

Tylorstown Landslip
Phase 4
Environmental Statement
Volume 1
December 2021





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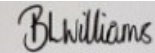


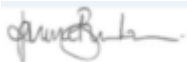
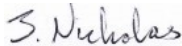

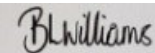
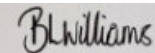
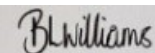


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P04	07/12/2021	Issued for pre-application consultation	BW	NH	RT

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Tylorstown Landslip

Environmental Impact Assessment – Volume 1: Environmental Statement

May 2021

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This document forms **Volume 1: Environmental Statement** of the Environmental Impact Assessment (EIA) for the Tylorstown Landslip Phase 4. Other accompanying Volumes include:

Volume 2: Plans

Volume 3: Appendices

Volume 4: Non-Technical Summary (NTS) to the Environmental Statement

During the Pre- Application Consultation (PAC) process, a digital (soft) copy of this document and accompanying Volumes can be obtained from the Local Planning Authority's website at no cost.

A paper (hard) copy can be requested, with no charge, via the methods listed below:

Email: consultation@rctcbc.gov.uk **Tel:** 01443 425014

Post: Freepost, RSBU-HJUK-LSSS, Research & Consultation, Public Relations & Strategy, The Pavilions, Cambrian Industrial Park, Clydach Vale, Tonypanydy, CF40 2XX

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Contents

Volume 1 – Environmental Statement

Quality Management	2
Revision Status / History	3
Contents	5
Table of Tables	9
Table of Figures	12
Part One Introduction	14
1. Introduction	15
1.1. The Environmental Statement	15
1.2. Statement of Competence	16
1.3. Purpose of the Proposed Scheme	17
1.4. Planning Policy	18
2. The Environmental Impact Assessment	20
2.1. Environmental Impact Assessment for Development	20
2.2. Legislative Framework for the Assessment	20
2.3. Best Practice Guidance and EIA	22
2.4. Presentation of Findings: Content of the Environmental Statement	22
2.5. General Approach to Assessment	24
3. Proposed Scheme Description	34
3.1. The Existing Conditions	34
3.2. Description of the Proposed Scheme	35
3.3. Construction	37
4. Consultation	39
4.1. Technical Consultation	39
4.2. Public Consultation	41
5. Alternatives Considered	42
5.1. Proposed Scheme History	42
5.2. Development of the Preferred Option	43
Part Two Environmental Impact Assessments	47
6. Air Quality	48
6.1. Introduction	48

6.2.	Legislation and Policy	48
6.3.	Guidance	49
6.4.	Assessment Methodology	50
6.5.	Baseline Conditions	58
6.6.	Preliminary Impact Assessment	60
6.7.	Mitigation, Enhancement and Monitoring	62
6.8.	Residual Impact Assessment	63
6.9.	Cumulative Effects	63
6.10.	Summary	63
7.	Cultural Heritage	64
7.1.	Introduction	64
7.2.	Legislation and Policy	64
7.3.	Assessment Methodology	66
7.4.	Baseline Conditions	78
7.5.	Preliminary Impact Assessment	86
7.6.	Assessment of the Significance of the Impact of the Development on the Historic Landscape (ASIDOHL2)	95
7.7.	Mitigation, Enhancement and Monitoring	123
7.8.	Residual Impact Assessment	124
7.9.	Summary	132
8.	Landscape and Visual Effects	134
8.1.	Introduction	134
8.2.	Legislation and Policy	135
8.3.	Guidance	136
8.4.	Assessment Methodology	137
8.5.	Baseline Conditions	144
8.6.	Preliminary Impact Assessment	152
8.7.	Mitigation, Enhancement and Monitoring	164
8.8.	Residual Impact Assessment	166
8.9.	Cumulative Effects	169
8.10.	Summary	171
9.	Biodiversity and Nature Conservation	174
9.1.	Introduction	174
9.2.	Legislation and Policy	175
9.3.	Assessment Methodology	177
9.4.	Baseline Conditions	190
9.5.	Preliminary Impact Assessment	204

9.6.	Mitigation, Enhancement and Monitoring	211
9.7.	Residual Impact Assessment	219
9.8.	Cumulative effects	220
9.9.	Summary	221
10.	Geology, Soils and Waste	223
10.1.	Introduction	223
10.2.	Legislation and Policy	224
10.3.	Guidance	226
10.4.	Assessment Methodology	227
10.5.	Baseline Conditions	231
10.6.	Preliminary Impact Assessment	243
10.7.	Mitigation, Enhancement and Monitoring	246
10.8.	Residual Impact Assessment	248
10.9.	Cumulative Effects	248
10.10.	Summary	248
11.	Water Environment and Flood Risk	250
11.1.	Introduction	250
11.2.	Legislation and Policy	250
11.3.	Guidance	252
11.4.	Assessment Methodology	253
11.5.	Baseline Conditions	257
11.6.	Preliminary Impact Assessment	263
11.7.	Mitigation, Enhancement and Monitoring	271
11.8.	Residual Impact Assessment	273
11.9.	Cumulative Effects	279
11.10.	Summary	279
12.	Noise	281
12.1.	Introduction	281
12.2.	Legislation and Policy	281
12.3.	Guidance	282
12.4.	Assessment Methodology	282
12.5.	Baseline Conditions	285
12.6.	Preliminary Impact Assessment	287
12.7.	Mitigation, Enhancement and Monitoring	292
12.8.	Residual Impact Assessment	292
12.9.	Cumulative Effects	292

12.10. Summary	292
13. Major Accidents and Disasters	293
<hr/>	
13.1. Introduction	293
13.2. Legislation and Policy	293
13.3. Guidance	295
13.4. Assessment Methodology	296
13.5. Baseline Conditions	299
13.6. Preliminary Impact Assessment	301
13.7. Mitigation, Enhancement and Monitoring	307
13.8. Residual Impact Assessment	307
13.9. Cumulative Effects	309
13.10. Summary	310
14. Pedestrians, Cyclists and Equestrians	311
<hr/>	
14.1. Introduction	311
14.2. Legislation and Policy	312
14.3. Assessment Methodology	315
14.4. Baseline Conditions	321
14.5. Preliminary Impact Assessment	323
14.6. Mitigation, Enhancement and Monitoring	328
14.7. Residual Impact Assessment	329
14.8. Cumulative Effects	334
14.9. Summary	334
15. Cumulative Effects	336
<hr/>	
15.1. Introduction	336
15.2. Legislation, Policy and Guidance	336
15.3. Assessment Methodology	337
15.4. Assessment of Effects	339
15.5. Summary	343
Part Three Summary and Conclusions	344
<hr/>	
16. Summary and Conclusions	345
<hr/>	
16.1. Introduction	345
16.2. Summary of Residual Effects	345
16.3. Schedule of Mitigation	347
16.4. Conclusions	348
17. Bibliography	349
<hr/>	
17.1. Introduction	349

17.2.	Air Quality	349
17.3.	Cultural Heritage	349
17.4.	Landscape and Visual Effects	351
17.5.	Biodiversity and Nature Conservation	351
17.6.	Geology, Soils and Waste	352
17.7.	Water Environment and Flood Risk	353
17.8.	Noise	353
17.9.	Major Accidents and Disasters	353
17.10.	Pedestrians, Cyclists and Equestrians	353
17.11.	Cumulative Effects	354

Table of Tables

Table 2.1	Structure of Technical Chapters	23
Table 2.2	Chapter Order and Headings According to EIA Regulations.	24
Table 2.3	Study areas.	26
Table 2.4:	General assumed assessment years to be applied.	27
Table 2.5:	Environmental value (sensitivity) and descriptions.	27
Table 2.6:	Magnitude of Impact Descriptions.	29
Table 2.7:	Typical descriptors for the significance of effect categories.	30
Table 2.8:	Typical matrix for determining significance of effect category.	30
Table 2.9:	Developments considered in cumulative assessment for Proposed Scheme (including LDP policies).	32
Table 5.1	Descriptions of the five Options considered in 1996 and 2000.	42
Table 6.1	National Air Quality Objectives	48
Table 6.2	Dusty Activities and their Dust Magnitude.	52
Table 6.3	Estimation of Dust Impact Risk	57
Table 6.4	Descriptors for Magnitude of Dust Effects	57
Table 6.5	RCTCBC NO2 Diffusion Tube Monitoring Data.	59
Table 6.6	2019 Defra Background Mapped Concentrations.	60
Table 6.7	Dusty Activities and their Residual Dust Magnitude.	61
Table 6.8	Risk of Mineral Dust Impacts.	61
Table 6.9	Magnitude of Dust Effect.	62
Table 6.10	Human Health Impacts.	62
Table 7.1.	Factors for assessing the value of heritage assets (after Table 5.1 DMRB 2019/2020).	69
Table 7.2.	Significance of adverse effect to heritage assets (matrix).	70

Table 7.3 LANDMAP Historic Landscape classification hierarchy (Natural Resources Wales 2016, 4).	77
Table 7.4. Identified Heritage Assets.	88
Table 7.5 Summary of heritage assets subject to direct impacts.	91
Table 7.6. Summary of heritage assets subject to indirect (visual) impacts.	93
Table 7.7. Full assessment of the potential direct, indirect (visual) and setting impacts of the Proposed Scheme on heritage assets.	94
Table 7.8. ASIDOHL2 Stage 2: Direct Impacts on HLCA 023.	97
Table 7.9 ASIDOHL2 Stage 2: Direct Impacts on HLCA 030.	98
Table 7.10 ASIDOHL2 Stage 2: Summary of Overall Impact.	98
Table 7.11. ASIDOHL2 Stage 3: Indirect Impacts.	100
Table 7.12 Evaluation of the relative importance of the part of HLCA 023 directly and/or indirectly affected by development.	104
Table 7.13 Evaluation of the relative importance of the part of HLCA 030 directly and/or indirectly affected by development.	106
Table 7.14 Evaluation of the relative importance of the part of HLCA 018 directly and/or indirectly affected by development.	108
Table 7.15 Evaluation of the relative importance of the part of HLCA 019 directly and/or indirectly affected by development.	110
Table 7.16 Evaluation of the relative importance of the part of HLCA 020 directly and/or indirectly affected by development.	112
Table 7.17 Evaluation of the relative importance of the part of HLCA 024 directly and/or indirectly affected by development.	114
Table 7.18 Evaluation of the relative importance of the part of HLCA 025 directly and/or indirectly affected by development.	116
Table 7.19 Evaluation of the relative importance of the part of HLCA 027 directly and/or indirectly affected by development.	118
Table 7.20. Stage 4: Relative Importance of Affect Areas within HLCAs.	119
Table 7.21. Summary of Overall Impact of the development on Historic Landscapes on the Register.	120
Table 7.22. Residual Direct Physical Impacts of the Proposed Scheme following recommended mitigation (Construction Phase).	126
Table 7.23. Residual Indirect (Visual) Impacts of the Proposed Scheme following recommended mitigation (Operational Phase).	129
Table 8.1 Landscape sensitivity (susceptibility and value) and typical descriptions	139
Table 8.2 Visual sensitivity (susceptibility and value) and typical description	140
Table 8.3 Magnitude and nature of effect on the landscape and typical descriptions.	142
Table 8.4 Magnitude (change) of visual effect and typical descriptions.	142
Table 8.5 Significance Matrix.	143
Table 8.6 Significance categories and typical descriptions.	143
Table 8.7 Summarising the Baseline Information and Sensitivity.	151

Table 8.8 Landscape Impact Assessment - Construction Phase.	153
Table 8.9 Summary of Visual Impact Assessment - Construction Phase.	157
Table 8.10 Landscape Assessment (without mitigation) – Operation Phase Year 1 and Year 15.	158
Table 8.11 Summary of Operation Visual Impacts (without mitigation).	163
Table 8.12 Construction phase visual mitigation.	164
Table 8.13 Operational phase landscape mitigation.	166
Table 8.14 Operational phase visual mitigation.	166
Table 8.15 Residual operational landscape impacts (with mitigation).	168
Table 8.16 Summary of residual operational visual impacts (with mitigation).	169
Table 8.17 Summary of Landscape Impact Assessment.	172
Table 8.18 Summary of Visual Impact Assessment.	173
Table 10.1 Significance category descriptions.	228
Table 10.2 Determination of the Receptor Value (Sensitivity).	229
Table 10.3 Determination of the Magnitude of Impacts.	229
Table 10.4 Significance Matrix.	230
Table 10.5 Significance criteria.	230
Table 10.6 Coal Outcrops from Consultants Coal Mining Report.	232
Table 10.7 Natural Ground Subsidence.	234
Table 10.8 Summary of contaminant information for the material at Llanwonno Tip.	237
Table 10.9 Summary of contaminant information for soils at the Receptor Site.	239
Table 10.10 Groundwater conditions (note BH01A, 02A and 03A are pre-existing wells and the naming used in this table is unlikely to reflect the wells' original names).	241
Table 10.11 Facilities which accepted over 1,000 tonnes of Construction and Demolition Waste in 2017.	242
Table 10.12 Facilities which accepted over 1,000 tonnes of Mixed Residual Waste in 2017.	243
Table 10.13 Summary of impacts.	246
Table 11.1 Descriptions and Examples of Receptor Value or Sensitivity.	254
Table 11.2 Description and Examples of Impact Magnitudes.	255
Table 11.3 Water Environment Effects Significance Matrix.	256
Table 11.4 Description of Effect Significance Categories.	256
Table 11.5 Baseline conditions for WFD waterbodies within less than 1km of the Proposed Scheme.	261
Table 11.6 Discharge consents in the study area.	261
Table 11.7 Preliminary construction phase impacts.	265
Table 11.8 Preliminary operational phase impacts.	269
Table 11.9 Construction phase mitigation and Residual Impact Assessment.	274
Table 11.10 Operation phase mitigation and Residual Impact Assessment.	276

