural practice (e.g. should be utilised, including the use of peat-free composts, mulches and soil conditioners, native plants of local provenance) to be implemented for any new planting proposed. A low intensity management program should be implemented as part of the Site Management Plan to provide improved habitat for reptiles and invertebrates. This should include light grazing to allow the grass to grow long but without scrub taking over. This 	<ul style="list-style-type: none"> Further surveys have been identified to include otters, badgers, bats and bryophyte surveys which are to be confirmed. Further surveys required to confirm presence of invasive species.

			management program should only be implemented to the south of the site to avoid conflict with archaeological interests on the Site.	
Land (for example: land take)	<ul style="list-style-type: none"> Current land use comprises agricultural land. No significant land take is anticipated. 	<ul style="list-style-type: none"> The Natural Resources Wales Well-Being Objectives include: ensure land and water in Wales is managed sustainably and in an integrated way which is a challenge for this scheme to deliver. 	<ul style="list-style-type: none"> Opportunity to improve the quality of the land by remediating the land. 	<ul style="list-style-type: none"> Further assessments to identify contaminated land.
Soil (for example: organic matter, erosion, compaction, sealing)	<ul style="list-style-type: none"> Ground contamination is not known, however due to historic land use there may be a potential contaminated land risk. 	<ul style="list-style-type: none"> Ground contamination is not known, however due to historic land use there may be a potential contaminated land risk. 	<ul style="list-style-type: none"> Opportunity to improve the quality of the soil by remediating the land. 	<ul style="list-style-type: none"> Further assessments to identify contaminated land.
Water (for example: hydromorphological changes, quantity and quality)	<ul style="list-style-type: none"> There is one watercourse (Afon Teifi) within proximity to the site (10m) which receives a high intake of polluted runoff which is lowering the water quality from good, upstream of the mine site to moderate quality. The Afon Teifi Water Framework Directive conservation measures include to improve modified habitat and to improve the condition of the channel/bed and or banks/shoreline whilst improving the water quality to good from its current moderate status. 	<ul style="list-style-type: none"> The Natural Resources Wales Well-Being Objectives include: ensure land and water in Wales is managed sustainably and in an integrated way and reduce the risk to people and communities from environmental hazards like flooding and pollution which is a challenge for this scheme to deliver. 	<ul style="list-style-type: none"> Opportunity to improve the water quality of the Afon Teifi and therefore improve the WFD Classification type, due to the improved run off and ground water from the site. 	<ul style="list-style-type: none"> WFD Assessment will be required prior to ECOR submission. Assessment needs to determine whether the works will have any short term or long term effects on other WFD elements.
Air	<ul style="list-style-type: none"> No AQMAs within the proximity of the scheme. 	<ul style="list-style-type: none"> Source all materials as locally to the site as possible. 	<ul style="list-style-type: none"> All waste will be recycled and reused where possible. This can be supported by technical assistance which may be required when looking at the lifecycle of the project. 	<ul style="list-style-type: none"> N/A
Climate (for example: greenhouse gas emissions, impacts relevant to adaptation)	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> The Ceredigion Public Service Board Well Being Plan has stated that the following is an aim and or challenge for the area: create environmentally responsible and safe communities that can adapt and respond to the effects of climate change. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Material assets	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Resource all materials as locally to the scheme as possible. 	<ul style="list-style-type: none"> All waste will be recycled and reused where possible. This can be supported by technical assistance which may be required when looking at the lifecycle of the project. 	<ul style="list-style-type: none"> N/A
Cultural heritage (including architectural and archaeological aspects)	<ul style="list-style-type: none"> The site has areas of high archaeological potential. There are 11 listed buildings and three scheduled monuments within proximity of the site. The site is also 	<ul style="list-style-type: none"> The site has areas of high archaeological potential. 	<ul style="list-style-type: none"> Opportunity to improve and enhance the knowledge of the cultural heritage features of the site following the 	<ul style="list-style-type: none"> Undertake consultation with the Planning Archaeologist at Dyfed Archaeological Trust to establish

	within a designated Upland Ceredigion Landscape of Outstanding Special Historic Interest and Ystrad Fflur Historic Landscape Character (HLC).		remediation works, in particular the areas of heritage interest. <ul style="list-style-type: none"> In line with the Wellbeing of Future Generations Act opportunity to improve protection of heritage features or increasing visibility of such features to the public (e.g. creation of information points). 	greater baseline information and to advise on the level of cultural heritage assessments required. An archaeological survey of the features identified onsite has been recommended. <ul style="list-style-type: none"> Engagement with the Public Services Board to gauge opportunities for public and educational engagement.
Landscape	<ul style="list-style-type: none"> The site is within two historic designated landscape areas (as mentioned above). The site is also situated within a rich setting of cultural heritage assets surrounded by wide views across the valley towards the rolling hills and mountains. 	<ul style="list-style-type: none"> The site is within two historic designated landscape areas (as mentioned above). 	<ul style="list-style-type: none"> Opportunity to improve historic landscape character as part of the remediation process. Both on and offsite enhancement opportunities have been identified and are outlined fully within the Landscape Memo report 2018. 	<ul style="list-style-type: none"> Undertake Landscape Visual Impact Assessment during the appraisal stage in relation to land reinstatement and future use.

Environmental Constraints Plan



KEY

- Abbey Consols - Site Area
- Area of collapsed Adit entrance
- Discharge point
- Stream/ditch
- Public Rights of Way
- Access road
- Area of uncertain flow conditions
- Marshy area
- Waste tips
- Areas marked during lower plan survey 2016
- Rabbit warren
- Trees with potential bat roosts
- Inland river cliff to be protected
- Otter spraint confirming Otter presence in the area
- Potential bat swarming and hibernation sites
- Protected Fish species
- Area of high archaeological potential
- Area of low archaeological potential
- Area of medium archaeological potential
- Flood Zone 3
- Flood Zone 2
- River (Afon Teifi)
- Overhead HV Line (11kV)
- Overhead LV Line (11kV)
- Electric pole

Note:
Site is part of the Upland Ceredigion Landscape of Outstanding Special Historic Interest and Ystrad Fflur Historic Landscape Character (HLC).

-The majority of the Site is a Habitat of Principal Importance; and

- Nationally scarce bryophyte and lichens are present on the site but accurate and up to date

A		IW 26/06/2018	GH/KB/TE/RG 26/06/2018	TE 26/06/2018
Ver	Amendments	Originated by and date	Checked by and date	Approved by and date

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Client :

Project :

Abbey Consols Metal Mine Remediation Project

Drawing Title :

Summary Constraints Map

Drawing No :

Figure 02

Scale @ A3 :

1:2,500

Purpose :

Information

3.0 Summary of Options

A long list of design options has been produced as part of the options process for this scheme. The benefits/opportunities and risks/constraints have been identified for each option relevant to each feature of the scheme. A detailed breakdown of this analysis is presented in Table 13 within Appendix A, with a summary of this assessment presented in Table 5.

The outputs of the detailed constraints and opportunities analysis have been used to produce a short list of the preferred options from the long list of options identified at Stage 2. This short list, shown in Table 6, presents two options per feature, with one preferred option being identified on the basis of weighing the constraints and benefits accordingly.

Table 5 Summary of the long list option process and Risk Assessment. Detailed analysis is presented in Table 13, Appendix.

Option Description	Option	Biodiversity	Water	Air	Geology	Waste	Heritage	Landscape	Flooding	Wellbeing	Comments
Capping	Option 1	+	+	0	0	-	-	-	0	0	Option 1 is the preferred option on the basis of a reduced level of impact upon the heritage features onsite in comparison with the other three options along with the benefits to the ecology onsite. All four options identified for the site capping show negative impact upon heritage of the site due to the potential for impact to archaeology however due to the placement of archaeology identified thus far onsite option 1 produces a reduced impact upon archaeology in comparison to the other options. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	0	0	0	+	-	-	0	0	
	Option 3	-	0	0	0	+	-	-	0	0	
	Option 4	-	0	0	0	+	-	-	0	0	
Groundwater/land drainage	Option 1	-	+	0	0	-	-	-	0	0	Option 1 is the preferred option on the basis of reduced level of impact to both ecology and heritage features onsite, in comparison to Option 2 and 3. Although options 1 and 2 show negative impact upon heritage features it is thought that option 1 has a reduced overall impact due to the smaller area of drainage required in comparison to option 2. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	0	0	0	0	-	-	0	0	
	Option 3	-	-	0	0	0	0	-	0	0	
Shallow clay wall	Option 1	-	+	0	0	+	-	-	0	0	Option 1 is the preferred option on the basis that it assists in separating the clean and contaminated water unlike option 3 (which is a do-nothing scenario and therefore does not solve the issue) and potential impacts as a result of the wall are minimised due to its reduced size in comparison with option 2. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	+	0	0	-	0	-	0	0	
	Option 3	+	0	0	0	+	+	0	0	0	
Water discharge from site	Option 1	+	+	0	0	+	0	-	0	-	Option 1 is the preferred option on the basis of a reduced level of ecology impact compared to the other options due to the positioning of the outfall along the river. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	+	0	0	0	0	0	-	-	0	
	Option 3	-	+	0	0	0	0	-	-	-	
	Option 4	+	+	0	0	0	0	-	-	-	

Option Description	Option	Biodiversity	Water	Air	Geology	Waste	Heritage	Landscape	Flooding	Wellbeing	Comments
Mine water capture	Option 1	-	+	0	0	0	-	+	0	0	The preferred option is option 1 on the basis that there are more enhancement opportunities with this option than there are with the other options. Option 2 provides opportunities for enhancement of landscape and visual impacts and heritage features as a result of the scheme. Technically, from a design perspective option 1 is preferred as option 2 may not be achievable, however, this is to be explored further as part of the design process taking into account the environmental benefits that this will produce. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	-	0	0	0	+	-	0	0	
	Option 3	+	-	0	0	0	-	-	0	0	
Mine water transfer to treatment area	Option 1	+	-	0	+	0	0	+	0	0	Option 1 is the preferred option due to the potential for environmental enhancement measures with this feature to include both ecology and landscape and visual impact features. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	+	0	0	-	0	-	+	0	0	
Mine water treatment area	Option 1	-	0	0	0	+	-	-	+	-	Option 1 is the preferred option as it contains the lowest potential impact level upon heritage features as a result of the works. Although Option 4 is showing higher environmental benefits the former slime pits would require additional water transfer distance and are located too far west to avoid a second outfall and therefore this option is less preferable as a result. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	+	0	0	0	0	-	-	-	
	Option 3	-	+	0	0	0	0	+	0	-	
	Option 4	-	0	0	0	0	+	+	0	-	
Access to treatment area	Option 1	-	0	0	0	0	-	0	0	0	Option 1 is the preferred option on the basis of the health and safety implications of having a compound close to the race track and the consequence of having a fence in the treatment area should anyone come off the race track. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.
	Option 2	-	0	0	0	+	-	-	0	0	
Key	Impact	Colour									
+	Beneficial effect										
-	Adverse effect										

0	Neutral effect		

Several design elements have been proposed to take forward for outline design stage, these are outlined within Table 6.