Table 12.1: BS 5228-1 ABC Method Threshold of Potential Significant Effects at Dwellings.	282
Table 12.2: Noise Survey Results.	287
Table 12.3: Predicted Construction Noise Levels as Daily Average and as Highest Levels.	288
Table 12.4: Typical Construction Noise Levels at Each Representative Noise-Sensitive Receptor in Function if the Works Occur on the Existing Tip, Haul Route or Receptor Site.	289
Table 13.1 Hazard groups and example risks	296
Table 13.2 Definition of Likelihood in Safety Risk Ranking Matrix	297
Table 13.3 Definition of Severity in Safety Risk Ranking Matrix	298
Table 13.4 Major Accidents and Disasters Safety Risk Assessment Matrix	298
Table 13.5 Potential hazards to the construction phase of the Proposed Scheme	303
Table 13.6 Mitigation and residual effects.	308
Table 14.1 Receptor sensitivity and descriptions.	316
Table 14.2 Magnitude of change descriptors.	318
Table 14.3: Generic descriptors for impact significance.	319
Table 14.4 Assessment matrix.	319
Table 14.5 PCE Receptors	322
Table 14.6 Preliminary construction phase impacts.	324
Table 14.7 Preliminary operational phase impacts.	327
Table 14.8 Construction phase mitigation and Residual Impact Assessment.	330
Table 14.9 Operation phase mitigation and Residual Impact Assessment.	332
Table 15.1 Impact significance scale used in the matrix of cumulative effects.	338
Table 15.2 Framework for determining the significance of cumulative effects.	339
Table 15.3 Operational phase receptors and residual/ cumulative effects	341
Table 15.4 Matrix of intra- project cumulative effects	342

Table of Figures

Figure 3.1 Proposed Scheme site location.....	34
Figure 5.1 Depictions of early concept designs.....	44
Figure 6.1 Sensitive Human Receptor Locations	56
Figure 6.2 Rhoose Meteorological Data 2019.....	56
Figure 10.1 Locations of Trial Pits at Llanwonno Tip.	236
Figure 12.1: Noise-Sensitive Receptors in the Vicinity of the Proposed Scheme.	286
Figure 12.2: Construction Noise Levels dB L _{Aeq,T} at a Height of 4m Above Local Ground.....	290
Figure 12.3: View of the Works From the Area of Blaenllechau with Tylorstown on the Right.	290
Figure 12.4: View of the Works From the Area of Tylorstown (East Road with East Street)...	291
Figure 12.5: View of the Works From the Area of Cefn llechau uchaf. The Receptor Site is Seen on the Right Edge as a Thin Blue Line at a Height of 5m Above Local Ground.....	291

Figure 13.1 Ariel view of Llanwonno Upper and Lower Tips (prior to landslide) and areas divided as in stability report. A) south-western area, B) landslide area and, C) north-eastern area (this figure is to give an idea of the location of the areas in relation to the Proposed Scheme. For specific details on the location of each area see Appendix 13.1). 300



Part One Introduction

1. Introduction

1.1. The Environmental Statement

- 1.1.1. Subject to Regulation 17 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017¹, an Environmental Impact Assessment (EIA) application must be accompanied by an Environmental Statement. This Environmental Statement (ES) is the product of an EIA and has been prepared by Capita Property and Infrastructure Ltd. (Capita) and Redstart, acting on behalf of Rhondda Cynon Taf County Borough Council (RCTCBC).
- 1.1.2. The ES can be viewed on the RCTCBC website.
- 1.1.3. The public can comment on the ES via email/ telephone or by post, as specified on Page 4. There will also be a link on the RCTCBC website for the Proposed Scheme.
- 1.1.4. All draft planning documents will be available via the RCTCBC website.
- 1.1.5. The purpose of the ES is to provide sufficient information to allow the Local Planning Authority (LPA), when deciding whether to grant planning permission for the Proposed Scheme, to do so in full knowledge of the significant effects the Proposed Scheme is likely to have on the environment during the construction and operational phases of the development.
- 1.1.1 This ES represents the findings of the EIA process in relation to the Proposed Scheme and includes the following:
- a description of the Proposed Scheme comprising information on the site, design, size and other relevant features of the development;
 - a description of the likely significant effects of the Proposed Scheme on the environment;
 - a description of any features of the Proposed Scheme, or measures envisaged in order to avoid, prevent, reduce or, if possible, offset likely significant adverse effects on the environment;
 - a description of the reasonable alternatives studied by the developer, which are relevant to the Proposed Scheme and its specific characteristics along with an indication of the main reasons for the option chosen;
 - a Non-Technical Summary (NTS); and
 - any additional information relevant to the specific characteristics or type of development and to the environmental features likely to be significantly affected.
- 1.1.2 This ES has been undertaken in compliance with the relevant legislation, and therefore:
- is based on a scope agreed with the LPA as to what environmental topics are required for inclusion;

¹ Welsh Government, 2017, The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017: <https://www.legislation.gov.uk/wsi/2017/567/regulation/17/made>

- includes the information required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment;
 - has been prepared, using the results of relevant UK environmental assessment, which were available at the time of preparation, with a view to avoiding duplication of assessment; and
 - has been prepared by competent experts.
- 1.1.6. In their response to the screening report the LPA considered that the proposal had the potential for significant environmental effects. As such, any future planning application for the Proposed Scheme would require an Environment Impact Assessment (EIA) and production of an Environmental Statement (ES).
- 1.1.7. The scoping response from the LPA was received 17 December 2020. It agreed with the assessment of the Proposed Scheme and its requirement for an EIA, but also stated additional assessments/reports needed to be added to the ES, or as supporting documents. These are discussed in further detail Section 4 and included:
- An assessment of impacts on Public Rights of Way (PRoW);
 - An Outline Construction Environment Management Plan (CEMP);
 - A Water Framework Directive (WFD) assessment;
 - A Coal Mining Risk Assessment; and
 - Further assessment of Great Crested Newts.

1.2. Statement of Competence

- 1.2.1. Under regulation 17(4a) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 an Environmental Statement (ES) must “*be prepared by persons who in the opinion of the relevant planning authority or the Welsh Ministers, as appropriate, have sufficient expertise to ensure the completeness and quality of the statement*”.
- 1.2.2. The Environmental Impact Assessment (EIA) has been undertaken and prepared in accordance with Schedule 4 of the EIA Regulations and with Institute of Civil Engineering’s (ICE) EIA guidance². Assessments for the environmental topics have been undertaken in accordance with the relevant Government, professional institute, or best practice guidelines. All text has undergone a strict quality assurance process, involving multiple review stages and led by individuals who are recognised as experts in their field through qualification, accreditation and/or chartership.
- 1.2.3. The overall EIA process has been managed by experienced Environmental Consultants from Capita. The EIA Lead for the Proposed Scheme is a Member of the Chartered Institute of Water and Environmental Management and Assessment (MCIWEM) and is considered a competent expert with appropriate experience working on similar infrastructure schemes. Additionally, the ES has undergone quality assurance and technical review by an Associate Director of environmental Planning who is a full member of the Institute of Environmental

² Carroll, B., Fothergill, J., Murphy, J. and Turpin, T., 2019. *Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities*. 3rd ed. ICE Publishing.

Management and Assessment (MIEMA) and a Chartered Environmentalist (CEnv) and has experience working on large-scale projects.

- 1.2.4. The above statement is considered to meet the requirements of Regulation 17(4b) of the EIA Regulations to “*contain a statement by or on behalf of the applicant or appellant describing the expertise of the person who prepared the environmental statement*”.

Acknowledgements and Copyright

- 1.2.5. As mentioned above, this ES was produced by Capita Property and Infrastructure and Redstart, on behalf of RCTCBC. However, significant contributions were also made by sub-consultants, providing technical Chapters of the ES:
- Chapter 6 ‘Air Quality’ and Chapter 12 ‘Noise’ were produced by GL Hearn’s Air Quality and Acoustics & Noise teams respectively. Chapter 6 ‘Air Quality’ was approved by Dr Xiangyu Sheng FRMetS CEng CEnv CSci, Director of GL Hearn’s Climate Change, Carbon & Air Quality team. Chapter 12 ‘Noise’ was approved by Josep Simona CEnv MIEnvSc MIOA, Associate within GL Hearn’s Acoustics&Noise team; and
 - Chapter 7 ‘Cultural Heritage’ was produced by Black Mountains Archaeology Ltd - The report and illustrations were prepared by Libby Langlands BA MA on 15/03/21 and checked by Richard Lewis BA MCIfA. The author would like to thank Lynne Moore of the NMR, RCAHMW, Calli Rouse of GGAT HER, Derek Elliott of CRAPW and Menna James at Rhondda Cynon Taf Libraries for their helpful assistance. The copyright of this chapter is held by Black Mountains Archaeology Ltd, who have granted an exclusive licence to Rhondda Cynon Taf Council and their agents Redstart enabling them to use and reproduce the material it contains. Ordnance Survey maps are reproduced under licence 100058761. Black Mountains Archaeology Ltd retains copyright of any annotations.

1.3. Purpose of the Proposed Scheme

- 1.3.1. On Sunday 16th February 2020, Storm Dennis caused the Llanwonno Upper Tip to fail above the village of Tylorstown. Approximately 60,000m³ of material slipped down the valley, with 28,000m³ filling the valley bottom from the toe of the slope outwards in an extremely low angled and widely distributed debris envelope, filling the Afon Rhondda Fach’s channel and diverting its course to the western side of the valley bottom. The slipped material has also covered an essential water main and disused trainline which is used as a footpath. Emergency works (referred to as Phases 1, 2 and 3 of the Tylorstown Landslips scheme) have been required to remove the slipped material from the river and valley bottom and transported to nearby Receptor Sites. These Phases are currently underway and do not form part of the Proposed Scheme.
- 1.3.2. The Proposed Scheme is for Phase 4 of the Tylorstown Landslip project which consists in undertaking essential stabilisation and remediation works, as recommended by geotechnical studies, to ensure the remaining material within the Llanwonno Upper tip is safe, as well as offering enhancements for the local area.
- 1.3.3. The main objective for the Proposed Scheme is to prevent any future slips of material such as that that occurred in February 2020 by moving colliery material from the Llanwonno Upper Tip (RH01) to a new Receptor Site adjacent to Old Smokey (RH02). Further detail on the Proposed Scheme can be found in Chapter 3.

1.4. Planning Policy

National planning policy and legislation

Planning Policy Wales

- 1.4.1. One of the aims of the Planning Policy Wales (PPW) Edition 11 (February 2021)³ is to “ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.” This is required by the Planning (Wales) Act 2015⁴, the Well-being of Future Generations (Wales) Act 2015⁵, and other key legislation. PPW underpins the requirement for sustainable development and promotes action at all levels of the planning system to maximise the well-being of Wales and its communities.

Planning (Wales) Act 2015

- 1.4.2. The Planning (Wales) Act 2015 brought in a ‘Pre-Application Consultations’ (PAC) process for planning applications of major developments in Wales. This includes “development carried out on a site of 1 ha or more”, which is applicable to the Proposed Scheme. The PAC process involves developers undertaking consultation with statutory stakeholders and local communities before applying for planning permission. Anyone can respond to a PAC, including those who have been directly consulted, individuals, community groups and specific interest groups. This early engagement is important because it can:

- improve the quality and relevance of new developments;
- give residents a voice and confidence to influence decisions affecting their local area; and
- build understanding between developers, planning authorities and communities.