Table 6 Outline design short list proposed for Abbey Consols

Surface Water Management System		
Capping:		
Option being considered	Option being considered	Preferred Option Decision
<p>Option 1: Northern part of the current waste tips to be capped requiring earth movement strategy (cut/fill balance- likely to require import of clean cover material e.g. from borrow pits). Waste from southern part of the current tips to be removed, placed below the liner of the northern part of the site and replaced with topsoil (some of it being proposed as mine water treatment area). Former slime pits area maybe designed to replicate original shape using clean material (opportunity to create specific habitats). Capping will require impermeable synthetic liner and drainage system to collect rainfall infiltration. Liner to be covered with clean material aiming to replicate current appearance (coarse material in the central part and finer cover/topsoil in the three smaller areas). Liner must be impermeable and long lasting as minor infiltration could result in substantial mobilisation of contamination (reducing the benefits of the scheme). Cover also needs to be sufficiently protective considering potential animal access. Drainage to feed into road drainage as much as practical and to feed into clean site discharge route.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none">• Reduces capped area and re-instates southern part of tips.• Allows restricted land use by the farmer for most of the area (except treatment area and mine water transfer).• Allows historic remains in the northern part with medium and high archaeological potential to be covered and therefore preserved for future generations as no excavation is proposed to these features. Removal of the motor track would be beneficial but not in the context of capping.• Offers opportunities to transfer habitats above the liner creating more long term protected habitats including the potential translocation of Bryophyte species.• Minimises land take from the farmer and no impact on race track (i.e. minimises impact on farmer).• Reduction of zinc runoff into the Afon Teifi.• Less disturbance to the waste tips and resulting water re-mediation onsite through potential removal of the race track.• Minimal disturbance to riverine habitats and species.• Minimal disturbance to trees and bat species.• Potential for visual and landscape enhancement opportunity as a result of re-grading. <p>Key Risks and Constraints</p>	<p>Option 3: Do more consolidation of fines to minimise capping footprint.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none">• Less capping material required for the consolidated fines.• Reduction in size of area utilised and therefore larger area available for habitat enhancement.• Minimal disturbance to riverine habitats and species.• Minimal disturbance to trees and bat species. <p>Key Risks and Constraints</p> <ul style="list-style-type: none">• Temporary disturbance to habitats (lower plants) which will require mitigation.• Increased risk of impacts on archaeological remains in the north-eastern part of the tips.• Requires more earthworks movements within the site.• Risk of leaving residual sources in place onsite.• Temporary disturbance to both reptiles and amphibians during construction.• Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction.• Fines are evidence of the mining process which could be lost during consolidation.• Potential for changes to landscape character and views/visual amenity.	<p>Option 1 is the preferred option on the basis of a reduced level of impact upon the heritage features onsite in comparison with the other three options. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>

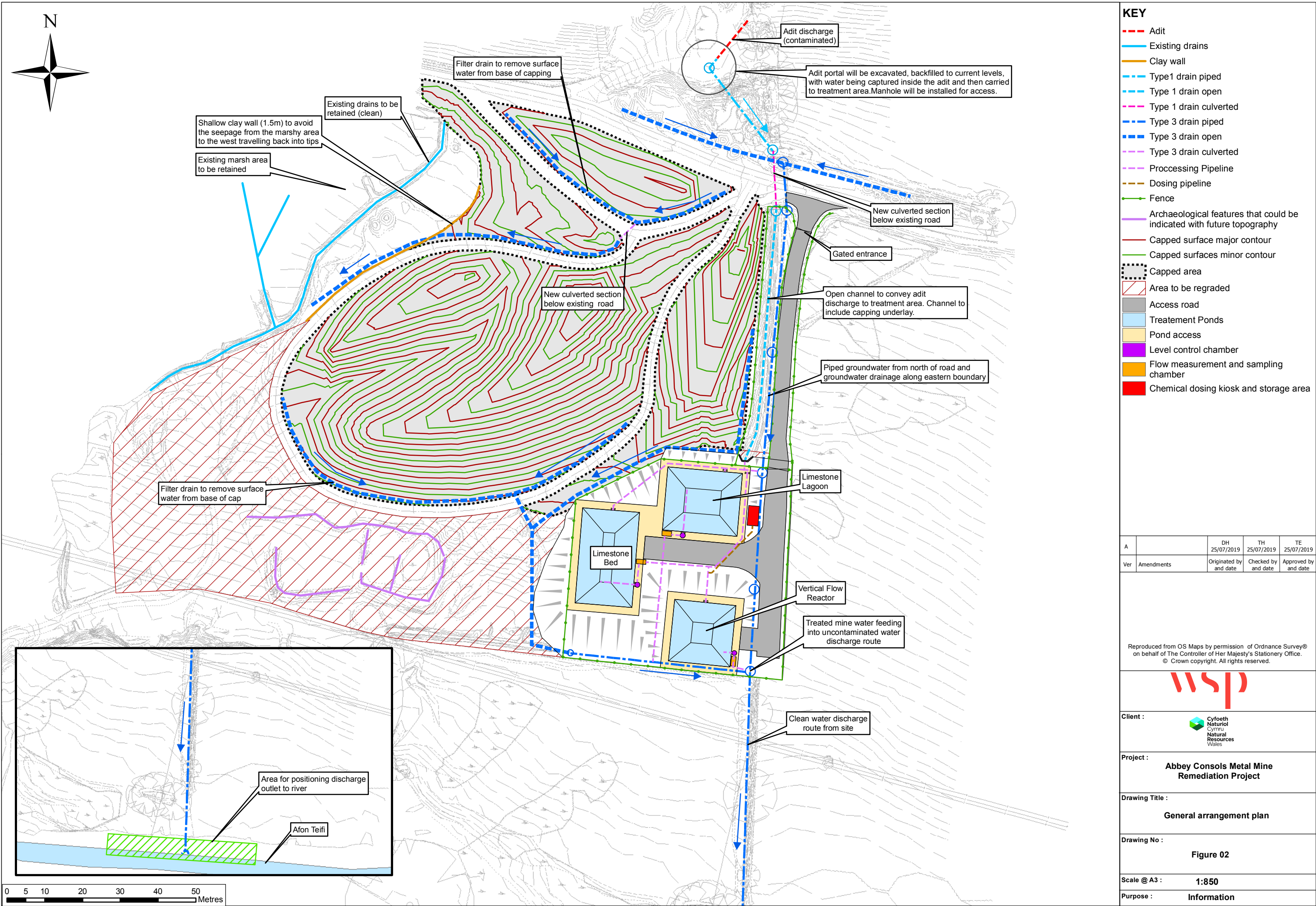
<ul style="list-style-type: none"> • Historic remains in the southern parts of the waste tips will be covered. The ground investigation has not raised specific issues but found waste thickness in the southern area to be generally very thin. • Temporary disturbance to habitats (lower plants) which will require mitigation. • Some waste may be present outside the capped areas and missed out during waste removal (e.g. between the tips and the marshy area in the northwest). Validation sampling and additional soil removal/replacement may need to be considered. • Environmental impact of creating borrow pits to generate clean cover material needs to be considered but can probably be kept to a minimum. • Temporary disturbance to both reptiles and amphibians during construction. • Weight of rock can adversely compact non-robust archaeological remains such as timber. Placement of rocks will disturb evidence of built structures. • Potential for changes to landscape character and views/visual amenity. 		
Groundwater control and land drainage:		
<p>Option 1: Replace groundwater and run-off drainage to the north of the road and add additional groundwater control drainage for the upper parts along the eastern boundary reducing groundwater inflows into the waste tip area. Drainage from the area to the north of the road and groundwater drainage along the eastern boundary to be carried in plain pipes towards an outfall point at the river. Land drains introduced at base of all capped areas to remove surface water/run off, and to prevent interaction between clean and contaminated water. Clean water then piped via the site discharge route towards the Teifi.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Full groundwater control at the upgradient side of the waste tips achieving further groundwater level lowering and stabilisation of water levels underneath the waste tips. • Minimal loss of run-off from the slopes into ground up-hydraulic gradient of the tips. • Generation of clean (almost heavy metal free) discharge to the Teifi. • Maintenance of the Marshy grassland area as it currently stands thus keeping minimising impact upon the Marshy grassland and keeping the hydrological balance as it is currently. • Separation of the clean and contaminated water around the site resulting in separate disposal routes into the river and treatment area respectively. • Opportunity to integrate any wildlife ponds into the landscape. Creation of wildlife ponds will be beneficial to the ecology of that located onsite. • Have new clean discharge as an above ground feature, and integrate with ecology, landscaping and aesthetic. • Potential for visual and landscape enhancement opportunity as a result of re-grading. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Drainage to the north of the road may capture heavy metal loading from spoil material/natural background. Water may need to be directed through the mine water treatment route. • Drainage is below ground and will require access for maintenance/sampling. Risk of blocking to be considered. 	<p>Option 2: Groundwater drainage around the entire waste tip area.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Control of groundwater levels (up and down hydraulic gradient of waste tip). • Limited impact upon important bryophyte populations onsite. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Impact upon the hydrology of the marshy grassland area. • Potential mixture of clean and polluted groundwater downstream of treatment area. • Potential for impacts upon both the ecology and archaeological features onsite. • Potential for temporary disturbance to bats utilising the tree lines. • Potential for changes to landscape character and views/visual amenity. 	<p>Option 1 is the preferred option on the basis of reduced level of impact to both ecology and heritage features onsite, in comparison to option 2 and 3. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>

<ul style="list-style-type: none"> Requirement for excavation into the spoil tips in order to install the drainage features thus generating waste during construction. There is potentially disturbance to both buried archaeology and ecology impacts as a result of the drainage requirements. Ground disturbance has the potential to impact on buried archaeological remains. Potential for impacts on the Afon Teifi SAC/SSSI site during construction to be considered for example silt runoff or contaminant runoff into the river potentially impacting both habitats and species present in the river. Potential for temporary disturbance to bats utilising the tree lines. Potential for changes to landscape character and views/visual amenity. 		
Shallow clay wall between the waste tips and the marshy area to the NW of the site:		
<p>Option 1: A shallow clay/bentonite wall (approx. 1.5m deep) is proposed along the north-western boundary of the waste tips to mitigate potential shallow groundwater flow from the west back into the tips. Groundwater levels below the waste are expected to drop after capping and mine water capture which could result in a groundwater flow from the marshy area towards the tips (inverted gradient). A shallow drain to the west of the wall is proposed to protect the road.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Stops shallow groundwater flow from the west into the waste tips. Reduces risks of dewatering of the marshy area and therefore affecting the ecology of the site. Cheap measure to separate waste from clean material to the west. Additional measure to protect marshy area from waste seepages. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Difficult to determine how far this section should be extended- needs to avoid water backing up on the waste tip side of the wall. May require land drain on the western side of the wall. Temporary limited disturbance to reptiles and breeding birds. Excavation of wall footings could disturb archaeological remains Potential for changes to landscape character and views/visual amenity. 	<p>Option 2: Consider a deeper and longer wall to the north western edge of the cap.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Maximisation of performance. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Higher costs for the excavation requirements. Temporary limited disturbance to reptiles and breeding birds. Increase of waste material required to be disposed of in an appropriate manner. Potential for changes to landscape character and views/visual amenity. 	<p>Option 1 is the preferred option on the basis that it assists in separating the clean and contaminated water unlike option 3 and potential impacts as a result of the wall are minimised due to its reduced size in comparison with option 2. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>
Water discharge from site/outfall:		
<p>Option 1: Formation of a discharge point/outfall to the Teifi at the eastern boundary of the site is proposed, staying upgradient of the current floodplain with erosion features and up-hydraulic gradient of the waste tips. It follows the historic line of mine water discharge.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Avoids floodplain with erosion features. Keeps water away from the waste tips (discharge upgradient). Follows historic route of water discharge. Opportunities to enhance ecology at outfall location. 	<p>Option 2: Chose other outfall locations (e.g. at the point of current discharge to the mine water/seepage or partial discharge to the stream to the west).</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Potential for avoidance of impacts upon trees located on the riverbank. Potential for reduced disturbance to features of the Afon Teifi SAC. Opportunities to enhance ecology at outfall location. Potential for enhancement opportunities if utilisation of open water channels. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Impact upon the flood plain including existing erosion features. 	<p>Option 1 is the preferred option on the basis of a reduced level of ecological impact compared to the other options. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>

<ul style="list-style-type: none"> Flexibility for the exact discharge point location to be determined based on ecological constraints. Potential for enhancement opportunities if utilisation of open water channels. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Works at/near the protected (SAC/SSSI) river required may have temporary disturbance impacts upon both species and habitats. Works may have the potential to effect trees at this location and any species utilising them. Temporary impacts upon users of the PROW during construction is envisaged for this option. Limited temporary disturbance to reptiles and breeding birds. Potential for changes to landscape character and views/visual amenity. 	<ul style="list-style-type: none"> Closer to the inland river cliff at the western boundary. Increased risk of contact with shallow groundwater during excavation. Works at/near the protected (SAC/SSSI) river required may have temporary disturbance impacts upon both species and habitats. Reduced flexibility for the exact discharge point location to be determined based on the ecological constraints. Temporary impacts upon users of the PROW during construction is envisaged for this option. Works may have the potential to effect trees at this location and any species utilising them. Limited temporary disturbance to reptiles and breeding birds. Potential for changes to landscape character and views/visual amenity. 	
<p>Mine Water Treatment</p>		
<p>Mine water capture:</p>		
<p>Option 1: Excavate from TP112 northwards/towards the entrance, clear adit from collapsed material/spoil and install capture pipe avoiding leakage into ground, backfill area to current condition with the exception of an access chamber to access the mine water for sampling and possibly installation of flow monitoring equipment. Collect information on ground conditions to allow evaluation of portal re-instatement above ground at future stage. Mine water management required during construction.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Allows efficient mine water capture (minimised loss to ground). Avoids mixing of mine water with groundwater. Allows exploring ground conditions for potential future re-instatement design. Minimal impact on field access and current land use. Alternative locations for the flow monitoring equipment to be assessed. Clearing the adit will enhance the archaeology for interpretation. Potential for enhancement opportunities for re-grading or planting. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Would require additional construction stage for formation of adit portal (if considered). Pipe blockage/overspill needs consideration (detailed design). Mine water needs to be accessed via chamber (confined space) or further downstream. Works have the potential to affect buried archaeology at this location. Works have the potential to affect mature trees, bats and breeding birds at this location. Potential for changes to landscape character and views/visual amenity. 	<p>Option 2: As option 1 but keep adit portal open followed by a buried pipe.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> Creation of a point of interest on the site. Recovering of a historic feature. Access to the mine water for sampling and inspections. Potential for use of the adit portal by bats. Potential for enhancement opportunities if utilisation of adit portal. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> Unknown conditions of the adit (e.g. water pressure, ground stability) which do not allow design construction at the current stage. Works have the potential to affect buried archaeology at this location. Works have the potential to affect mature trees, bats and breeding birds at this location. Potential for changes to landscape character and views/visual amenity. 	<p>The preferred option is option 1 on the basis that there are more enhancement opportunities with this option than there are with the other options. Option 2 provides opportunities for enhancement of landscape and visual impacts and heritage features as a result of the scheme. Technically, from a design perspective option 1 is preferred as option 2 may not be achievable, however, this is to be explored further as part of the design process taking into account the environmental benefits that this will produce. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>
<p>Mine water transfer to treatment area:</p>		

<p>Option 1: Mine water from the capture structure will be carried in a closed pipe below ground to discharge into an open channel to the south of the road (slightly downstream of current discharge pipe). Open channel will need to be fully lined or built in stone to minimise risk of losses to the ground. This can be tied into the capped area to the west. Channel will act as visual feature similar to historic leats following historic path for most of the way to the south (until feeding into treatment area). Fall will be designed to provide sufficient head to run the mine water through treatment by gravity. Opportunities for habitat creation (e.g. transfer of lower plant rock material). At the treatment area the mine water will then feed into treatment units (initially only trial units).</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Aesthetic feature and opportunity for habitat creation and landscape integration. • Covering impacted soil material underneath liner/hard cover. • Fully gravity driven. • Fully separated transfer from clean drainage discharge. • Minimal impact on quarry area. • Opportunities for installation of flow monitoring equipment and sampling points. • Limited potential impact upon bryophytes. • Greater potential for enhancement of the drainage feature within the landscape to include planting than option 2. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Open access to heavy metal polluted water. Limited access to heavy metal polluted water within a restricted area. Potential harm to species utilising the open access channel as a drinking source. • Discharge flows and flow variations are unknown for design, i.e. design needs to assume maximum capacity • A new crossing pipe under the road may be required to separate this water from the surface water drainage system. • Temporary disturbance to reptiles and breeding birds during construction. • Greater potential for changes to landscape character and views/visual amenity than option 2. 	<p>Option 2: Transfer water in fully buried pipe.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Opportunity for habitat creation and landscaping at this location. • No exposure of mine water to receptors. • Limited potential impact upon bryophytes. • Potential for enhancement of the drainage feature within the landscape to include planting. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Potential for impacts to buried archaeology. • Requirement for increased excavation in contaminated soil. • Loss of pressure head for gravity flow through the treatment system. • Loose opportunity to obtain sight of this historic water feature. • Maintenance of existing main water more difficult below ground. • Reduces head for water to run by gravity through treatment area. • Potential leakage would not be visible/risk of blockage below ground. • Loss of visual benefits. • Temporary disturbance to reptiles and breeding birds during construction. • Potential for changes to landscape character and views/visual amenity. 	<p>Option 1 is the preferred options due to the potential for environmental enhancement measures with this feature to include both ecology and landscape and visual impact features. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>
<p>Mine water treatment area:</p>		
<p>Option 1: Treatment area proposed for adit discharge in south eastern corner of the current waste tips. For the field trial this is including 2 or 3 lined pond/lagoon or buried trench elements which will be hydraulically connected to allow testing of different configurations, fill materials and chemical dosing to optimise heavy metal removal from the water. Treated water will join the site wide drainage discharge route. Treatment areas will require infrastructure for maintenance access. The area may require fence enclosure.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • It uses currently contaminated land (low value) and lining of the structures offering additional benefits in terms of reduced spread of residual contamination in the underlying drift deposits. • Treatment area is at a safe distance from the race track and relatively low on the slope reducing visual impacts. 	<p>Option 3: Creation of cascading treatment area along route of existing channel/ditch.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Minimise impact upon farmland. • Reduced water transfer distance. • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Visual impact of this option is likely to be relevant to those utilising the PRoW. 	<p>Option 1 is the preferred option as it contains the lowest potential impact level upon heritage features as a result of the works. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>

<ul style="list-style-type: none"> • Tested treatment solution has some similarity with historic settlement lagoons. • Location offers opportunity to maintain historic discharge route from the adit to the treatment area (visual benefit, potential for habitat creation). • The proposed treatment area is located outside of the flood zone. • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Potential requirement for chemical dosing may require small building at least for permanent solution with potential temporary visual impact of trial dosing facilities (all small size). • Relatively distant location of the treatment area from the water capture increases risks of water losses during transfer. • A public footpath/PRoW runs parallel to the river to the south of the treatment site. This may require a temporary diversion during construction of the treatment works and connection to the outfall to the river. • Works have the potential to impact areas of high archaeological potential. • Temporary potential disturbance to bryophytes during construction. • Temporary disturbance to reptiles and breeding birds. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Potential for changes to landscape character and views/visual amenity. 	<ul style="list-style-type: none"> • Likely requirement to alter configuration after trial stage (i.e. a distinct treatment area is easier to manage in the future). Difficulties in habitat creation in the short to medium term due to the requirement to alter configuration after the trial stage. • Potential for impact upon heritage features as a result of a cascading treatment design. • Temporary potential disturbance to bryophytes during construction. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Potential for changes to landscape character and views/visual amenity. 	
<p>Access to treatment area:</p>		
<p>Option 1: Formation of an access track along the eastern boundary (to the east of the current ditch). This will require moving eastern fence line/additional land take but allows access to mine water discharge route and drainage separate from the race track. The access track to be resurfaced with granular material and include a turning stub.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Additional land take (requires moving of eastern fence line). • Archaeological opportunity to preserve finds identified onsite. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • Formation of an access track from the race track at the centre of the waste tips as an alternative route. • Potential for impact to buried archaeology onsite for creation of the access track. • Further agricultural habitat loss of neutral/marshy grassland. • Limited impacts to reptiles. 	<p>Option 2: Access from the central part of the race track within the waste tips to be created to the treatment area.</p> <p>Benefits and Opportunities</p> <ul style="list-style-type: none"> • Reduction in additional land take from the owner's farmland. • Shorter track length to the treatment area. • Incorporate earthworks – removal of waste in building access track. <p>Key Risks and Constraints</p> <ul style="list-style-type: none"> • H and S concerns due to proximity to the race track. • No access to the discharge route along the eastern boundary. • Potential for impacts upon buried archaeology. • Potential for impacts upon ecological features of the site. • Lower potential for changes to landscape character and views/visual amenity as opposed to option 1. 	<p>Option 1 is the preferred option on the basis of the health and safety implications of having a compound close to the race track and the consequence of having a fence in the treatment area should anyone come off the race track. It is thought that through sensitive design and mitigation (such as the adoption of appropriate mitigation within the EAP that includes heritage, ecology and landscape measures), project impacts can be minimized whilst securing the wider environmental benefits of the scheme.</p>



4.0 Environmental Impact Assessment (EIA) Screening

As the first stage of the Environmental Impact Assessment process the purpose of Screening is to determine whether a proposed project is likely to have significant effects on the environment. To facilitate the Screening process the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, define EIA Development as either Schedule 1 or Schedule 2 development that is likely to have a significant effect on the environment by virtue of factors such as its nature, size or location (see table 7 below).