- 1.4.3. The Proposed Scheme is classified as a ‘major development’ as it exceeds 1ha in area, and therefore is required to follow the PAC process. Consultation will take place prior to the submission of the planning application (Autumn 2021) to determine whether the Proposed Scheme is accepted by the statutory and non- statutory stakeholders.

Future Wales - The National Plan 2040⁶

- 1.4.4. Future Wales – the National Plan 2040 is the national development framework for Wales, setting the direction for development in the country to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities.

³ Welsh Government, February 2021, Planning Policy Wales; Edition 11: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

⁴ Welsh Government, 2015, Planning (Wales) Act 2015: <https://www.legislation.gov.uk/anaw/2015/4/contents/enacted>

⁵ Welsh Government, 2015, Well-being of Future Generations (Wales) Act 2015: <https://www.legislation.gov.uk/anaw/2015/2/contents/enacted>

⁶ Welsh Government, February 2021, Future Wales - The National Plan 2040: <https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf>

- 1.4.5. As one of a number of documents concerned with infrastructure and development in Wales, Future Wales aims to “ensure the planning system at all levels is consistent with, and supports the delivery of, Welsh Government strategic aims and policies”.

Local planning policy

- 1.4.6. The Rhondda Cynon Taf LDP was adopted in March 2011. It sets out how the County Borough will be developed over a 15-year period up to 2021 and provides detailed policies for which new development proposal will be considered against.
- 1.4.7. RCTCBC’s Local Development Plan (LDP) mainly includes policy on housing and infrastructure, however, some of these are located within close proximity to, or within, the development boundary of the Proposed Scheme. These are discussed in further detail in Table 2.9 of section 2.5 below.

2. The Environmental Impact Assessment

2.1. Environmental Impact Assessment for Development

2.1.1. The term 'Environmental Impact Assessment' (EIA) encompasses a process that must be followed for certain types of project requiring development consent. It provides a means of drawing together, in a systematic way, an assessment of a project's likely significant effects on the environment. It aims to protect the environment by ensuring that a consenting authority, when deciding whether to grant permission for a project, does so in the full knowledge of likely significant effects, and is able to take this information into account in the decision-making process.

1.1.3 The main objectives of the EIA process are to:

- ensure that consideration and reporting of the likely environmental effects is undertaken by the Overseeing Organisation so that planning and design decisions can be fully informed;
- facilitate good design by being an integral part of design development and the pre-planning stage of development;
- ensure that the relative importance of the likely impacts are properly evaluated;
- aid the identification of measures that could reduce the magnitude of potentially negative impacts and the scope for such mitigation;
- provide opportunities for stakeholders, including the public and statutory environmental bodies, to comment on proposals; and
- reduce the environmental impact of a project.

2.1.2. A key principal of EIA is the iterative way in which it operates with a developing scheme design; each running concurrently and having the ability to directly influence the other. As the environmental effects of the developing design are recognised, the design can be adjusted to mitigate against these effects. Similarly, as the design evolves the scope of assessment may change.

2.2. Legislative Framework for the Assessment

EU Directives

2.2.1. In the UK the EIA regime is governed by European Council Directive No 85/337/EEC, as amended by Council Directives 97/11/*EC and 2009/31/EC which have been codified by 2011/92/EU. This has subsequently been amended by 2014/52/EU and has been recently transposed into UK law.

2.2.2. Under the EU Directive, certain major projects such as the construction of motorways, major chemical installations etc. are listed as Annex I projects where EIA is mandatory. Projects listed in Annex II of the directive may or may not require EIA dependent on their predicted environmental effects. Where a project is Annex II, criteria contained within Annex III should be considered, under the following:

- characteristics of projects;
- location of projects; and
- type and characteristics of the potential impact.

Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

- 2.2.3. The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (the EIA Regulations), transpose the requirements of the EIA Directive into UK law and in determining the need for EIA.
- 2.2.4. The position of the applicant is that the Proposed Scheme does not constitute a Schedule 1 development under the EIA Regulations. Additionally, the Proposed Scheme does not fall exactly within any of the industries listed under Schedule 2 of the EIA Regulations, but it is best described as an extractive Industry scheme under Section 2(a) of the EIA Regulations, due to the Proposed Scheme involving the relocation of colliery material left over from historic coal mining in the area.
- 2.2.5. Following the UK leaving the European Union on 31st January 2020 (a process commonly referred to as 'Brexit'), a new statutory instrument, the Environmental Assessment of Plans and Programmes and the Environmental Impact Assessment (Miscellaneous Amendments) (Wales) (EU Exit) Regulations 2018 (SI No.245, W60), came into force. This enables the process of EIA to continue to operate with no substantive changes. The amendments made through the statutory instrument as part of the EU Withdrawal Act 2018 removed, where appropriate, references to obligations to EU law and also removed the need to re-examine any decision made prior to Brexit as a result of the changes.

Screening (Regulation 5)

- 2.2.6. The Proposed Scheme was screened for EIA in the report *Tylorstown EIA Screening Phase 4*, and a screening opinion requested from RCTCBC on 19th October 2020. The position of the applicant is that the Proposed Scheme does not constitute a Schedule 1 development under the EIA Regulations. Additionally, the Proposed Scheme does not fall exactly within any of the industries listed under Schedule 2 of the EIA Regulations, but it is best described as an extractive Industry scheme under Section 2(a) of the EIA Regulations.
- 2.2.7. A screening opinion from RCTCBC was received on 03/11/2020 confirming their agreement that the Proposed Scheme constitutes EIA development.

Scoping (Regulation 14)

- 2.2.8. An applicant making a planning application that constitutes EIA development may request a 'scoping opinion' from the LPA, setting out the scope and level of detail to be provided in the Environmental Statement (ES) to support an application.
- 2.2.9. A scoping report was prepared in October 2020 to support the request for an EIA scoping opinion from RCTCBC for the development of the Proposed Scheme. This was subsequently submitted in November 2020. The scoping report provided:
- a summary of the Proposed Scheme and alternatives considered to date;
 - a description of the baseline conditions of the environment, its sensitivities or constraints (as known at the time);
 - an outline and initial assessment of potential impacts and effects (including cumulative effects);
 - an outline of the scope of work and methodologies to be applied under each environmental discipline in carrying out the EIA; and

- the proposed structure of the ES to be submitted with planning application for the Proposed Scheme.

2.2.10. A scoping opinion from RCTCBC was received on 17 December 2020 confirming their agreement of the scope of the ES and that the Proposed Scheme constitutes EIA development.

2.2.11. Further details of the topics and elements ‘scoped in’ and ‘scoped out’ of the EIA are detailed below in Section 2.5 ‘General Approach to Assessment’.

2.3. Best Practice Guidance and EIA

Institution of Civil Engineers (ICE) EIA Handbook⁷

2.3.1. The EIA handbook produced by the ICE is the principal guiding document used for this EIA. The ICE Handbook is a practical guide for planners, developers and communities, explaining both the EIA process and the legal procedures that run alongside the EIA process. It is written by practitioners for practitioners and therefore is a fundamental guidance document for supporting the writing up of this ES, where the Proposed Scheme does not fully fit within one of the defined industries listed under Schedule 2 of the EIA Regulations.

2.3.2. Other guidance, such as the Design Manual for Roads and Bridges (DMRB), will be used for those topics where a specific methodology is not provided within the ICE Handbook.

2.4. Presentation of Findings: Content of the Environmental Statement

Report Structure

2.4.1. The Environmental Statement is presented in four volumes as outlined below:

2.4.2. **Volume 1 – Environmental Statement:** containing the introduction, detailed impact assessments for individual environmental topic chapters and a summary of the key findings. The volume is divided into three parts:

- Part 1: Introduction
- Part 2: Environmental Impact Assessments
- Part 3: Summary and Conclusions

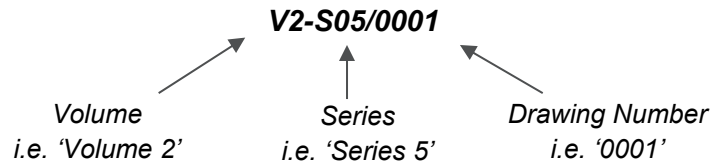
2.4.3. **Volume 2 – Plans:** a series of plans illustrating baseline conditions, key constraints, impacts and mitigation proposals.

2.4.4. **Volume 3 – Appendices:** comprising all technical appendices which have been referred to in Volume 1 including, but not limited to, calculations, statistical analyses, field notes, site photographs and data records.

2.4.5. **Volume 4 – Non- Technical Summary:** a summary, designed for consumption by the general public, of the Proposed Scheme, the impacts, assessment, proposed mitigation, residual environmental effects and an invitation to respond to consultation.

⁷ Carroll, B., Fothergill, J., Murphy, J. and Turpin, T., 2019. *Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities*. 3rd ed. ICE Publishing.

- 2.4.6. To assist with navigation of the volumes, the chapter numbers for the specific environmental topic areas covered in Volume 1, Part 2 correspond throughout Volumes 2 and 3.
- 2.4.7. Items contained in Volume 2 will be referenced as necessary in Volume 1, using the following standard:



Individual Assessment Topic Reporting Structure

Table 2.1 Structure of Technical Chapters

Heading	Description
Introduction	Overview of the purpose of the chapter and description of the study area with a definition of the topic and the topic's scope.
Legislation, Policy and Guidance	Outlines the key national and local legislation, policy and guidance associated with the environmental topic and the Proposed Scheme.
Assessment Methodology	Description of the tools and techniques used, and the significance criteria used with reference to any relevant legislation and/or guidance.
Baseline Conditions	Description of the conditions at the locality of the Proposed Scheme prior to any works being carried out within the environmental topic.
Assessment of Effects	Description of the predicted impacts, before the application of mitigation measures, on the environmental topic associated with the construction and operation of the Proposed Scheme.
Mitigation, Enhancement and Monitoring	Describing proposed measures to avoid, reduce, restore or compensate for effects identified as significant during the assessment.
Residual Impact Assessment	Summarising the potential impacts and effects of the Proposed Scheme, beneficial or adverse, permanent or temporary with a residual assessment of significance with mitigation in place.
Cumulative effects	Cumulative effects of the Proposed Scheme with the committed developments identified within the vicinity are identified here and any likely significant effects on the environment are discussed.
Summary	Summary of the environmental topic assessment highlighting key findings and significant impacts and their relationship with national and local legislation, policy and guidance.

2.5. General Approach to Assessment

Environmental Topics

Table 2.2 Chapter Order and Headings According to EIA Regulations.

Chapter Number	EIA Regulations topic	ES chapter name
6	Air	Air Quality
7	Cultural Heritage	Cultural Heritage and Archaeology
8	Landscape	Landscape and Visual Effects
9	Biodiversity	Biodiversity and Nature Conservation
10	Soil	Geology, Soils and Waste
	Material Assets	
11	Noise	Noise
12	Water	Water Environment and Flood Risk
13	Major Accidents and Disasters	Major Accidents and Disasters
14	Land	Pedestrians, Cyclists and Equestrians
15	Cumulative Effects	Cumulative Effects

- 2.5.1. A few topics were ‘scoped out’ due to the likely effects on the environment identified being considered insignificant. A summary of the justifications for scoping these elements out of the assessment is provided below.

Traffic and Transport

- 2.5.2. This topic has been scoped-out of the ES as it is unlikely there will be any significant impacts on local traffic and transport receptors both during the construction and operation phases of the Proposed Scheme. This is due to the majority of vehicle movements required during construction not occurring on public highways and the fact no operational impacts are anticipated.
- 2.5.3. Moreover, traffic and transport issues will already be covered in the planning application through the production of a Transport Statement. Due to the nature and scale of the Proposed Scheme, as well as its minimal interaction with the local highway network, this is deemed to be sufficient to assess and mitigate for all traffic and transport related impacts.

Population and Human Health

- 2.5.4. The effects to the population and socioeconomics of the area from the Proposed Scheme are unlikely to be significant. The Proposed Scheme does not involve the building or development of any residential properties or businesses that would add to the population or economy of the area, and so these aspects have been scoped out of further assessment.

- 2.5.5. The effects on human health have the potential to be significant during construction of the Proposed Scheme. However, these aspects are covered within the noise and air quality chapters and so effects on human health have also been scoped out of further assessment.

Climate Change

- 2.5.6. The design of the Proposed Scheme has given consideration to measures to minimise GHG emissions. The Proposed Scheme will require approximately 15,000 vehicular movements in order to transport the 160,000m³ of colliery material from RH01 to the Receptor Site. However, best practice measures to reduce GHG emissions, such as the use of modern and efficient plant and the avoidance of vehicle idling, will be integrated into the CEMP and implemented by the contractor during construction. Moreover, the design of the construction phase of the development has and will continue to seek to reduced emissions by selecting the shortest and most efficient available haul route for material transport.
- 2.5.7. As the Proposed Scheme will mostly be relocating existing material from RH01 to the Receptor Site and not using a significant amount of additional resources or materials, it is not considered that the Proposed Scheme will have any potential significant effects on carbon consumption and climate change as a result.