Where a proposed development falls into the definition and descriptions of Schedule 1 and Schedule 2 then it is likely that it will be screened into EIA and subject to the Environmental Impact Assessment Regulations (2017).

The threshold for Schedule 1 development generally relate to major projects which by virtue of their scale, location, appearance or the type of activity, have the potential to impact on the environment. These such projects are specifically defined in the EIA Regulations and automatically require EIA.

Table 7 Relevant Extracts of Schedule 2 of the EIA directive

Relevant Extracts of Schedule 2 of the EIA Directive	
Column 1 Description of the Development	Column 2 Applicable thresholds and criteria
2 Extractive Industry (b) Underground mining	All development except the construction of buildings or other ancillary structures where the new floorspace does not exceed 1,000 square metres.
11 Other Projects Waste water treatment plants (unless included within Schedule 1)	The area of the development exceeds 1,000 square metres.
13 Changes and extensions (b) Any change to or extension of development of a description listed in paragraphs 1 to 12 of column 1 of this table, where that development is already authorised, executed or in the process of being executed.	Either— (i) The development as changed or extended may have significant adverse effects on the environment; or (ii) in relation to development of a description mentioned in column 1 of this table, the thresholds and criteria in the corresponding part of column 2 of this table applied to the change or extension are met or exceeded.

The proposed preferred development option (Appendix A) does not fall into the project descriptions given in Schedule 1. Hence, EIA for this scheme is not mandatory under Schedule 1.

However, by virtue of its nature, it is of relevance to some of the categories of development given within Schedule 2. As indicated in Table 7, the scheme could be regarded as being of relevance to paragraph 11 (Other projects – waste water treatment plants), whilst also being of relevance to paragraph 2(b) via paragraph 13(b) as a change or extension to an existing underground mining scheme and further consideration of the matter is required

Whilst the project is of relevance to paragraph 11 of Schedule 2 the proposed waste water treatment plant itself (comprising of two lagoons and one treatment area approximately 0.30 hectares in size) would be below the 1,000m² threshold indicated in Table 7. Hence, it is not felt that the project is of relevance to the EIA regulations from the perspective of paragraph 11.

From the perspective of paragraphs 2(b) and 13(b), the underground mining development to which the project relates has ceased production. Hence, it can be argued that the 2(b) elements of the scheme is 'already authorised, executed, or in the process of being executed' as discussed in paragraph 13(b), and that EIA could be required on this basis. This would be the case where either of the contingencies laid out in 13(b)Column 2 are met. The delivery of the proposed scheme would not alter the overall footprint of the scheme to any significant degree, thus it is felt that the scheme would not be relevant to the EIA regulations under 13(b)(ii). The final consideration is whether or not the development, as changed or extended, may have significant adverse effects on the environment and thus requires EIA under 13(b)(i) under Schedule 3 of the EIA Regulations. Further consideration of this matter is presented in Table 8 below.

Table 8 EIA Regulations (Schedule 3) assessment of the preferred options for the Abbey Consols Site.

Schedule 3 Assessment Criteria	Relevance to the Abbey Consols Site	Mitigation	Screening Opinion
Characteristics of the development			
The size and design of the development	The size of the preferred development option infrastructure is under 1 hectare with the preferred design option outlined within the site figures.	Mitigation proposed has been included within the design and is outlined below in accordance with a non-statutory environmental report.	Screened out of statutory EIA process The overall development is 4.5 hectares in size however the infrastructure proposed (the water treatment plant) is less than 1 hectare in size. Therefore, the proposed scheme has been screened out of the statutory EIA process.
The cumulation with other existing developments	No other existing developments are known that could generate a cumulative impact with this proposed development.	None proposed.	Screened out of statutory EIA process Screened out of the statutory EIA process on the basis of no known other developments proposed close to this scheme.
The use of natural resources, soil, land, water and biodiversity	The natural resources of the area are constrained to agricultural farmland, the River Teifi and woodland further north of the site. Potential impact upon ecology, heritage, water and soil will be managed through a site Environmental Action Plan along with a set of management plans specific to the proposed design including an Ecological Management Plan, Landscape Strategy and Heritage Strategy.	<ul style="list-style-type: none"> • Environmental Action Plan • Ecological Management Plan • Landscape Strategy (Site Reinstatement Plan – led by Chartered Landscape Architect) • Heritage Strategy • Habitats Regulations Assessment 	Screened out of statutory EIA process Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site.
The production of waste	The production of waste will be managed by the production of a site waste management plan for the scheme with waste produced to be identified by type and disposed of appropriately by a licensed waste contractor in accordance with best practise requirements.	<ul style="list-style-type: none"> • Site Waste Management Plan • Environmental Action Plan 	Screened out of statutory EIA process Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site.
Pollution and nuisances	Potential water and dust pollution that could result from this scheme will be managed through the implementation of an Environmental Action Plan to include pollution prevention measures minimising potential impacts generated as a result of construction.	<ul style="list-style-type: none"> • Silt Management Plan • Environmental Action Plan • Water Framework Directive Assessment 	Screened out of statutory EIA process Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site. The existing pollution impact upon the water quality of the River Teifi will be reduced through the implementation of this scheme reducing pollution levels and cleaning up the mine discharge thus enhancing the existing water quality as a result.
The risk of major accidents and or disasters relevant to the development concerned, including those caused by climate change in accordance with scientific knowledge.	The proposed design does not include areas of high infrastructure within the flood plain with the only anticipated design feature being the outfall into the River Teifi. Impact as a result of climate change is not anticipated to occur due to the minimal nature of the infrastructure being proposed, distance of the features away from the river and the minimal frequency of which extreme flooding could be generated.	None proposed.	Screened out of statutory EIA process The proposed scheme is considered unlikely to cause significant greenhouse gas emissions during construction and as such will not have a significant impact on atmospheric greenhouse gas concentrations.

			<p>Post-construction, there will be no greenhouse gas emissions.</p> <p>The proposed scheme will contribute positively to climate change adaptation through providing protection despite prediction of increased severity of flood events.</p>
The risks of human health.	Construction working hours would be agreed through consultation with the NRW and the landowner. Potential air quality and noise effects would be managed through implementation of an Environmental Action Plan (EAP) (incorporating construction best-practice measures).	None proposed.	<p>Screened out of the statutory EIA process</p> <p>Construction working hours would be agreed through consultation with the NRW and the landowner.</p> <p>Potential air quality and noise effects would be managed through implementation of an Environmental Action Plan (EAP) (incorporating construction best-practice measures).</p>
Location of development			
The existing and approved land use.	The land use of the site is that of a motor racing track and a mine waste tip.	Not applicable.	<p>Screened out of statutory EIA process</p> <p>The overall development is 4.5 hectares in size however the site is classed as a previous extractive industry “mining” with an additional motor track running through the site and a proposed land use as a waste water treatment plan. The proposed scheme has been screened out of the statutory EIA process as the infrastructure proposed onsite is less than 1 hectare in size.</p>
The relative abundance, availability, quality and regenerative capacity of natural resources.	The regenerative capacity of the natural resources is considered to be good surrounding the site with agricultural farmland, the River Teifi and the treeline all apparent. The utilisation of both a Landscape Strategy and Ecological Management Plan will assist in integrating the natural resources of the site back into the landscape following the proposed works.	<ul style="list-style-type: none"> Ecological Management Plan Landscape Strategy (Site Reinstatement Plan – led by Chartered Landscape Architect) 	<p>Screened out of the statutory EIA process</p> <p>Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site.</p> <p>Screened in to the non-statutory environmental reporting on the basis of on the basis of potential for impact without mitigation measures proposed.</p>
The absorption capacity of the natural environment.	The zinc levels reaching the River Teifi are currently lowering the quality of the water however with the remediation of the site an improvement in the water quality of the river is anticipated and therefore a higher absorption capacity is likely to result.	Environmental Action Plan.	<p>Screened out of the statutory EIA process</p> <p>Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site.</p>
<p>The likely significant effects of the development on the environment must be considered in relation to:</p> <ul style="list-style-type: none"> a) Magnitude and spatial extent of the impact; b) Nature of the impact; c) Transboundary nature of the impact; d) Intensity and complexity of the impact; e) Probability of the impact; 	The likely significance of effect as a result of the proposed scheme has been considered in relation to the aspects outlined under Schedule 3. With the minimal requirement for infrastructure and the proposed improvement to the water quality as a result of the scheme it is considered that the potential environmental impact that could result will not be significant with the following management plans in place: Environmental Action Plan, Ecological Management Plan, Heritage Strategy and the Landscape Strategy.	<ul style="list-style-type: none"> Environmental Action Plan Ecological Management Plan Landscape Strategy (Site Reinstatement Plan – led by Chartered Landscape Architect) Heritage Mitigation Strategy 	<p>Screened out of the statutory EIA process</p> <p>Screened out of statutory EIA on the basis of no significant environmental impact upon the natural resources of the site.</p>

<p>f) Expected onset, duration and frequency and reversibility of the impact;</p> <p>g) The cumulation of the impact with the other existing and or approved development; and</p> <p>h) The possibility of effectively reducing the impact.</p>			
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4.1 EIA Screening Conclusion

Sections 1 and 2 of this report provide an overview of the environmental context of the scheme, illustrating that there are a number of potentially sensitive environmental receptors found within the locality of the scheme. These potential receptors include the presence of ecological receptors on site, the site being situated adjacent to nationally and internationally protected sites, namely the Afon Teifi SAC and SSSI, and the proposed development also lying within proximity to a number of cultural heritage assets, unknown buried archaeology and within an important landscape.

The likelihood of the scheme affecting these potential receptors is deemed to be low given that the majority of the proposed interventions are relatively minor and being limited to improvements to site drainage, capping mine spoil, the construction of a small, permeable stone track, a small treatment plant and discharge point. It is proposed that the scheme will be designed in as environmentally sensitive manner as possible, taking into account the views of specialists in relevant environmental disciplines on ways to reduce identifiable primary impacts and to mitigate any residual impacts. Their suggested mitigation proposals will be captured within an Ecological Management Plan and an Environmental Action Plan.

During the operational phase of the project its likely impacts will be largely limited to the beneficial effects of improving the quality of water discharges from the site which will bring benefits to the SAC, SSSI and the WFD status of the local. As a result of the relatively small scale of proposed works, the steps that will be taken to avoid, reduce and mitigate the potential impacts of the scheme and the aim of the project being to improve the quality of water discharges from the site, as outlined within Table 8 it is suggested that the project will not have significant adverse effects on the environment and that a statutory EIA for this scheme is not required under 13(b)(i) of Schedule 2. Thus, although yet to be agreed with Ceredigion County Council, it is currently believed the scheme will be screened out of any requirement for a statutory EIA and therefore an Environmental Statement will not be required.

Whilst significant environmental impacts are not anticipated to arise from the proposed works, it is acknowledged that for certain environmental receptors there's potential for environmental impact to occur. In light of these risks and in accordance with Natural Resources Wales good practice, further targeted environmental surveys and assessments are proposed that will inform an Environmental Action Plan (EAP) for the scheme. Section 5 portrays the scope of the targeted environmental surveys and assessments proposed.

5.0 Scope of Environmental Assessment

5.1 Introduction

To ensure environmental risks associated with the project are managed, targeted surveys and assessments are proposed that will inform an Environmental Action Plan.

Standard methods for survey and assessment will be used where available and modified where appropriate to the scale, location and nature of the proposed scheme.

The scoping process aims to identify potential environmental impacts of the proposed scheme, put forward suitable mitigation where feasible to do so at this stage of the project, and define what further work is necessary to inform an Environmental Action Plan (EAP). A further purpose of this scoping exercise is to seek agreement with key stakeholders on the approach to be taken and issues to be considered within the Environmental Action Plan.

5.2. Scoping Assessment

Following consideration of the baseline environmental situation, predicted potential effects and potential preliminary mitigation, the scope of further work, surveys and assessments required to inform the development of a fit-for-purpose EAP have been identified in Table 9. This scoping exercise has considered potential predicted construction and operation phase impacts and opportunities. Decommissioning phase impacts have not been considered given that the proposed scheme is intended to exist in perpetuity.

Key stakeholders have been invited to comment on the content of a previous version of this ECOR. The responses of consultees are presented within Appendix B. The actions identified from the consultation have been recorded in Table 9 where applicable.

Table 9 - Environmental Topics Scoped-In /-Out of Environmental Assessment

Topic – Receptor / Resource	Predicted Potential Effects / Opportunities	Preliminary Mitigation/Enhancement	Next Steps
Population (including Traffic and Transport, Recreation and Public Access, Socio-Economics)	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Disturbance to local farmer due to construction access traffic, disruption of the motorsports track and physical construction works. Impacts to users of Public Rights of Way and permissive footpaths. Construction employment and local job creation. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Impacts to users of Public Rights of Way and permissive footpaths and on the motorsports track. Public access improvements. Natural resource interpretation / communication improvements. 	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Construction working methodology, hours and access route to be developed and agreed through consultation with the NRW. Temporary footpath diversions and / or closures and appropriate signage / wider communication to the public. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Appropriate signage informing users of footpaths necessary procedure / alternative footpath routes. Install interpretation boards to promote well-being and appreciation of the natural environmental resource of the area with focus on archaeology and biodiversity. 	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP. Public Right of Way mitigation measures to be agreed with Ceredigion County Council. Opportunities to improve public right of ways to be investigated.
Human Health (including Air/Dust and Noise)	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Disturbance / nuisance to local residents due to construction access traffic and physical construction works. <p><u>Operation phase</u></p> <p>N/A</p>	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Construction working methodology and hours to be developed and agreed through consultation with NRW and Ceredigion County Council. Implementation of dust suppression measures to be outlined within the Environmental Action Plan for the site works. <p><u>Operation phase</u></p> <p>N/A</p>	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP.
Climate Change	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> The proposed scheme would require material and energy for the construction phase which it is recommended is managed through a Site Waste Management Plan and a Materials 	<p><u>Construction phase</u></p> <p>N/A</p> <p><u>Operation phase</u></p>	<ul style="list-style-type: none"> Site Waste Management Plan and Material Assessment.

	<p>Assessment (particularly with regards to importing material for capping).</p> <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Managing flood risk presents a catchment scale significant environmental benefit. 	N/A	
Biodiversity and Nature Conservation	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Small scale loss of high/very high value habitats (including Bryophyte habitat) due to land take for proposed capping of the tip spoils. Potential impacts to protected/notable species and habitats onsite. Potential impact to the Afon Teifi SAC/SSSI located south of the site. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Opportunity to create new habitat(s) to improve the existing site and produce replacement habitat for example for the Bryophyte species present onsite. 	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Mitigation measures for the marshy grassland area should be implemented to safe guard this habitat. If works are required within 10m of the river corridor then a buffer and working methods will need to be agreed with an ecologist and a pre-commencement check and toolbox talk and ongoing monitoring will be required for the scheme. It is recommended that any ground clearance works should be undertaken outside the bird breeding season (February to August). It is recommended that ground clearance is undertaken during the last autumn/early winter and is completed by March to minimise potential impacts upon reptiles. Provision of bird and bat boxes on retained trees is being considered for this scheme. Provision of invertebrate hotels and habitat piles is being considered for this scheme. <p>Pre-construction ecological walkover.</p> <p><u>Operation phase</u></p> <ul style="list-style-type: none"> If works are occurring within 10m of the river then ongoing otter monitoring will be required for the scheme. Enhancement of biodiversity through improving the water quality of the Afon Teifi. Re-opening of the adit entrance would create additional roosting opportunities for bats including hibernation sites. Natural regeneration of topsoil from the site utilising existing seed banks will be outlined within the Environmental Action Plan for the site. A low intensity management program should be implemented as part of the site management plan providing habitat for reptiles and invertebrates. This is to be detailed within the Environmental Action Plan for the scheme. 	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP. Habitat Regulations Assessment (Test of Likely Significant Effect & Appropriate Assessment) Site of Special Scientific Interest (SSSI) Assent Bryophyte and Lichen Mitigation Plan Otter & Bat survey (dependant on extent of proposed works).
Ground Conditions and Waste	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Loss of agricultural land associated with land take. Adverse changes to soil characteristics. Waste from construction and excavation works to be appropriately disposed of. Creation of preferential pathways for ground contamination. Potential to release contaminated material during ground excavations. <p><u>Operation phase</u></p>	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Appropriate soil handing procedures. Implementation of a Site Waste Management Plan (SWMP). Implementation of soil handing procedures in accordance with the Environmental Action Plan to include erosion control, runoff control, installation of silt and pollutant traps and locations of stockpiles distances away from the watercourse. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Optimisation of design to minimise footprint of the site works. 	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP. Site Waste Management Plan and Material Assessment.

	<ul style="list-style-type: none"> Loss of agricultural and motorsport land. 		
Water (including Flood Risk, Geomorphology and WFD)	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Water quality associated with silt-laden runoff into the Afon Teifi. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Increase in water from the surface water management system into the Afon Teifi could potential influence the flood risk at this location. Water Framework Directive Assessment is recommended prior to the works onsite. Managing flood risk through the appropriate use of the surface water management system presents a catchment scale significant environmental benefit. 	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Erosion / runoff control, e.g. installation of suitable silt/pollutant traps (e.g. silt fencing and booms). Stockpiles of loose material are to be located away from watercourses to be outlined within the Environmental Action Plan. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Encourage farmers to use less fertilisers / pesticides within part of the proposed storage area. Potential for improvement of the water quality runoff into the Afon Teifi therefore improving the Water Framework Directive Classification type through the design and treatment of water from the site. 	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP. Water Framework (WFD) Directive Preliminary (Screening and Scoping) Assessment, and full WFD Assessment if applicable. Silt/Material Management Plan
Cultural Heritage	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Potential direct physical impacts to currently unknown archaeological remains located within the site i.e. from the proposed capping and treatment area. Temporary setting impacts to SAMs of which three are within the vicinity of the site including Florida Abbey. Potential for indirect temporary impact to the Strata Florida site. Construction works would change the landscape character of area (Landscape of outstanding special historic interest) during the construction phase. Potential impacts to receptors including residential (isolated properties and settlements) and recreational routes (recreational trails, footpaths). <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Impact to setting of SAMs. The treatment works would change landscape character of area during the long term. Potential impacts to receptors including residential (isolated 	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Areas of high archaeological potential to be impacted by the proposed design. The need for an archaeological watching brief and recording measures is to be ascertained for the scheme in further consultation with Dyfed Archaeological Trust. Further consultation with Dyfed Archaeological Trust to be progressed to agree design and construction phase working methodologies and incorporation of the heritage enhancement measures such as the creation of public information points. Incorporation of advice from the landscape mitigation recommendations. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Sensitive design and screening of the treatment area in relation to the buried archaeological remains. Utilisation of the slime pits as a heritage feature to be retained onsite. Enhancement of the site through restoration of the adit entrance. 	<ul style="list-style-type: none"> Preliminary Mitigation/Enhancements to be incorporated into EAP. Archaeological Site Excavation. Heritage Mitigation Strategy to be approved by Dyfed Archaeological Trust. Investigate opportunities to promote heritage interest.

	properties and settlements) and recreational routes (recreational trails, footpaths).		
Landscape and Visual	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Construction works would change landscape character of area during the construction phase. Potential impacts to receptors including residential (isolated properties and settlements) and recreational routes (recreational trails, footpaths). <p><u>Operation phase</u></p> <ul style="list-style-type: none"> The embankment would change landscape character of area during the long term. Potential impacts to receptors including residential (isolated properties and settlements) and recreational routes (recreational trails, footpaths). 	<p><u>Construction phase</u></p> <ul style="list-style-type: none"> Incorporation of advice from the landscape team in relation to the proposed landscape strategy which have the potential to enhance the site as part of the remediation process. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> Landscape remodelling and planting to be recommended for the site enhancing the integration of the proposed scheme with the existing features present. 	<ul style="list-style-type: none"> - Preliminary Mitigation/Enhancements to be incorporated into EAP. - Site Reinstatement Plan – led by Chartered Landscape Architect. - Constraints and Opportunities Plan.

5.3. Scoping Conclusion

It is proposed that the scope of further environmental work, surveys and assessments to be delivered will include:

- Population:
 - Public Right of Way mitigation measures (e.g. diversion) to be agreed with Ceredigion County Council.
 - Opportunities to improve Public Right of Way and connectivity with Strata Florida Abbey/Farmstead to be investigated.