Study Areas

- 2.5.8. Typically, no single study area is applicable to all topics. Instead, the study areas vary according to:
- the geographical scope of the potential effects relevant to each topic;
 - the information required to make an appropriate assessment of these effects;
 - any topic specific best practice guidance; and
 - any feedback received through consultation activities.
- 2.5.9. A description of the study areas for each of the technical topics along with a justification for its use is provided within each topic chapter. A summary is given in Table 2.3 along with a reference to the relevant plan as provided in Volume 2.

Table 2.3 Study areas.

Topic	Description	Plan Ref
Air Quality	The assessment considers receptors within 2.5km of the redline boundary.	N/A
Cultural Heritage and Archaeology	The chapter employs a 250m radius study area centred on the red line boundary of the Proposed Scheme for all existing information pertaining to the historic environment.	V2-S07-0001
Landscape and Visual Effects	Through desk-based research it was determined that a 1km buffer was proportionate for the Proposed Scheme.	V2-S08-0001, 0002.
Biodiversity and Nature Conservation	The chapter employs a 1km radius study area centred on the red line boundary of the Proposed Scheme.	V2-S09-0004
Geology, Soils and Waste	The chapter focuses primarily on the red line boundary of the Proposed Scheme.	N/A
Noise	The study area defined as the area within 1km of the red line boundary of the Proposed Scheme. This is a wider area than typically taken for construction works but was considered appropriate given the rural nature and varying topography of the area.	N/A
Water Environment and Flood Risk	The study area covers the extent of the proposed Proposed Scheme and a 1km buffer around the redline boundary.	V2-S11-0001, 0002.
Major Accidents and Disasters (MAAD)	The study area for MAAD will cover the immediate extent of the Proposed Scheme area, including any areas that could theoretically be subjected to slips, both currently and as a result of the Proposed Scheme.	N/A
Pedestrians, Cyclists and Equestrians (PCE)	Guidance recommends a study area of 500m around the red line boundary of the Proposed Scheme, however, due to the changes in topography of the area directly around the Proposed Scheme the study area for PCE is 250m, as impacts on receptors beyond this will not be significant.	V2-S14-0001
Cumulative Effects	The study area covers the extent of the proposed Proposed Scheme and a 1km buffer around the redline boundary.	N/A

Baseline Data

2.5.10. Establishing the baseline environmental conditions (i.e. the environment without the Proposed Scheme) is a necessary starting point to enable any assessment of potential change resulting from the proposals. The description of the baseline accounts for any changes likely to occur before the Proposed Scheme's construction and operation commences. This includes any independent changes that can be predicted including changes to legislation, regulations and policy, traffic growth and other community developments with a level of commitment established, such as planning consent gained.

- 2.5.11. Baseline conditions have been established by a combination of desk-based study, site surveys, and calculated by modelling where appropriate. Reference should be made to individual topic chapters for information in relation to the timing of surveys and any expiry dates if applicable.
- 2.5.12. The description of the baseline and future baseline conditions will identify receptors that may be affected by the proposals. As some receptors can be more sensitive to certain impacts or can be considered to be more valuable, each identified receptor will be assigned a 'value' (or 'sensitivity') rating which is defined in general on a five-point scale with descriptors for; *very high, high, medium, low, and negligible* values. Reference should be made to the 'Assessment Methodology' sections within each topic chapter for the relevant 'value' (or 'sensitivity') ratings and descriptors to be applied, if applicable.

Defining Assessment Years

- 2.5.13. Depending on the environmental topic, the effects will be assessed in the baseline years for construction and opening. Some topics will also make an assessment in a future year which is usually taken at 15 years after opening but may be taken in the worst year within 15 years of operation. It should be noted that in some cases the worst year in the first 15 years of operation can be the opening year (see Table 2.4). In such instances, no future year assessment will be made.
- 2.5.14. The baseline year and future year assumptions will be reported in the methodology sections of the technical chapters.

Table 2.4: General assumed assessment years to be applied.

Assessment Years	Year
Baseline (<i>immediately prior to construction</i>)	2021
Opening/completion of the proposed works	2022
Future (<i>+15 years or *worst year in the 15 years following construction</i>)	2037

Assigning Value to Receptors

- 2.5.15. The value of the receptors is reported within each of the technical chapters. The descriptions for the sensitivity of receptors are shown in Table 2.5, and unless otherwise stated within the technical chapters themselves, this is how value has been applied to the receptors mentioned throughout the ES.

Table 2.5: Environmental value (sensitivity) and descriptions.

Value (sensitivity) of receptor	Typical description
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.

Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Identifying Impacts

- 2.5.16. Following a review of the baseline information, likely ‘*impacts*’ on the environment (i.e. the changes resulting from an action) and their ‘*effects*’ (i.e. the consequences of those impacts) will be identified.
- 2.5.17. To assess the likelihood and significance of effects from the Proposed Scheme a source-pathway-receptor model will be used in line with the ICE EIA guidance⁸.
- Source – Proposed Scheme change;
 - Pathway – the method or route by which the ‘source’ could affect the ‘receptor’; and
 - Receptor – the population, whose health outcomes may be affected.
- 2.5.18. The impacts and their associated effects identified will include those that are: direct, indirect or cumulative; permanent or temporary; positive (beneficial) or negative (adverse); and, short, medium or long term in nature. They may result from:
- the existence of the development;
 - the use of natural resources;
 - the emission of pollutants, the creation of nuisances and the elimination of waste; and
 - forecasting methods used to assess the effects on the environment.
- 2.5.19. Where possible each identified impact will then be assigned a value for ‘**magnitude**’ (or extent) of change, defined in general on a five-point scale with descriptors for; *major*, *moderate*, *minor*, *negligible* and *no change* as shown in Table 2.6. These descriptions will be used within the technical chapters unless otherwise stated in that chapter.

⁸ Carroll, B., Fothergill, J., Murphy, J. and Turpin, T., 2019. *Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities*. 3rd ed. ICE Publishing.

Table 2.6: Magnitude of Impact Descriptions.

Magnitude of Impact (change)		Typical Description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Slight	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition to one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assessing Significance

- 2.5.20. The **significance** of an environmental effect is typically a function of the ‘**value**’ (or ‘sensitivity’) of a receptor and the ‘**magnitude**’ (or ‘extent’) of impact. Combining the environmental value of the receptor with the magnitude of impact produces a significance of effect category.
- 2.5.21. The significance of effects will cover the following:
- the natural and human receptors which would be affected and the pathways for such effects;
 - the geographic importance, sensitivity and value of the receptors;
 - the duration (long or short-term); permanence (permanent or temporary) and changes in significance (increase or decrease);
 - reversibility – is the change reversible or irreversible, permanent or temporary;
 - environmental and health standards (e.g. local air quality standards) being threatened; and
 - feasibility and mechanisms for delivering mitigation measures.
- 2.5.22. By assigning each effect to one of five significance categories (*very large, large, moderate, slight, or neutral*) different topic issues can be placed on the same scale thus assisting the decision-making process by being comparable at whatever stage the project is at within that process. Typical descriptors for the significance of effect are provided in Table 2.7.

Table 2.7: Typical descriptors for the significance of effect categories.

Significance category	Typical descriptors of effect
Very Major	Effects at this level are material in the decision-making process.
Major	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- 2.5.23. In general, those effects assessed as moderate, large, or very large are considered 'significant' and are taken forward to the residual assessment once mitigation measures are applied.

The greater the environmental value (or sensitivity) of the receptor, and the greater the magnitude (or extent) of the impact, then the more significant the effect. This can be aided by use of a matrix, such as that shown in the DMRB guidance (LA104) and replicated in Table 2.8.

Table 2.8: Typical matrix for determining significance of effect category.

	Magnitude of Impact (Degree of Change)					
		No change	Negligible	Minor	Moderate	Major
Environmental Value (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

- 2.5.24. Not all the environmental topics will use the matrix-based approach as described in Table 2.8 but will instead use numerical values to identify significance of effects (i.e. Noise and Vibration). Furthermore, some topics do not have agreed or standard methods of assessment or scales of measurement for either 'value' (or sensitivity) of a receptor or

‘magnitude’ (or extent) of change to assist with the matrix-based approach. Where alternative bases of assessment apply, details are provided within the ‘Assessment Methodology’ sections within each topic chapter.

Mitigation Measures, Enhancements, and Residual Effects

- 2.5.25. Where potentially significant adverse environmental effects are identified, developing appropriate mitigation will be an iterative part of the Proposed Scheme development following the mitigation hierarchy of avoidance, reduction, remediation, and compensation. Mitigation measures that are permanent (e.g. landscape planting for vegetation loss compensation) are shown on the mitigation plans in Volume 2 of this EIA (see Plans V2-S16-0001 to 0003) and recorded in the Mitigation Schedule in Volume 3 (see Appendix 16.1).
- 2.5.26. The environmental assessment in each technical topic shall discuss the following types of mitigation:
- embedded mitigation: mitigation adopted within the Proposed Scheme design to avoid or prevent adverse environmental effects; and
 - applied mitigation: measures required to reduce and if possible offset likely significant adverse effects, in support of the significant effects highlighted within the environmental assessment.
- 2.5.27. The term ‘enhancement’ typically refers to providing measures over and above those needed to mitigate the adverse effect, and/or maximising the opportunity for beneficial effects of the Proposed Scheme. Biodiversity net gain is an example of enhancement and is discussed within the Biodiversity technical chapter (Chapter 9).
- 2.5.28. Effects that remain after mitigation are referred to as ‘residual effects’. Following agreement of the mitigation and enhancement measures to be applied, environmental impact assessments will be repeated for those impacts with a significant effect, this time accounting for all agreed mitigation measures being in place. The significance of any ‘residual effects’ will then be reported.

Assessment of Cumulative Effect

- 2.5.29. The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that consideration is given to “*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*”.
- 2.5.30. These cumulative effects are those that are the result of multiple actions on environmental receptors and resources. Temporal and spatial scope are the main considerations for looking for cumulative effects. There are two types of cumulative effect:
- the combined action of a number of different environmental topic-specific effects upon a single/resource receptor within a single project (‘in combination’); and
 - the combined action of a number of different projects, cumulatively with the Proposed Scheme being assessed, on a single resource/receptor (‘cumulative’).
- 2.5.31. When cumulative effects are being assessed they will:

- establish the zone of influence of the project together with other projects;
- establish a list of projects that have the potential to result in cumulative impacts; and
- obtain further information and detail on the list of identified projects to support further assessment.

2.5.32. The cumulative developments have been identified through a desk-based study, primarily through consultation with the LPA, as well as reviews of the Local Development Plans and other related documents for the local area. The developments considered for the cumulative effects of the Proposed Scheme include those summarised in Table 2.9 and discussed in more detail in Chapter 14: Cumulative Effects.

Table 2.9: Developments considered in cumulative assessment for Proposed Scheme (including LDP policies).

Planning Application Reference	Location	Description
20/0993/35	Overlapping with the southern part of the site of the Proposed Scheme.	Phase 2 and 3 of the Tylorstown Landslip project, consisting in removing material from the Afon rhondda Fach valley and depositing them on the riverbank. These are part of the emergency works at Tylorstown to move the slipped material.
20/1312/08	Station Road, Ferndale, to the southwest of the Proposed Scheme.	Temporary deposit and storage of approximately 8,000m3 of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works, as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective).
20/1313/08	Land across from Oaklands business park, Ferndale, to the southwest of the Proposed Scheme.	Temporary deposit and storage of approximately 22,000m3 of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works , as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective).
Not yet submitted	Along the Afon Rhondda Fach Valley, from Maerdy to Tylorstown	Proposal by RCTCBC for a new Active Travel Route to be created, consisting of a Cycle Route along the Afon Rhondda Fach as well as links from the route to key locations in the area. Preliminary designs have been produced by RCTCBC but construction of this Scheme is not expected to commence until late 2022 or 2023.
LDP Number	Location	Description
NSA 27.2	Llanwonno and Tylorstown Landslips	identifies areas of land to be included in a land reclamation scheme for Llanwonno and Tylorsotwn tips. The Proposed Scheme directly interacts with the land identified under this policy. The removal of material from RH01 supports this policy, however, further consultation will be undertaken with the LPA to ensure the

Planning Application Reference	Location	Description
		use of the Receptor Site within the policy area does not conflict with the policy.
NSA 20.2	Along the dismantled tramway alongside the Afon Rhondda Fach.	This is the Upper Rhondda Relief Road. While this is in the LDP, the initial stage of the road (from Porth to Pontygwaith) was completed many years ago with no sign of extension, making cumulative interactions with this scheme unlikely.
NSA 23.4	Pontygwaith to Aberaman	Sets out the railway cutting for Cycle Network Improvements – Pontygwaith to Aberaman. While this development may occur, it is not considered the Proposed Scheme would conflict with the implementation of a cycle route in this location; and
AW8.65	Any SINC or RIGs within the County Borough	This is a SINC and this policy sets out measures for the protection and enhancement of the natural environment. Although the proposals will temporarily disrupt land designated under the policy, it also offers an opportunity for enhancements.