Human Health:

- Construction best practice measures to be incorporated into EAP.
- Climate Change:
 - Site Waste Management Plan and Material Assessment.
- Biodiversity and Nature Conservation
 - Habitat Regulations Assessment (Test of Likely Significant Effect & Appropriate Assessment)
 - Site of Special Scientific Interest (SSSI) Assent
 - Bryophyte and Lichen Mitigation Plan
 - Otter & Bat survey (dependant on extent of proposed works).
- Ground Conditions and Waste:
 - Site Waste Management Plan and Material Assessment.
- Water:
 - Water Framework (WFD) Directive Preliminary (Screening and Scoping) Assessment, and full WFD Assessment if applicable.
 - Silt/Material Management Plan
- Cultural Heritage:
 - Archaeological Site Excavation.
 - Heritage Mitigation Strategy to be approved by Dyfed Archaeological Trust.
 - Investigate opportunities to promote heritage interest.
 -
- Landscape and Visual:
 - Site Reinstatement Plan – led by Chartered Landscape Architect.
 - Constraints and Opportunities Plan

Actions identified via the above referenced deliverables will be recorded within the project's Environmental Action Plan (EAP) together with any further mitigation deemed appropriate.

5.4. Environmental Enhancements

A draft list of potential environmental enhancements is Table 10.

Table 10 – Potential Environmental Enhancements (multiple benefits)

Potential environmental enhancement	Effectiveness at providing environmental improvement	Timescales
	High / medium / low	Long term (10+ years)
		Medium term (5-10y)
		Short term (1-5years)
Installation of public interpretation boards on the PROW.	Medium	Long term
Provision of bird and bat boxes on retained trees.	Medium	Long term
Provision of invertebrate hotels and habitat piles.	Medium	Long term
Otter monitoring program.	Medium	Medium term
Enhancement of the Afon Teifi through improvement of the water quality.	High	Long term
Re-opening of the adit entrance generating potential bat roosting opportunities.	Medium	Long term
Low intensity management program for reptiles and invertebrates could be implemented as part of the EAP.	Medium	Long term
Enhancement of the heritage feature and their interpretation onsite.	Medium	Long term
Landscape planting plan and landscape strategy to be incorporated into the design.	Medium	Long term

6. Closing Note

This Environmental Constraints and Opportunities Record (ECOR) has recorded the sites environmental baseline, presented an outline design for the works and described how the option appraisal has considered the sites key environmental features. Further to this the ECOR documents the EIA screening opinion and set the scope the non-statutory Environmental Impact Assessment to be taken forward during the scheme detail design stage.

Key stakeholders have been invited to contribute to the development of this ECOR. The responses of consultees to the contents of this ECOR are presented within Appendix B. The actions identified from the consultation have been recorded in Table 9 where applicable.

Appendices

Table 13 – Outline design long list options Risks and Opportunities Table

Design element	Option description	Key Benefits and Opportunities	Key Risks and Constraints
Surface Water Management System (Waste Tips)			
Capping Covering of areas of contamination to prevent rainwater ingress and formation of perched water/seepages (mobilisation of heavy metals from the waste).			
Option 1	Covering the northern section of the waste tips including a liner and waste removal from the southern part of the current waste tips. Waste from the southern section will be condensed into the northern part below the liner. Capped area will be covered with plain rock and topsoil material roughly replicating current topography. Removal of the motor track around the mine site has been considered as part of the remediation.	<ul style="list-style-type: none"> • Reduces capped area and re-instates southern part of tips. • Allows restricted land use by the farmer for most of the area (except treatment area and mine water transfer). • Allows historic remains in the northern part with medium and high archaeological potential to be covered and therefore preserved for future generations as no excavation is proposed to these features. Removal of the motor track would be beneficial but not in the context of capping. • Offers opportunities to transfer habitats above the liner creating more long term protected habitats including the potential translocation of Bryophyte species. • Minimises land take from the farmer and no impact on race track (i.e. minimises impact on farmer). • Reduction of zinc runoff into the Afon Teifi. • Less disturbance to the waste tips and resulting water re-mediation onsite through potential removal of the race track. • Minimal disturbance to riverine habitats and species. • Minimal disturbance to trees and bat species. • Potential for visual and landscape enhancement opportunity as a result of re-grading. 	<ul style="list-style-type: none"> • Historic remains in the southern parts of the waste tips will be covered. The ground investigation has not raised specific issues but found waste thickness in the southern area to be generally very thin. • Temporary disturbance to habitats (lower plants) which will require mitigation. • Some waste may be present outside the capped areas and missed out during waste removal (e.g. between the tips and the marshy area in the northwest). Validation sampling and additional soil removal/replacement may need to be considered. • Environmental impact of creating borrow pits to generate clean cover material needs to be considered but can probably kept to a minimum. • Temporary disturbance to both reptiles and amphibians during construction. • Weight of rock can adversely compact non-robust archaeological remains such as timber. Placement of rocks will disturb evidence of built structures. • Potential for changes to landscape character and views/visual amenity.
Option 2	Cap entire site area, negating the need for movement of contaminated fines (but increasing the need for clean cover material).	<ul style="list-style-type: none"> • Reduced earthworks requirements. • Heritage fines are evidence of the mining process. Negating the need for the removal of such is beneficial. • Minimal disturbance to riverine habitats and species. • Minimal disturbance to trees and bat species. 	<ul style="list-style-type: none"> • Weight of rock can adversely compact non-robust archaeological remains such as timber. Placement of rocks will disturb evidence of built structures. • Temporary disturbance to habitats (lower plants) which will require mitigation. • Larger area of treatment required – increased land take. Different location for treatment area. • Substantially more liner material required (and cover material). • Long-term maintenance requirements increase. • Increased impact on farmer due to increased land take (in particular for treatment area).

			<ul style="list-style-type: none"> • Temporary disturbance to both reptiles and amphibians during construction. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Potential for changes to landscape character and views/visual amenity.
Option 3	Do more consolidation of fines to minimise capping footprint.	<ul style="list-style-type: none"> • Less capping material required for the consolidated fines. • Reduction in size of area utilised and therefore larger area available for habitat enhancement. • Minimal disturbance to riverine habitats and species. • Minimal disturbance to trees and bat species. 	<ul style="list-style-type: none"> • Temporary disturbance to habitats (lower plants) which will require mitigation. • Increased risk of impacts on archaeological remains in the north-eastern part of the tips. • Requires more earthworks movements within the site. • Risk of leaving residual sources in place onsite. • Temporary disturbance to both reptiles and amphibians during construction. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Fines are evidence of the mining process which could be lost during consolidation. • Potential for changes to landscape character and views/visual amenity.
Option 4	No capping however take contaminated material off site.	<ul style="list-style-type: none"> • No waste material left onsite. • Minimal disturbance to riverine habitats and species. • Minimal disturbance to trees and bat species. • Minimal disturbance to the rabbit warren within the waste tips. • Minimal disturbance to archaeological remains. 	<ul style="list-style-type: none"> • Environmental impact of off-site landfilling or treatment (transport, requirement of substantial amounts of topsoil). • The waste tips are archaeological evidence of the mining process which will be lost. • Disturbance due to the transport needed for disposal. • Imported topsoil to be brought too site for use. • Temporary disturbance to habitats (lower plants) which will require mitigation. • Temporary disturbance to both reptiles and amphibians during construction. • Potential for changes to landscape character and views/visual amenity.
Groundwater control and land drainage Avoid contact between clean groundwater and waste material and good separation of clean runoff from the restored surface. Options are driven by capping options above.			

Option 1	Replace groundwater and run-off drainage to the north of the road and add additional groundwater control drainage for the upper parts along the eastern boundary reducing groundwater inflows into the waste tip area. Drainage from the area to the north of the road and groundwater drainage along the eastern boundary to be carried in plain pipes towards an outfall point at the river. Land drains introduced at base of all capped areas to remove surface water/run off, and to prevent interaction between clean and contaminated water. Clean water then piped via the site discharge route towards the Teifi.	<ul style="list-style-type: none"> Full groundwater control at the upgradient side of the waste tips achieving further groundwater level lowering and stabilisation of water levels underneath the waste tips. Minimal loss of run-off from the slopes into ground up-hydraulic gradient of the tips. Generation of clean (almost heavy metal free) discharge to the Teifi. Maintenance of the Marshy grassland area as it currently stands thus keeping minimising impact upon the Marshy grassland and keeping the hydrological balance as it is currently. Separation of the clean and contaminated water around the site resulting in separate disposal routes into the river and treatment area respectively. Opportunity to integrate any wildlife ponds into the landscape. Creation of wildlife ponds will be beneficial to the ecology of that located onsite. Have new clean discharge as an above ground feature, and integrate with ecology, landscaping and aesthetic. Potential for visual and landscape enhancement opportunity as a result of re-grading. 	<ul style="list-style-type: none"> Drainage to the north of the road may capture heavy metal loading from spoil material/natural background. Water may need to be directed through the mine water treatment route. Drainage is below ground and will require access for maintenance/sampling. Risk of blocking to be considered. Requirement for excavation into the spoil tips in order to install the drainage features thus generating waste during construction. There is potentially disturbance to both buried archaeology and ecology impacts as a result of the drainage requirements. Ground disturbance has the potential to impact on buried archaeological remains. Potential for impacts on the Afon Teifi SAC/SSSI site during construction to be considered for example silt runoff or contaminant runoff into the river potentially impacting both habitats and species present in the river. Potential for temporary disturbance to bats utilising the tree lines. Potential for changes to landscape character and views/visual amenity.
Option 2	Groundwater drainage around the entire waste tip area.	<ul style="list-style-type: none"> Control of groundwater levels (up and down hydraulic gradient of waste tip). Limited impact upon important bryophyte populations onsite. 	<ul style="list-style-type: none"> Impact upon the hydrology of the marshy grassland area. Potential mixture of clean and polluted groundwater downstream of treatment area. Potential for impacts upon both the ecology and archaeological features onsite. Potential for temporary disturbance to bats utilising the tree lines. Potential for changes to landscape character and views/visual amenity.
Option 3	Split the groundwater drainage and surface runoff into separate discharge routes.	<ul style="list-style-type: none"> Shorter piped drainage sections to the point of discharge. Limited impact upon important bryophyte populations onsite. 	<ul style="list-style-type: none"> Higher performance risks and less control over of discharge routes. Higher impact on the offsite farmland. Potential for disturbance to the river including both otter and fish species present. A longer route of excavation will be required for appropriate disposal. Potential for temporary disturbance to bats utilising the tree lines. Potential for changes to landscape character and views/visual amenity.
Shallow clay wall between the waste tips and the marshy area to the NW of the site Mitigate risks of water transfer from the marshy area towards the tips.			
Option 1	Shallow clay wall approximately 1.5m deep to block perched water above glacial till in relation to the north western edge of the cap.	<ul style="list-style-type: none"> Stops shallow groundwater flow from the west into the waste tips. Reduces risks of dewatering of the marshy area and therefore affecting the ecology of the site. Cheap measure to separate waste from clean material to the west. Additional measure to protect marshy area from waste seepages. 	<ul style="list-style-type: none"> Difficult to determine how far this section should be extended- needs to avoid water backing up on the waste tip side of the wall. May require land drain on the western side of the wall. Temporary limited disturbance to reptiles and breeding birds. Excavation of wall footings could disturb archaeological remains. Potential for changes to landscape character and views/visual amenity.