3. Proposed Scheme Description

3.1. The Existing Conditions

3.1.1. The Proposed Scheme is located to the north of the settlement of Tylorstown, in the Afon Rhondda Fach valley, which is a steep sided valley in South Wales within the County Borough of Rhondda Cynon Taf (see Figure 3.1). The valley sides are generally covered by woodland, with open moorland at higher elevations. The area has historically been used for the extraction of coal and was previously occupied by numerous colliery sites. The area is therefore characterised by the remnants of this past industry, such as the many landforms created by deposited colliery material.

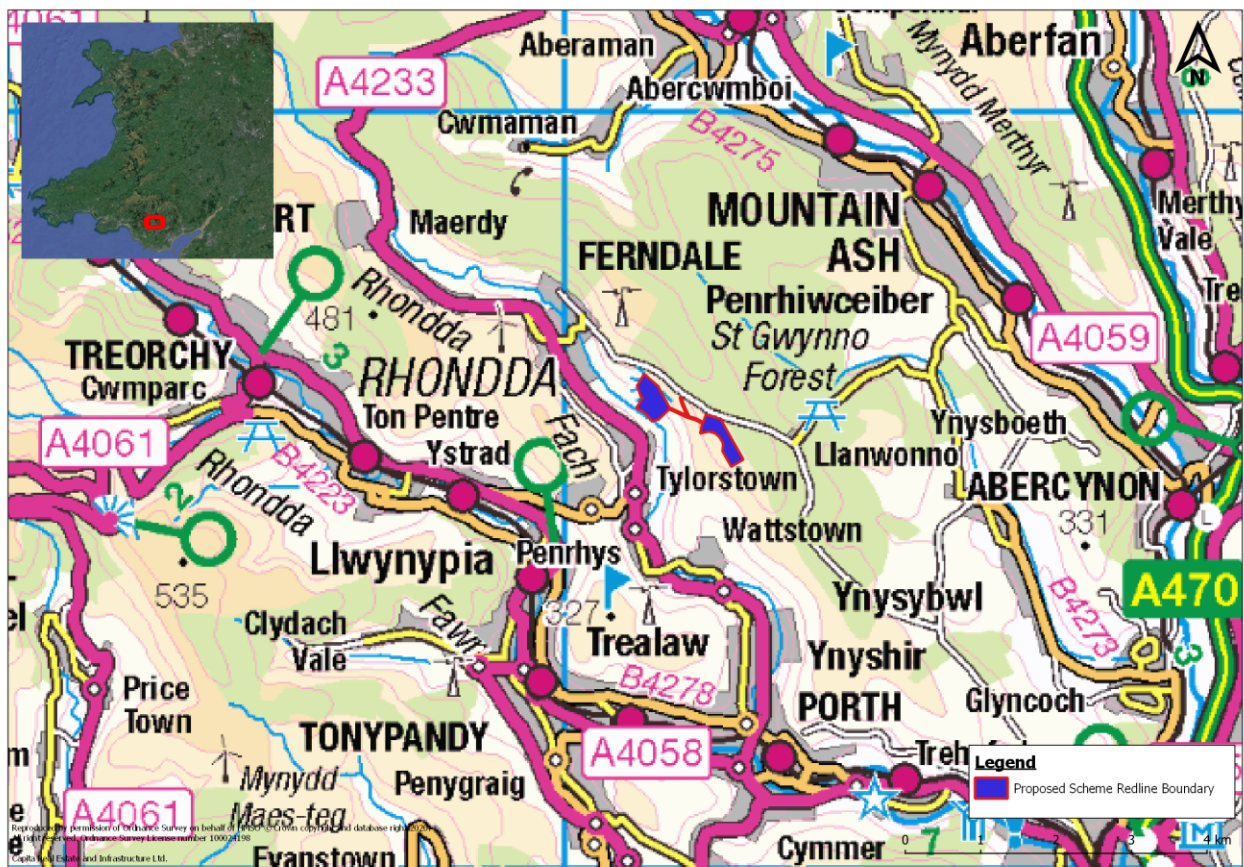


Figure 3.1 Proposed Scheme site location.

Key Environmental Constraints

3.1.2. Key features (constraints) of the area include the following:

- Existing old tips in the area;
- Ecological features including four Sites of Importance for Nature Conservation (SINC) in the area with Old Smokey SINC on site and several habitats of county importance and ecological value onsite. Also, potential for protected species to be present on site such as great crested newts, reptiles, terrestrial invertebrates, other mammals, breeding and wintering birds, lichens and bryophytes and invasive non-native species;

- Public right of Ways (PRoW) including footpath TYL 9/1 that runs directly to the east of the Receptor Site and cuts through the Red Line Boundary (RLB), as well as other PRoWs and informal footpaths within the local area;
- The Afon Rhondda Fach in the valley below the site which is a primary watercourse and tributary of the Afon Rhondda Fawr, which is also assessed under the WFD; and
- The nearby town of Tylorstown in the valley below and the local leisure centre located directly beneath the Site of Llanwonno Tip.

3.2. Description of the Proposed Scheme

- 3.2.1. The Proposed Scheme involves ensuring the remaining material within the tip safe, as well as offering enhancements for the area. As such, it includes the remediation of the remaining material within RH01, on the hillside and consists of the following, as depicted in Volume 2: V2-S03-0001.

Llanwonno Tip

- 3.2.2. Circa 195,000m³ of material remaining within Llanwonno Upper Tip, on the hillside, will be removed and landscaping of the area following the removal will be implemented. The hillside will be graded to match the natural sloping gradient of the valley side, tying the area into the surrounding landscape. This will also create more stability on the valley side by removing the material overlying the natural sloping gradient of the valley. The proposed excavation area is depicted in drawing Volume 2: V2-S03-0002 and associated cross sections in drawings Volume 2: V2-S03-0004 to 0008.

Landscaping

- 3.2.3. Llanwonno Tip will be graded to match the natural sloping gradient of the valley side. Grading of material within the tip will create a beneficial change by tying the area into the surrounding landscape. It will also create more stability on the valley side by removing the material overlying the natural sloping gradient of the valley (see Chapter 8: Landscape Character for more detail).

Drainage design

- 3.2.4. Appropriate surface water drainage will be provided at the reprofiled tip. This will consist of swales and herring bone drains to collect surface water flows, directing them towards a network of three drainage channels below the tip. These will, in turn, direct waters towards an existing channel and outfall to the Afon Rhondda Fach. The swales and channels will be bentonite clay lined with some localised energy dissipation features (rocks or rock gabions), to make them as naturalistic as possible. The herringbone drains will consist of gravel.
- 3.2.5. Further details of the outline drainage design are available in the Tylorstown Slip Phase 4 drainage strategy (see Appendix 11.2 of the Tylorstown Slip Phase 4 Environmental Statement).

Slip Area

- 3.2.6. Up to 35,000m³ of material will be used to infill such features as the slip scar, below Llanwonno Tip, to bring the ground to a homogenous level, similar to the natural sloping

gradient of the valley side. Natural regenerated vegetation will cover these earthworks over time (see Chapter 8: Landscape Character for more detail).

Widening of Tramway

- 3.2.7. Approximately 160,000m³ of the material will need to be transported along a disused tramway to the adjacent Receptor Site (approximate centre at ST 02103 95732). Therefore, widening of the existing tramway in order to allow access for trucks and plant to RH01 and the Receptor Site.
- 3.2.8. The haul road will be subject to a condition assessment to assess its suitability to carry the intended earth moving vehicles and this will include the condition of embanked sections raised on spoil or other Made Ground. The drainage of the route will be considered, and local improvements will need to be designed as appropriate. A degree of rutting may be inevitable, and it is envisaged that a programme of on-going repair during haulage operations will be necessary using capping type aggregates and perhaps laid over geogrid laid as a strengthening layer.
- 3.2.9. The section of the tramway/footpath running below Llanwonno upper tip that was lost as a result of the landslide will be reinstated.

Receptor Site

- 3.2.10. As mentioned above, approximately 160,000m³ of the material excavated from Llanwonno Tip will be transported to the Receptor Site, to be deposited and landscaped into a new landform, adjacent to the existing Old Smokey. The purpose of this movement of colliery material is to prevent any future slips such as that that occurred in February 2020, by moving it to a more stable and secure location and to provide the re-establishment of 'Colliery Spoil' and 'Ffridd' ecological habitats on the site. The habitat re-establishment will be carefully managed and monitored to maximise the success of the iconic Valleys habitat and ensure there is an ecologically beneficial and sustainable after use of both the Receptor Site and the existing tip. The intention is for a nature reserve to be created in this location and the re-establishment of ecological habitats to act as case-study for other similar sites across Wales.
- 3.2.11. The final dimensions of the landform at the Receptor Site will be refined during detailed design and adjusted on site, depending on the final volume of colliery material transported. However, the general shape, location and scale of the new landform will not change significantly. The current design of the Receptor Site is 540m long, with a width varying between 75m and 120m, a maximum height of 7.08m, a 2.5% cross fall and 1 in 3 side batters. The location of the Receptor Site is depicted in Volume 2: V2-S03-0001 and V2-S03-0003.
- 3.2.12. The Receptor Site indicative heights are shown in the cross section plans Volume 2: V2-S03-0009 to 0013. Starting at ground level from Chainage 0.000, increasing to 6.42m by Chainage 60.000. It reaches its highest point at Chainage 280.000 at 7.08m in the centre, dipping down to 6.07m at Chainage 360.000 and back up to 6.86m by Chainage 400.000, giving the Receptor Site a shape which fits in better with the surrounding undulating landscape, than if it were designed as a level surface. By Chainage 480.000 it is almost back at ground level, before returning completely to ground level by Chainage 500.000.
- 3.2.13. The Receptor Site has been designed to fit behind the conical shape of Old Smokey, in order to reduce the Landscape and Visual impacts on the communities within the valleys,

the effects on visual receptors are assessed within the Landscape and Visual Effects chapter (See Section 8).

- 3.2.14. The material that makes up the Receptor Site comes from the reprofiling of the Llanwonno Tip, where the material is being removed to prevent further slips from occurring. To achieve this, the Proposed Scheme will remove the material that raises the valley side to above that of its natural slope angle, to create a flatter area of land instead of the bulge that is present currently.

Drainage Design

- 3.2.15. The outline drainage design proposals for the Receptor Site consist of swales surrounding the new landform and running across the top of the landform. These bentonite clay lined and appropriately vegetated channels will collect and direct surface water flows into two attenuation ponds which in turn discharge into the existing drainage network.

3.3. Construction

Haulage route and Vehicle Movements

- 3.3.1. The design of the Proposed Scheme allows the recovery of all the material to be undertaken without having to access the public road network. The haulage route used between the sites will be along the disused tramway and not on any public highway for the duration of the Proposed Scheme's construction. This has major advantages in that it saves approximately 3,000 HGV road journeys through Ferndale, and potentially 9,000 if travelling through Blaenllechau.
- 3.3.2. It is assumed that the transport of material from Llanwonno tip to the receptor site will require 16,000 HGV movements in total over a period of around four to six months, giving an average of 135 to 140 HGVs movements per day.
- 3.3.3. The tramway will be widened to approximately 5m, dependent on vehicle size, with a length of 550m. It will be surfaced using stone surfaced crusher run at <300mm in diameter (thickness to be confirmed by the contractor based on conditions after site strip).
- 3.3.4. Further detail on the transport arrangements required during the depositing of material on the sites are discussed in the Transport Statement accompanying the application (Appendix 14.1).

Construction compounds

- 3.3.5. There will be one construction compound on site that will have an approximate area of 5700m². This will be located to the east of the haulage route, north-west of the Receptor Site, as depicted in Volume 2: V2-S03-0014.

Site Access Route

- 3.3.6. The majority of traffic, both staff and smaller delivery vehicles, will arrive from the west having travelled on the main A4233. This requires all vehicles to pass through the centre of Ferndale. The roads through Ferndale are of sufficient width for standard delivery vehicles to negotiate without disrupting other road users.
- 3.3.7. Access to the site by larger vehicles, such as the low loaders delivering the vehicles to move the waste within the site will be through the forestry road linking to the A4233 to the north of

the site. If required, a lead vehicle will be provided for the low loaders along with stop and go provision as they access the site from the haul road.