Option 2	Consider a deeper and longer wall to the north western edge of the cap.	<ul style="list-style-type: none"> Maximisation of performance. 	<ul style="list-style-type: none"> Higher costs for the excavation requirements. Temporary limited disturbance to reptiles and breeding birds. Increase of waste material required to be disposed of in an appropriate manner. Potential for changes to landscape character and views/visual amenity.
Option 3	Do nothing hoping that purged water within marshy area is draining to the southwest anyway.	<ul style="list-style-type: none"> Cost savings over implementing a wall at this location. No excavation within the marshy grassland area. No temporary disturbance to species or habitats. No impact on the archaeological resource. 	<ul style="list-style-type: none"> Potentially compromising the overall performance of the site remediation. Reduces risks of dewatering of the marshy area and therefore affecting the ecology of the site.
Water discharge from site/outfall Currently there is no formal discharge point increasing risk of erosion. Surface water from the capped areas, collected groundwater and treated mine water will need to be discharged to the Afon Teifi.			
Option 1	Collect all water from the site into a single discharge route on the eastern boundary to a fully designed outfall location.	<ul style="list-style-type: none"> Avoids floodplain with erosion features Keeps water away from the waste tips (discharge upgradient) Follows historic route of water discharge. Opportunities to enhance ecology at outfall location. Flexibility for the exact discharge point location to be determined based on ecological constraints. Potential for enhancement opportunities if utilisation of open water channels. 	<ul style="list-style-type: none"> Works at/near the protected (SAC/SSSI) river required may have temporary disturbance impacts upon both species and habitats. Works may have the potential to effect trees at this location and any species utilising them. Temporary impacts upon users of the PROW during construction is envisaged for this option. Limited temporary disturbance to reptiles and breeding birds. Potential for changes to landscape character and views/visual amenity.
Option 2	Chose other outfall locations (e.g. at the point of current discharge of the mine water/seepage or partial discharge to the stream to the west)	<ul style="list-style-type: none"> Potential for avoidance of impacts upon trees located on the riverbank. Potential for reduced disturbance to features of the Afon Teifi SAC. Opportunities to enhance ecology at outfall location. Potential for enhancement opportunities if utilisation of open water channels. 	<ul style="list-style-type: none"> Impact upon the flood plain including existing erosion features. Closer to the inland river cliff at the western boundary. Increased risk of contract with shallow groundwater during excavation. Works at/near the protected (SAC/SSSI) river required may have temporary disturbance impacts upon both species and habitats. Reduced flexibility for the exact discharge point location to be determined based on the ecological constraints. Temporary impacts upon users of the PROW during construction is envisaged for this option. Works may have the potential to effect trees at this location and any species utilising them. Limited temporary disturbance to reptiles and breeding birds. Potential for changes to landscape character and views/visual amenity.
Option 3	Considering more than one discharge points (for example the location options from 1 and 2).	<ul style="list-style-type: none"> Potential water volumes would be lower at each outfall location. Potential for avoidance of impacts upon trees located on the riverbank. Potential for reduced disturbance to features of the Afon Teifi SAC. Opportunities to enhance ecology at outfall location. Potential for enhancement opportunities if utilisation of open water channels. 	<ul style="list-style-type: none"> Increased earthworks within the flood plain depending on the outfall locations. Works at/near the protected (SAC/SSSI) river required may have temporary disturbance impacts upon both species and habitats. Increased costs of maintenance and impacts upon the farmland owner. Temporary impacts upon users of the PROW during construction is envisaged for this option. Works may have the potential to effect trees at this location and any species utilising them.

			<ul style="list-style-type: none"> • Potential for further temporary disturbance to reptiles and breeding birds. • Potential for changes to landscape character and views/visual amenity.
Option 4	Soakaway solution for some or all of the collected water to avoid work at the Teifi.	<ul style="list-style-type: none"> • Avoids construction near to the river. • Potential for creation of an ecological habitat. • Maintaining some storage capacity of the site to support lower flow contribution to the river. • Limited potential impact to important bryophyte species. • Potential for enhancement opportunities if utilisation of open water channels. 	<ul style="list-style-type: none"> • Additional land take of the area required potentially within the flood plain. • Significant performance concerns due to the high clay content of the ground and locally high groundwater level. • Potential to increase erosion issues towards the flood plain. • Temporary impacts upon users of the PROW during construction is envisaged for this option. • Potential for changes to landscape character and views/visual amenity.
Mine Water Treatment			
Adit Discharge			
Mine Water Capture Buried adit entrance allows mine water to enter waste tips and to mix with groundwater. Requirement for full control of the contaminated discharge from the adit (main source of pollutant).			
Option 1	Clear adit from collapsed material/spoil and install capture pipe avoiding leakage into ground, backfill area to current condition with the exception of an access chamber to access the mine water for sampling and possibly installation of flow monitoring equipment. Collect information on ground conditions to allow evaluation of portal re-instatement above ground at future stage. Mine water management required during construction. Mine water would be captured and carried in an enclosed pipe toward the discharge under the road.	<ul style="list-style-type: none"> • Allows efficient mine water capture (minimised loss to ground) • Avoids mixing of mine water with groundwater • Allows exploring ground conditions for potential future re-instatement design • Minimal impact on field access and current land use • Alternative locations for the flow monitoring equipment to be assessed. • Clearing the adit will enhance the archaeology for interpretation. • Potential for enhancement opportunities for re-grading or planting. 	<ul style="list-style-type: none"> • Would require additional construction stage for formation of adit portal (if considered) • Pipe blockage/overspill needs consideration (detailed design) • Mine water needs to be accessed via chamber (confined space) or further downstream • Works have the potential to affect buried archaeology at this location. • Works have the potential to affect mature trees, bats and breeding birds at this location. • Potential for changes to landscape character and views/visual amenity.
Option 2	As option 1 but keep adit portal open followed by a buried pipe.	<ul style="list-style-type: none"> • Creation of a point of interest on the site. • Recovering of a historic feature. • Access to the mine water for sampling and inspections. • Potential for use of the adit portal by bats. • Potential for enhancement opportunities if utilisation of adit portal. 	<ul style="list-style-type: none"> • Unknown conditions of the adit (e.g. water pressure, ground stability) which do not allow design construction at the current stage. • Works have the potential to affect buried archaeology at this location. • Works have the potential to affect mature trees, bats and breeding birds at this location. • Potential for changes to landscape character and views/visual amenity.
Option 3	Capturing mine water downstream of the adit location (e.g. improving the existing drainage of the quarry)	<ul style="list-style-type: none"> • No reason to excavate the adit portal location. • Lower costs for construction. • Reduced impact upon mature trees at this location. • Reduced visual and landscape impacts as a result of reduced construction area and timescales. 	<ul style="list-style-type: none"> • Risk of significant mine water being lost to the ground (inefficient capture). • Risk of dilution with groundwater. • Risk of impact upon buried archaeology. • Reduced enhancement opportunities for landscape and visual impacts.


Mine water transfer to treatment area Mine water transfer between adit entrance and treatment area required.			
Option 1	Open channel from the current discharge pipe under the road to the treatment area.	<ul style="list-style-type: none"> • Aesthetic feature and opportunity for habitat creation and landscape integration. • Covering impacted soil material underneath liner/hard cover. • Fully gravity driven. • Fully separated transfer from clean drainage discharge. • Minimal impact on quarry area. • Opportunities for installation of flow monitoring equipment and sampling points. • Limited potential impact upon bryophytes. • Greater potential for enhancement of the drainage feature within the landscape to include planting than option 2. 	<ul style="list-style-type: none"> • Open access to heavy metal polluted water. Limited access to heavy metal polluted water within a restricted area. Potential harm to species utilising the open access channel as a drinking source. • Discharge flows and flow variations are unknown for design, i.e. design needs to assume maximum capacity. • A new crossing pipe under the road may be required to separate this water from the surface water drainage system. • Temporary disturbance to reptiles and breeding birds during construction. • Greater potential for changes to landscape character and views/visual amenity than option 2.
Option 2	Transfer water in fully buried pipe (not visible).	<ul style="list-style-type: none"> • Opportunity for habitat creation and landscaping at this location. • No exposure of mine water to receptors. • Limited potential impact upon bryophytes. • Potential for enhancement of the drainage feature within the landscape to include planting. 	<ul style="list-style-type: none"> • Potential for impacts to buried archaeology. • Requirement for increased excavation in contaminated soil. • Loss of pressure head for gravity flow through the treatment system. • Loose opportunity to obtain sight of this historic water feature. • Maintenance of existing main water more difficult below ground. • Reduces head for water to run by gravity through treatment area. • Potential leakage would not be visible/risk of blockage below ground. • Loss of visual benefits. • Temporary disturbance to reptiles and breeding birds during construction. • Potential for changes to landscape character and views/visual amenity.
Mine water treatment area Trial Scheme Requirement to treat adit discharge to minimise heavy metal concentrations prior to discharge into the river. Treatment area for adit discharge, including dosing and maintenance area. Initially this will be used for approximately 1 year field trial to optimise treatment solution and designs. Ultimately the temporary system will be converted into a permanent system.			
Option 1	Within the south east corner of the current waste tips a mine water treatment area will be developed.	<ul style="list-style-type: none"> • It uses currently contaminated land (low value) and lining of the structures offering additional benefits in terms of reduced spread of residual contamination in the underlying drift deposits. • Treatment area is at a safe distance from the race track and relatively low on the slope reducing visual impacts. • Tested treatment solution has some similarity with historic settlement lagoons. • Location offers opportunity to maintain historic discharge route from the adit to the treatment area (visual benefit, potential for habitat creation). • The proposed treatment area is located outside of the flood zone. 	<ul style="list-style-type: none"> • Potential requirement for chemical dosing may require small building at least for permanent solution with potential temporary visual impact of trial dosing facilities (all small size). • Relatively distant location of the treatment area from the water capture increases risks of water losses during transfer. • A public footpath/PRoW runs parallel to the river to the south of the treatment site. This may require a temporary diversion during construction of the treatment works and connection to the outfall to the river. • Works have the potential to impact areas of high archaeological potential.