- 3.3.8. Minor alterations to the kerb line at the Blaenllechau Road/ Haul Road junction will be required and the existing access to the site will be widened and improved (see Transport Statement Appendix 14.1 for more detail).

Temporary drainage

- 3.3.9. Some temporary drainage features are currently in place below Lannwonno Upper Tip, to capture surface water flows running down the side of the valley and along the slip scar. These drainage feature will be removed by the end of construction, as new permanent drainage arrangements are constructed.

Construction plant and equipment

- 3.3.10. The plant likely to be used for the construction of the Proposed Scheme includes:
- Volvo A20 articulated hauler;
 - Volvo A30 articulated hauler; and
 - CAT 320 hydraulic excavator.

Construction practice

- 3.3.11. The majority of works will take place during the working week and only in the daytime. There will be no night-time working and minimal working on Saturday mornings. All relevant Code of Construction Practice (CoCP) guidelines will be followed to reduce impacts during construction.
- 3.3.12. Details of the loading and unloading of plant and materials and their associated storage will be detailed within the Construction Traffic Management Plan and the proposed detailed operation of the site develops.

4. Consultation

4.1. Technical Consultation

4.1.1. The following stakeholders were identified for input to the consultation of the Proposed Scheme:

- Rhondda Cynon Taf County Borough Council (RCT);
- Natural Resources Wales (NRW);
- Cadw (Welsh Government historic environment);
- Welsh Water;
- Lead Local Flood authority (LLFA);
- Highways Authority;
- South Wales Fire and Rescue Service;
- HSE; and
- Western Power.

4.1.2. Liaison with RCTBC planning was undertaken prior to submitting the EIA screening and scoping report and, as statutory consultees, NRW were consulted on the EIA screening and scoping reports. Details on the responses received through consultation with the above-mentioned stakeholders is described below and divided into the relevant technical chapters.

Air Quality

4.1.3. Initial correspondence between Air Quality team and RCT health officer agreed the Air Quality assessment approach.

4.1.4. NRW agreed in their scoping response that air quality and dust impacts at the Craig Pont Rhondda SSSI and the Waun Goch, Penhiw-Caradoc SSSI ecological receptors are unlikely to be significant.

Landscape and Visual

4.1.5. Initial correspondence between the Landscape and Visual technical lead and RCT was conducted to agree Landscape and Visual Impacts assessment methodology. Agreement was made on receptor viewpoints.

Biodiversity

4.1.6. NRW advised through their scoping response (14 December 2020) that Great Crested Newts should be considered further and included within the ES. NRW also recommended that the advice of the local authority Ecologist was sort to ensure that biodiversity issues are adequately considered, as well as contacting relevant local interest groups.

Contaminated Land, Geology, Soils and Waste

4.1.7. NRW recommended in their scoping response that the Construction Environment Management Plan (CEMP) be included in the ES.

- 4.1.8. A meeting was subsequently held between NRW, RCT and Redstart on 28 May 2021 during which Redstart presented the Proposed Scheme as well as their approach to the proposed site investigation. NRW were able to comment and ask questions during and following the meeting. NRW confirmed they had no concerns about the investigation results as these were aligned with expectations, confirming contamination risks were low. NRW asked that the mechanism is used to relocate the material be clarified. Redstart and RCTCBC expressed a preference for the use of the 'Definition of Waste: Code of Practice (DoW CoP)' mechanism but that this needed to be clearly set out prior to construction.
- 4.1.9. The scoping response from the Coal Mining Authority (27 November 2020) stated that a Coal Mining Risk Assessment would need to be undertaken as part of the environmental assessment of the area, due to the Proposed Scheme being in a Development High Risk Area.

Noise

- 4.1.10. Initial correspondence between the noise technical lead and the RCT Senior Environmental Health Officer occurred 13 November 2020 in order to comment and agree on the noise assessment methodology. The approach to assessment was approved as part of the scoping opinion received 17 December 2020.

Water Environment and Flood Risk

- 4.1.11. Welsh Water was consulted during scoping to provide comments. They stated in response (27 November 2020) that the Proposed Scheme may be subject to Schedule 3 of the Flood and Water Management Act 2010 and may require approval for Sustainable Drainage Systems (SuDs) and consultation with RCTCBC was recommended.
- 4.1.12. NRW stated that remedial works for drainage and exposed springs on the slip slope should be included in the ES from their scoping response (14 December 2020). It was also recommended that the WFD Assessment, CEMP and drainage survey results be included in the ES.
- 4.1.13. The drainage design and strategy, as well as the WFD assessment were also discussed with NRW, during the meeting held on 28 May 2021. The following points were raised by NRW:
- NRW asked that if dye is used in drainage surveys to inform NRW prior to it being used, in case they get any reports from the public. Redstart noted that due to defined existing open channels and no unknown pipes, that no dye is being used;
 - NRW asked to be informed about the proposed silt protection measures, to prevent as much material as possible from entering watercourses;
 - NRW raised that a 'watching brief' from NRW on the movement of the material might be appropriate;
 - NRW asked for a confirmation of whether the drainage features would be concreted. Redstart confirmed that main channels will be swales or bentonite clay lined with some localised energy dissipation features (rocks or rock gabions) to make it as naturalistic as possible. Herringbone drains will consist of gravel;
 - NRW confirmed that they agreed with the WFD assessor's decision to exclude the Nant Clydach from the WFD assessment;

- NRW requested that the WFD assessment consider the fish spawning season and include appropriate mitigation measures in relation to this; and
- NRW queried whether the proposals create an easier pathway for leachate, due to looser compaction on the donor site. However, the Redstart design team confirmed that material is expected to be more tightly compacted at Llanwonno Tip than it is currently.

4.1.14. The above comments were taken into consideration and integrated into the WD assessment and this ES, during the finalisation of the reports.

Public Rights of Way (PRoW) and Transport

4.1.15. Consultation occurred with the Public Rights of Way (PRoW) officer 16 November 2020 through email communication to discuss the impacts the Proposed Scheme would have on PRoW footpaths in the area. The design impacts were then discussed further with PRoW officer 24 November 2020 as it was identified that the Proposed Scheme will dissect a PRoW. Following submission of the scoping report, the PRoW officer stated within the scoping opinion (received 17 December 2020) that the impacts on PRoWs should be included within the ES to identify what mitigation measures will be put in place for the PRoWs that are being dissected by the Proposed Scheme.

4.1.16. Consultation with NRW was undertaken with regards to the use of the forestry road linking to the A4233 to the north of the site and the use of the haul road to reduce impacts on the public highways.

Major Accidents and Disasters

4.1.17. South Wales Fire and Rescue Authority was consulted through the scoping stage of the EIA and stated (2 December 2020) that the Proposed Scheme should consider the need for the provision of adequate water supplies on the site for firefighting purposes and access for emergency firefighting appliances.

4.2. Public Consultation

4.2.1. No public consultation has been conducted to date. Public consultation will occur as part of the PAC process and added to this section prior to submission of the final ES for planning.

5. Alternatives Considered

5.1. Proposed Scheme History

- 5.1.1. As required by the EIA Regulations, Regulation 18 (3)(d), reasonable alternatives to the Proposed Scheme considered by the developer must be presented.
- 5.1.2. Throughout the design of the Proposed Scheme, multiple alternative options and designs have been considered and this continues to be the case as the design is finalised. This includes considerations for:
- disposal of the material;
 - alternative disposal locations; and
 - alternative landscape designs for the Receptor Site.
- 5.1.3. In 1996, a reclamation scheme was developed for the Llanwonno Tips that involved the complete removal of the tips to another deposition area adjacent to 'Old Smokey'. At the time, the Proposed Scheme was not implemented and in 2000, RCT commissioned an Options Assessment Report to review the options available for the management of the site. In this report ecological impacts were also taken into consideration.
- 5.1.4. In November of 2000, Halcrow produced an *Options Assessment Report* and identified five options for the site. These are explained in Table 5.1 below.

Table 5.1 Descriptions of the five Options considered in 1996 and 2000.

Option	Description of Option
Option 1	Do nothing
Option 2	Continuation of existing inspection strategy
Option 3	Leave the existing landform of the tips unchanged and make localised drainage repairs and improvements to the existing problems of the eroded watercourses, together with ongoing inspections
Option 4	Re-profiling and stabilisation of upper tip through earthworks, with drainage improvements largely as for Option 3
Option 5	Complete removal of both Upper and Lower Tips at Llanwonno to eliminate any problems in terms of stability of the tips. This would require the removal of approximately 450,000 m ³ of material and require substantial environmental mitigation measures.

- 5.1.5. In March 2000 Hyder carried out an ecological survey of the Tylorstown and Llanwonno Road tip sites based on the complete removal of the Llanwonno Tips to a deposition area south east of Tylorstown Landslip. It was stated in the Option Assessment Report of November 2000, that the complete removal of the tips would have "a very severe short to medium term impact on ecology and would require substantial mitigation measures" (page 30).
- 5.1.6. Following the appraisal, the decision was made that continued inspection of the material would be implemented, to monitor the situation. However, following the events of February

2020, these options were revisited, and the removal of the material was considered to be the only effective way to avoid slips in the future.

- 5.1.7. Following the landslip in February 2020, the options in Table 5.1 were revisited, alongside three additional options:
- Option 6: Complete removal of both Upper and Lower Tips at Llanwonno to an adjacent or nearby receptor site without having to take the material 'off site'. This would require the removal of approximately 450,000 m³ of material and require substantial environmental mitigation measures at the donor and receptor sites;
 - Option 7: Removal of all the unstable or potentially unstable material from the Upper Llanwonno Tip off site whilst leaving the stable Lower Tip in situ. This would require the removal of approximately 160,000 m³ of material, some environmental mitigation measures on site and result in considerable difficulties in transporting the material, a long period to deliver the works and have a high financial cost; and
 - Option 8: Removal of all the unstable or potentially unstable material from the Upper Llanwonno Tip to an adjacent or nearby receptor site without having to take the material 'off site' whilst leaving the stable Lower Tip in situ. This would require the removal of approximately 160,000 m³ of material, some environmental mitigation measures on both sites, a reasonable period of works and cost.
- 5.1.8. In assessing these options, the events of February 2020 and the prevention of another landslip were given the highest weighting. From the options appraisal analysis, it was clear that it was essential to choose both a safe and practical solution.
- 5.1.9. The chosen solution presented in this application was Option 8, which involves the removal to a close by receptor site of the majority of the material from the Upper Tip. This reduces the impact on environmental receptors in the area compared to the other options that involved removing material, particularly on the local ecology of the site, as well as reducing the duration of the works required to transport and reprofile the material.
- 5.1.10. No works are proposed to the Llanwonno Lower Tip as it is considered to be more stable in itself, it is also performing the function of toe weighting an area of natural instability of the hillside directly above it.

5.2. Development of the Preferred Option

Site Access Route Development

- 5.2.1. Initially, Blaenllechau Road, a B Road was going to be used as the main access route to the site from the main road, for both the HGVs and plant that will be excavating and moving the material, to the other vehicles construction workers will be using to get to site daily with. However, after further assessment of Blaenllechau Road through the production of the Transport Statement (Appendix 14.1), pinch points along Commercial Street and Blaenllechau Road, as well as a sharp bend on Station Road were identified to be an issue to low loaders delivering the vehicles to move the material within the site. This meant that another route had to be identified to provide access to these vehicles.
- 5.2.2. Access from Stanleytown and Ynysybwl also have narrow widths, sharp corners, overhanging vegetation and use of these roads could also cause further damage to the road surfaces. The forestry road linking to the A4233 to the north was therefore identified to

provide access to the low loaders delivering the plant and other vehicles (See figures within the Transport Statement for further information).

Initial Concept Designs for Receptor Site

- 5.2.3. The initial concept for the deposit of the material removed from RH01 was to deposit against the north-east edge of Old Smokey, so it would form an extension of the Old Smokey tip (depicted as 'Concept Design 1' in Figure 5.1). However, this option was discarded due to concerns to the safety and stability of Old Smokey with the additional material piled against one side. Therefore, it was decided that the Receptor Site would be a separate area of material which form its own distinct landform nearby (depicted as 'Concept Design 2' in Figure 5.1).
- 5.2.4. At this point, the main consideration with regards to the development of the preferred option was the shape and size of the Receptor Site, where the material is being relocated to, to reduce the impact to as many environmental receptors as reasonably possible. Several designs iterations of the Receptor Site were produced, through engagement with technical leads of the various ES chapters as well as external stakeholders.
- 5.2.5. The first of these concepts is depicted as 'Concept Design 3' in Figure 5.1 below. This consisted of a rectangular and compact landform that sought to minimise land take and disturbance to local receptors. However, this design was considered to be too 'engineered' and unlikely to fit within the local landscape. The option was therefore adapted further at the next stage of design described below.