		<ul style="list-style-type: none"> • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. 	<ul style="list-style-type: none"> • Temporary potential disturbance to bryophytes during construction. • Temporary disturbance to reptiles and breeding birds. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Potential for changes to landscape character and views/visual amenity.
Option 2	Different location for treatment area, at the original location within flood plain.	<ul style="list-style-type: none"> • Being down gradient of the site to allow treatment of all water discharges from the site. • Minimising potential impacts upon both heritage and ecological features present within the waste tips. • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. 	<ul style="list-style-type: none"> • Construction within the flood plain required within proximity to the river. • Potential for requirement of a flood risk assessment. Risk of flooding potential. • Potential for impact upon the protected river. • Poor ground conditions (e.g. shallow groundwater). • Utilisation of further land for the treatment area to be situated on. • Temporary disturbance to reptiles and breeding birds. • Potential for changes to landscape character and views/visual amenity. • A public footpath/PRoW runs parallel to the river to the south of the treatment site. • This may require a temporary diversion during construction of the treatment works and connection to the outfall to the river.
Option 3	Creation of cascading treatment area along route of existing channel/ditch	<ul style="list-style-type: none"> • Minimise impact upon farmland. • Reduced water transfer distance. • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. 	<ul style="list-style-type: none"> • Visual impact of this option is likely to be relevant to those utilising the PRoW. • Likely requirement to alter configuration after trial stage (i.e. a distinct treatment area is easier to manage in the future). Difficulties in habitat creation in the short to medium term due to the requirement to alter configuration after the trial stage. • Potential for impact upon heritage features as a result of a cascading treatment design. • Temporary potential disturbance to bryophytes during construction. • Potential for temporary disturbance impacts upon the rabbit warren which will require monitoring under a method statement and closure during construction. • Potential for changes to landscape character and views/visual amenity.
Option 4	Incorporation of the former slime pits area into the treatment process	<ul style="list-style-type: none"> • Utilisation of a historic feature onsite within the treatment process. • Minimise impact upon farmland. • Minimise potential buried archaeology impact to the finds identified onsite (related to the earthworks impacts discussed in the capping section). • Potential for habitat creation. • Potential for landscape and visual enhancement opportunities within the treatment area. 	<ul style="list-style-type: none"> • Former slime pits would require additional water transfer distance and are located too far west to avoid second outfall. • Current treatment design is for large scale field trial, i.e. reshape/resizing may be required after the trial stage and would potentially not fit into historic layout. • Increased temporary disturbance to the riverine species and habitats. • Potential for changes to landscape character and views/visual amenity. • A public footpath/PRoW runs parallel to the river to the south of the treatment site. This may require a temporary diversion during

			construction of the treatment works and connection to the outfall to the river.
Access to treatment area Access to treatment area required for inspection and maintenance.			
Option 1	New access track to be constructed along the eastern boundary to the treatment area.	<ul style="list-style-type: none"> • Additional land take (requires moving of eastern fence line) • Archaeological opportunity to preserve finds identified onsite. 	<ul style="list-style-type: none"> • Formation of an access track from the race track at the centre of the waste tips as an alternative route. • Potential for impact to buried archaeology onsite for creation of the access track. • Further agricultural habitat loss of neutral/marshy grassland. • Limited impacts to reptiles. • Potential for changes to landscape character and views/visual amenity.
Option 2	Access from the central part of the race track within the waste tips to be created to the treatment area.	<ul style="list-style-type: none"> • Reduction in additional land take from the owner's farmland. • Shorter track length to the treatment area. • Incorporate earthworks – removal of waste in building access track. 	<ul style="list-style-type: none"> • H and S concerns due to proximity to the race track. • No access to the discharge route along the eastern boundary. • Potential for impacts upon buried archaeology. • Potential for impacts upon ecological features of the site. • Lower potential for changes to landscape character and views/visual amenity as opposed to option 1.

Table 14 ECOR Consultation Responses

Consultee	Date of consultation	Summary of Response	Action taken
Cadw	29 August 2019	The ECOR holds appropriate information and confirms that any remedial works on the site will not have a direct impact on any designated heritage assets or their settings. A number of non-designated heritage assets have been identified and there is a possibility that others may be revealed during any works carried out in the area. We would therefore recommend that the Dyfed Archaeological Trust are consulted during the development of the remedial scheme.	A site visit with Dyfed Archaeological Trust was held 11/11/2019 to consult with the specialists and inform the design process. Notes from the meeting were recorded and circulated to participants. An approach to further site investigations and the need for a mitigation strategy for stakeholder approval were identified during the meeting. These will be delivered in line with the prescriptions contained within Table 9.
Eifion Jones (Ceredigion Council - Public Rights of Way Officer)	29 August 2019	<p>I can confirm that both footpath 79/30 are directly affected (see map/aerial photos beneath – not definitive). At this stage it is difficult to comment on the extent of the impact due to the limited details available. It is noted and appreciated that the public rights of way (PROW) have been identified within the constraints check and mitigation has been included.</p> <p>In terms of closing paths temporarily during the constructions works: this is possible under the Road Traffic Act 1984 and I herein attach the relevant application form; I would ask that you please note the following:</p> <ul style="list-style-type: none"> i) lead in times required for a closure – due to the advertising requirement ii) the application fee and further advertising costs iii) the length of closure required (**see below) iv) the terms and conditions <p>**Closures such as these can only be in place for 6 months; any longer requires a further extension application & fee and would require Welsh Government sign off.</p> <p>In general terms any works to the public right of way should be undertaken by a competent person with the necessary skills and experience to reinstate the path to its previous condition; any unnecessary stepping of the path should be avoided and it should not be left any less accessible than it would be currently.</p> <p>In relation to footpath 79/30 Strata Florida; the location of this path is of particular importance; it is close to a popular destination and is also within easy walking distance of a nearby settlement and service centre (Pontrhdyfendigaid). We would ask that consideration be given to the possibility of making surface improvements to this path in a bid to target least restrictive access linking to nearby service centre/settlement; we would be happy to discuss this further.</p>	<p>A road closure notice will look to be applied for during the construction window.</p> <p>Consultation with the PROW officer will be undertaken during the design process.</p>

			
Tom Cotterell (National Museum Wales – Senior Curator: Minerology)	29 August 2019	I have read through the two proposals and can confirm that I can see no issues from a geological/mineralogical heritage perspective in terms of either site. However, in the case of Abbey Consols I would be interested to study the dumps if the option of capping and moving of dump material is taken forward.	Consideration of studying the dump material from the capping and moving activities will occur prior to construction.
Dyfed Archaeological Trust (Zoe Bevan-Rice – Archaeological Planning Officer)	29 August 2019	<p>Abbey Consols</p> <p>For the works here a full programme of archaeological mitigation governed by a WSI will be required. This programme will need to be designed by an archaeologist when more detailed plans are available and it is anticipated that this will include elements of topographical survey, trial trenching, excavation, recording and intensive watching brief. This will be dependent upon the nature of the remediation works and which area of the site they relate to. The site also lies within relative close proximity to two SM's therefore Cadw should be consulted in relation to any potential setting issues.</p> <p>This advice is based upon the information available however each site is different and potentially archaeologically complex. In view of this it may prove beneficial to consider a future site visit in order to help elucidate these proposal's in the context of each individual site.</p>	A site visit with Dyfed Archaeological Trust was held 11/11/2019 to consult with the specialists and inform the design process. Notes from the meeting were recorded and circulated to participants. An approach to further site investigations and the need for a mitigation strategy for stakeholder approval were identified during the meeting. These will be delivered in line with the prescriptions contained within Table 9.
Sam Bosanquet (Natural Resources Wales - Specialist Advisor: Terrestrial Habitats and Species)	29 August 2019	<p>This report seems a little bit less accurate than the other (i.e. Esgair Mwyn) one. 2.2.4 says lichens have been surveyed 3 times, but then mentions 4 surveys, and then lists a bunch of bryophytes despite the initial paragraph not mentioning bryophytes. Most of the bryophytes mentioned are common; <i>Polytrichum piliferum</i> is mentioned twice. 2.2.4 should say that lichens and bryophytes have been surveyed by specialists on 4 occasions, and should say that a diverse range of lichen and bryophyte species have been found including one Nationally Scarce moss (<i>Ditrichum lineare</i> in the sludge area) and one Nationally Rare Lichen (<i>Rhizocarpon cinereovirens</i>). It is probably worth saying that <i>Ditrichum plumbicola</i> was specifically searched for and was not found.</p> <p>2.2.5 "Interesting botanicals with several notable flora species". Surely the notable plants should be specifically mentioned, especially as they don't seem to have been considered during the NRW surveys of August 2018.</p>	A site visit to discuss Bryophytes was held 11/11/19. Notes from this meeting were circulated to attendees, with recommendations made for measures to include in the bryophyte and lichen mitigation strategy recommendation for delivery in Table 9.

		<p>I like the idea of transferring metal-rich habitat to above the liner, creating long-term <i>Calaminarion</i> habitat. This could be drawn out a bit more. It also appears that the southernmost spoil area (including the <i>Ditrichum lineare</i> site?) is being retained because it is archaeologically interesting.</p> <p>The whole report seems very long and complicated compared with the one for Esgair Mwyn: it's mighty difficult to work out what is being suggested in Table 6. I'm not sure I can really say that I'm happy that the proposals are OK from 'my' bryophyte/lichen standpoint, just because Table 6 is so chaotic. It looks as though this is a first draft, so perhaps the next iteration will be easier to understand.</p>	
Carol Fielding (NRW Environment Team)	29 August 2019	No Response	
NRW Conservation Geologist	29 August 2019	No Response	
NRW Landscape Officer	29 August 2019	No Response	
NRW WFD Coordinator	29 August 2019	No Response	
Wildlife Trust of S & W Wales	29 August 2019	No Response	
Ceredigion Public Service Board	29 August 2019	No Response	
Ceredigion Council - Enterprise	29 August 2019	No Response	
Ceredigion Council - Land Drainage	29 August 2019	No Response	
Sustrans Wales	29 August 2019	No Response	
David Pervival & David Thomas & Scott Lloyd(RCAHMW)	29 August 2019	No Response	
Robert Protheroe Jones (National Waterfront Museum)	29 August 2019	No Response	
Peter Claughton (Welsh Mines Society)	27 November 2019	<p>Abbey Consols – Mine Water Capture – Whilst keeping the adit portal open is only given as Option 2, it should be the preferred option as it maintains access to the discharge point and allows for future access for further investigation by competent persons. The final decision should be made only after the stability of the discharge point has been assessed.”</p>	Continue to keep the feasibility of Option 2 under review during design development



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