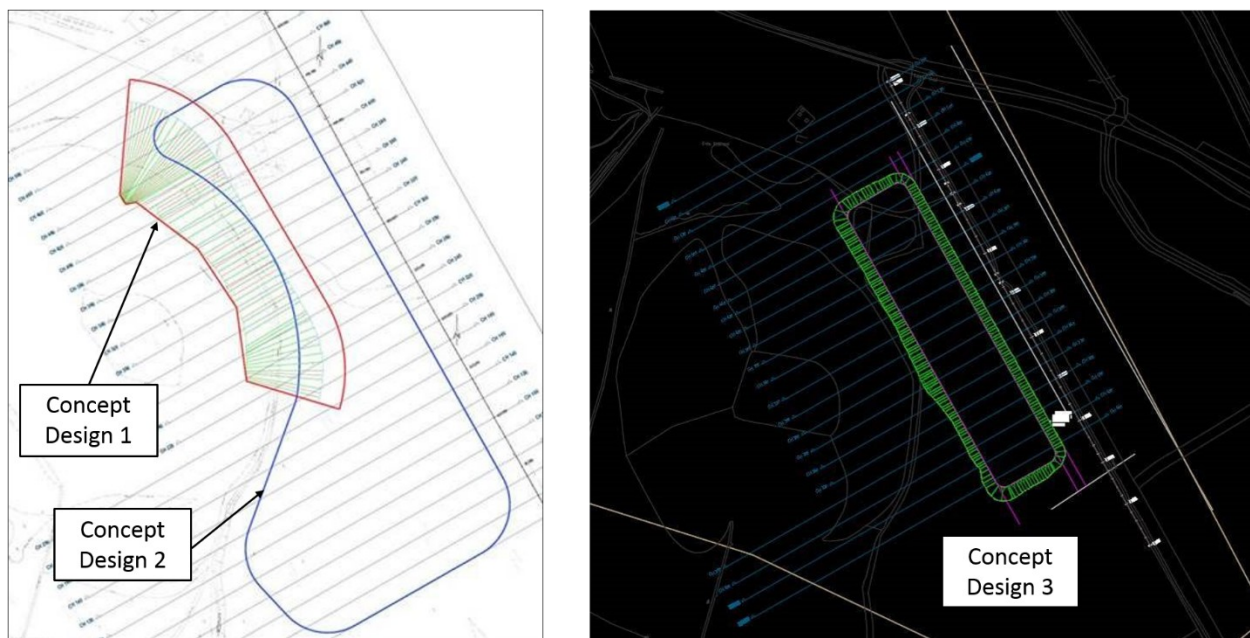


Figure 5.1 Depictions of early concept designs

Outline Designs and Design Workshop 1

- 5.2.6. A design workshop was organised in November 2020 to discuss two further options in consideration for the design with technical specialists contributing towards the ES, to enable them to identify any potential issues with the designs and express a preference for one over the other. These two options are referred to as Option 4 and Option 5 (as seen in plan V2-S05-0001 and V2-S05-0002 respectively). Option 4 is wider to the south and thinner to the

north than Option 5 with a gradual increase in height towards the northern end. Option 5 is wider at the northern end and has a gradient that peaks in the centre, dropping off to both the south and north of the Receptor Site.

- 5.2.7. Through the workshop, the main environmental constraints that would influence the shape and size of the Receptor Site were identified to come from the environmental topics discussed below. Please note that further details of the impacts to each of these topics are provided in the relevant technical chapters of this EIA.

Heritage

- 5.2.8. A number of heritage assets and records, including a disused tramway and associated building, are located within the Receptor Site area (see Chapter 7 for further information). Consideration was made for these features, attempting to avoid them as much as possible, particularly those that are still present or visible on site.

Ecology

- 5.2.9. Most of the area where the Receptor Site is proposed to be is covered in priority habitat and therefore prioritisations had to be made about which habitats were the most important to protect/ the hardest to mitigate for, if lost. It was understood that some loss of habitat was unavoidable and could be mitigated for. Therefore, it was decided that:
- The area of Acid Neutral Flush and Raised Bog on the eastern edge of the Receptor Site should be avoided;
 - The area of Acid neutral flush within the Receptor Site would be translocated to the foot of the Receptor Site, adjacent to the drainage arrangement;
 - The areas of Dry Heath should be avoided as much as reasonably possible; and
 - The areas of bare earth should be prioritised for the placement of the Receptor Site over areas of habitat.
- 5.2.10. In response to the cultural heritage and ecology constraints mentioned above, it was understood that the restriction in surface area of the proposed Receptor Site would require an alteration to the height of the Receptor Site. This meant that the landscape and visual receptors needed to be further considered also.

Landscape/Visual

- 5.2.11. Receptor Site needed to avoid extending significantly further north or south to take advantage of the presence of Old Smokey blocking the view of the deposit from the main landscape and visual receptors in the valley; and
- 5.2.12. Receptor Site needed to increase the height of material stored but only in the middle section of the mound, where visual impacts are limited, again because of the presence of Old Smokey blocking views from receptors.

Public Right of Way (PRoW)

- 5.2.13. The TYL/9/1 PRoW footpath crosses through the RLB, to the east of Old Smokey, running in a north-west to south-east direction, from Blaenllechau Road to footpath YCC/16/1. Due to its proximity, the PRoW was given strong consideration during the design workshops, ensuring the proposed Receptor Site design did not sever the footpath. Unfortunately, the

addition of drainage elements has meant that severance of the PRow cannot be completely avoided.

Design Workshop 2 and Preferred Option

- 5.2.14. A second workshop was held with the technical leads and engineers to compare two further refined options, referred to as Option 6 and Option 7 (as seen in plan V2-S05-0003 and V2-S05-0004 respectively). The same process described for the first workshop was followed during the second, ensuring all appropriate considerations were made during the decision process. The workshop resulted in the Preferred layout for the Receptor Site being selected.

Compound

- 5.2.15. The indicative compound location and shape were also refined to minimise impacts on the receptors discussed above, particularly cultural heritage and ecological receptors.



Part Two Environmental Impact Assessments

6. Air Quality

6.1. Introduction

- 6.1.1. The air quality assessment will consider potential dust and air quality effects as a result of increase in dust emissions associated with the removal and transport of colliery material during the works. The key focus will be the potential human health and dust nuisance impacts of the works on the sensitive nearby human receptors.
- 6.1.2. Human health pollutants for consideration will be nitrogen dioxide (NO₂) and particulate matter (PM₁₀) concentrations due to both vehicle and dust emissions from the removal and transport of colliery material. These will be compared against National Air Quality Objectives (NAQOs) to determine the extent to which the effects on residential properties are significant.

6.2. Legislation and Policy

- 6.2.1. Air quality is governed by a series of local, regional, and national legislation and policies.
- 6.2.2. With regards to the potential effects of the Proposed Scheme, the key legislation is the NAQOs, as set out in the Air Quality Strategy (2015)⁹ and the Air Quality (Wales) Regulations (2010)¹⁰. The 2015 regulations are the latest update to the legislation which transposes into UK law the requirements of the European Directives 2008/50/EC and 2004/107/EC, which apply legal responsibility to the NAQOs. The NAQOs provide targets for various pollutants, including NO₂, PM₁₀ and PM_{2.5} concentrations, as presented in Table 6.1 below.

Table 6.1 National Air Quality Objectives

Pollutant	Measured As	Objective
Nitrogen dioxide (NO ₂)	Annual Mean	40µg/m ³
	1 Hour Mean	200µg/m ³ not to be exceeded more than 18 times a year
Nitrogen Oxides (NO _x) for vegetation and ecosystems	Annual Mean	30 µg/m ³
Particles (PM ₁₀)	Annual Mean	40µg/m ³
	24 Hour Mean	50µg/m ³ not be exceeded more than 35 times a year
Particles (PM _{2.5}) (WHO Limit)	Annual Mean	10 µg/m ³
	24 Hour Mean	25 µg/m ³

Source: Air Quality Strategy 2015

- 6.2.3. These air quality objectives are aimed at the protection of human health. The annual mean NAQOs apply at locations where the public may be regularly exposed, such as building facades of residential properties, schools, hospitals, and care homes. The 1-hour and 24-hour mean NAQOs apply at locations where it is reasonable to expect members of the public to spend at

⁹ Defra (2015); The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

¹⁰ Welsh Ministers (2010); Air Quality (Wales) Regulations

least these periods of time, such as busy shopping streets and school playgrounds for the 1-hour mean, and hotels or residential gardens for the 24-hour mean. For full details, see Box 1.1 of LAQM TG (16)¹¹.

- 6.2.4. Air Quality Standards are the concentrations recorded over a given time period which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on human health and the environment. They can also be used as a benchmark to indicate whether air pollution is getting better or worse.
- 6.2.5. An exceedance is a period of time (defined for each standard) where the concentration is higher than that set out in the Standard. In order to make useful comparisons between pollutants (the Standards may be expressed in terms of different averaging times), the number of days of which an exceedance has been recorded is often reported.
- 6.2.6. Planning policy in Wales is governed by PPW, published in February 2021¹². It advises, in section 6.7.6, that planning considerations should:
- *“address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
 - *not create areas of poor air quality or inappropriate soundscape; and*
 - *seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.”*
- 6.2.7. The Wellbeing of Future Generations (Wales) Act 2015 is an act of the National Assembly for Wales to make provision requiring public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales in a way that accords with the sustainable development principle.
- 6.2.8. In January 2019, the UK Government published a Clean Air Strategy¹³ which outlines its aims and methods to tackle *“all sources of air pollution.”* This includes stronger emphasis on reducing domestic building, farming, and industrial emissions, on top of the existing legislative framework in place to address transport emissions. It also focuses on human exposure to fine particulate matter (PM_{2.5}), specifically to half the number of people in the UK exposed to concentrations above 10µg/m³ by 2025.
- 6.2.9. The Clean Air Plan for Wales was published in August 2020 and aims to improve air quality and reduce the impacts of air pollution on human health and the natural environment. Some of the main issues in the plan are new targets for PM_{2.5} and the Welsh Government are:
- “working closely with the Clean Air Advisory Panel to receive independent and expert advice on the development of evidence-based and effective air quality targets for the benefit of current and future generations. We will develop and enact a new target for fine particulate matter, taking account of the WHO guidelines on air quality”.*

6.3. Guidance

- 6.3.1. The assessment of the construction effects of the Proposed Scheme on air quality, including the risk of impacts, will follow the methodology provided in the documents detailed below:

¹¹ Department for Communities and Local Government (2018); National Planning Policy Framework

¹² Welsh Government (2021); Planning Policy Wales – Edition 11

¹³ Defra (2019); Clean Air Strategy 2019

*Guidance on the Assessment of Mineral Dust Impacts for Planning*¹⁴

- 6.3.2. The Institute of Air Quality Management (IAQM) has produced this guidance to provide developers, consultants, and local authorities with a means of qualitatively assessing the impact of dust impacts from mineral sites, particularly as part of the planning process. The guidance uses a simple distance-based screening process to identify those mineral sites where the dust impacts are unlikely to be significant and therefore require no further assessment. Where more detailed assessment is required, a basic assessment framework based on the source-pathway-receptor approach is used to evaluate the risk of dust impacts and effects. Where effects are predicted to be 'Significant', further mitigation (also provided) is recommended. Although the Proposed Scheme is not a mineral site, it does undertake several activities during the construction period which resemble that of a mineral site (such as the excavation and transport of large volumes of colliery material), and as such this guidance is suitable for undertaking the dust assessment for the Proposed Scheme.

*Local Air Quality Management Technical Guidance*¹⁵

- 6.3.3. Published by the Defra for use across England, Scotland, Wales and Northern Ireland, the Local Air Quality Management Technical Guidance (LAQM.TG(16)) contains the methods by which local authorities should manage, assess and improve air quality within their authoritative boundaries. The methodologies included are also widely used by consultants assessing the impacts of new developments on local air quality.

*Land-Use Planning & Development Control: Planning for Air Quality (2017)*¹⁶

- 6.3.4. Environmental Protection UK (EPUK) and IAQM published updated guidance, detailing when a detailed air quality assessment is required, in relation to traffic generation (both light and heavy-duty vehicles), speed, road realignment, car park ventilation, energy and heating provision plant. The guidance also provides impact descriptors to aid in assessing the significance of the impact, as well as what should be included in the assessment and associated report.

*Design Manual for Roads and Bridges LA105 Air Quality*¹⁷

- 6.3.5. This document published by Highways England, Welsh Government, Transport Scotland and Department for Infrastructure provides a set of criteria used to determine when an air quality assessment can be scoped out based on changes in traffic data and also indicates the distance within which pollution concentration from a road is likely to be significant.

6.4. Assessment Methodology

Assessment of Short-term Impacts – Construction Phase

- 6.4.1. This assessment is focused on the Construction phase. The Construction Phase is considered to be the stage during which the material is moved from its current location to the Receptor Site which will be landscaped into a new feature.

Transport Emissions

¹⁴ IAQM (2016); Guidance on the Assessment of Mineral Dust Impacts for Planning v1.1

¹⁵ Defra (2018); Local Air Quality Management Technical Guidance (TG16).

¹⁶ EPUK / IAQM (2017); Land-Use Planning & Development Control: Planning for Air Quality v1.2

¹⁷ Highways England (2019); Design Manual for Roads and Bridges LA 105 – Air Quality.

- 6.4.2. The IAQM planning guidance states the following indicative criteria to proceed to an air quality assessment:
- a change of light duty vehicle (LDV) flows of:
 - more than 100 Annual average daily traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA); and
 - more than 500 AADT elsewhere.
 - a change of heavy-duty vehicles (HDV) flows of:
 - more than 25 AADT within or adjacent to an AQMA; and
 - more than 100 AADT elsewhere.

Dust Assessment Methodology

Dust Deposition

- 6.4.3. The dust assessment uses the Guidance on the Assessment of Mineral Dust Impacts for Planning which is a simple distance-based based on the source-pathway-receptor approach used to evaluate the risk of dust impacts and effects. Where effects are predicted to be 'Significant', further mitigation is recommended. Although the Proposed Scheme is not a mineral site, it however undertakes several activities which are like that of a mineral site, as described in paragraph 6.3.2, and as such this guidance is suitable for undertaking the dust assessment for the Proposed Scheme.

Step 1: Screen the need for an Assessment

- 6.4.4. The first step is to check if there are relevant receptors within 1km of the operations, then a detailed dust assessment can be screened out.
- 6.4.5. The next exercise is to check whether there are receptors located between 400m (for hard rock), or 250m (for soft rock) and if there are relevant human and/or ecological receptors within 250m or 400m, in which case a disamenity dust impact assessment will be required. This step is deliberately chosen to be conservative (and will, in practice, result in assessments being required for most minerals development schemes and schemes involving the excavation and movement of large volumes of material). Given that the nearest human receptors are located along East Street, within approximately 120m south of the Proposed Scheme boundary, it is considered that an assessment is required.

Step 2: Define the Potential Dust Emission Magnitude

- 6.4.6. Identification of the main dusty activities and determination of the dust magnitude. The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. The scale of potential dust emissions associated with the dusty activities was determined using the following criteria shown in Table 6.2.

Table 6.2 Dusty Activities and their Dust Magnitude.

Site preparation and restoration	Area	Seeded or unseeded bunds	Bund height (m)	Material moved (tonnes)	No of HDV per day	Type of spoil
Large	10ha	unseeded	>8	100,000	>10	fine grained and friable material with low moisture content
Medium	2.5 - 10ha			20,000 - 100,000	5 to 10	
Small	2.5ha	seeded	<4	20,000	<5	high moisture content
Spoil extraction	Area	Extraction method	Type of spoil	Potential rate of extraction		
Large	>100ha	drilling and blasting	small particle size and/or low moisture content	>1,000,000tpa extraction rate		
Medium	20 - 100ha			200,000 - 1,000,000tpa		
Small	<20ha	hydraulic excavator	coarse material and/or high moisture content	<200,000tpa		
Materials Handling	No of loading plant	Surface	Location	Type of spoil		
Large	>10	poorly surfaced ground	within 50m of site boundary	high dust potential and/or low moisture content		
Medium	5 - 10					
Small	<5	Hard Standing	100m away from site boundary	low dust potential and/or high moisture content		
On-site transportation	Haul Road	No of HDV per day	Surface	Length of haul road (m)	Speed (mph)	

Large	Unpaved	>250	loose	>500	Uncontrolled		
Medium		100 - 250					
Small	Paved	<100	compacted aggregate	<500	15		
Spoil processing	Type of spoil	Processing	Volume material processed	Rock type			
Large	high dust potential and/or low moisture content	mobile crusher and screener with concrete batching plant on-site	>1,000,000tpa	Hard rock			
Medium			200,000 - 1,000,000tpa				
Small	low dust potential and/or high moisture content	fixed screening plant with effective design in dust control	<200,000tpa	wet sand or gravel			
Stockpiles and exposed surfaces	Stockpile	Windspeeds	Location	Operations	Type of spoil	Stockpile duration	Potential rate of extraction (tpa)
Large	exposed area >10ha	High	within 50m of site boundary	Daily transfer	high dust potential and/or low moisture content	>12 months	>1,000,000
Medium	2.5 - 10ha						200,000 - 1,000,000
Small	<2.5ha	Low	100m away from site boundary	Weekly transfer	low dust potential and/or high moisture content	1 month	<200,000
Off-site transportation	No. of HDV	Surface	Vehicle cleaning or Road sweeper				
Large	>200	unsurfaced site access road <20m in length	No				
Medium	25 - 200						

Small	<25	paved surfaced site access road >50m in length	Yes
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Step 3: Identify Receptors and the Pathway

6.4.7. The nearest sensitive receptors and their dust sensitivities are then identified as either High, Medium, or Low, based on the descriptions below.

High sensitivity receptor:

- users can reasonably expect enjoyment of a high level of amenity; or
- the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
- Indicative examples include dwellings, medium- and long-term car parks and car showrooms.

Medium sensitivity receptor:

- users would expect a to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or
- the appearance, aesthetics or value of their property could be diminished by soiling; or
- the people or property wouldn't reasonably be expected a to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.
- Indicative examples include parks, and places of work.

Low sensitivity receptor:

- the enjoyment of amenity would not reasonably be expected; or
- there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
- there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
- Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short term car park and roads.

6.4.8. In addition, the distance of the receptors to relevant dusty site activity and the prevailing wind direction that will affect them during dusty episodes were determined using the 2019 meteorological data from Rhoose meteorological station, approximately 20 miles away.

6.4.9. Figure 6.1 shows the nearest receptors considered within the assessment.

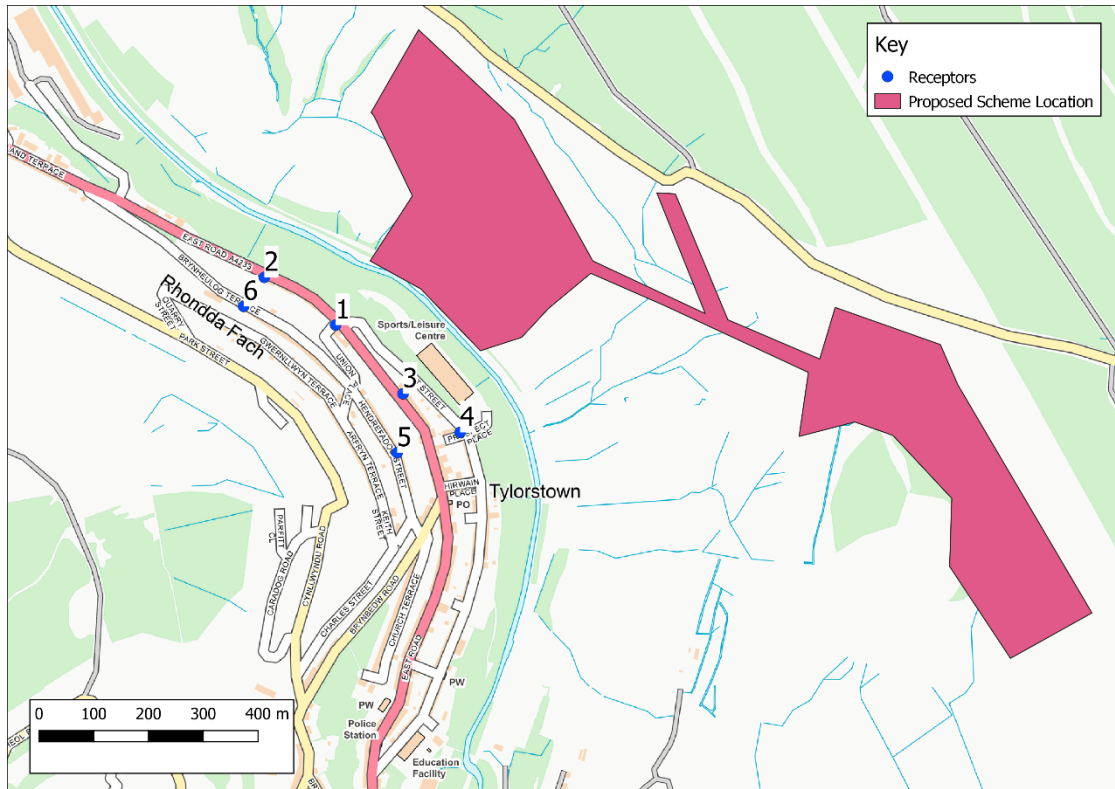


Figure 6.1 Sensitive Human Receptor Locations

6.4.10. Figure 6.2 shows Rhose meteorological data with a prevailing westerly wind direction.

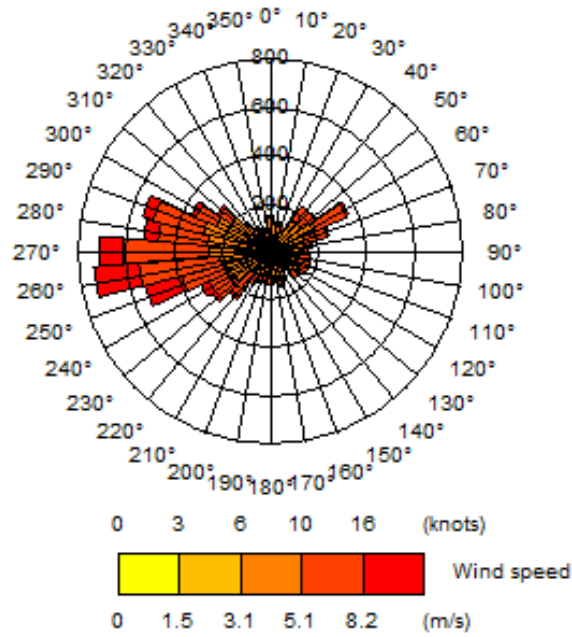


Figure 6.2 Rhose Meteorological Data 2019

Step 4: Dust Risk and Magnitude of Dust Effects

- 6.4.11. The dust risk as well as the likely magnitude of dust effect at the specified receptors are then determined using the Tables 6.3 and Table 6.4 below.

Table 6.3 Estimation of Dust Impact Risk

		Residual Source Emissions		
		Small	Medium	Large
Pathway Effectiveness	Highly effective pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Table 6.4 Descriptors for Magnitude of Dust Effects

		Receptor Sensitivity		
		Low	Medium	High
Dust Impact Risk	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Risk	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

Human Health PM₁₀

- 6.4.12. The IAQM recommends the PM₁₀ dust assessment includes a review of existing background ambient concentration of PM₁₀. If the long-term background PM₁₀ concentration is less than 17µg/m³ there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective and such a finding can be put forward qualitatively, without the need for further consideration.

Assessment of Long-term Impacts – Operational Phase

- 6.4.13. The Operational Stage is considered to begin once the Receptor Site has been constructed, at which stage there will be no further vehicular movements or other activities capable of generating dust. Therefore, no assessment of this stage has been undertaken.

Significance Criteria

- 6.4.14. Using professional judgement, the significance of the dust effects is determined based on the predicted magnitude of the likely effect from dust deposition at individual receptors, the

number of receptors that experience these different effects and consideration of any mitigation measures incorporated into the Proposed Scheme (including design features and management controls (e.g. Dust Management Plan)).

Limitations and Assumptions

- 6.4.15. The methodology used to assess the likely effects of the operation of the Proposed Scheme is risk-based and therefore it does not allow for quantification of the effects, or consideration of unfavourable weather episodes and failure of mitigation measures (i.e. problems with water supply used for dust suppression).

6.5. Baseline Conditions

Air Quality

- 6.5.1. The nearest Air Quality Management Area (AQMA); the Tylorstown AQMA, is located less than 1km from the Proposed Scheme and was declared due to exceedances of the annual mean NO₂ NAQO.
- 6.5.2. Given that the excavation process and transport of material will be solely within the Proposed Scheme site boundary, traffic related air quality impacts within the AQMA are unlikely to be significant.
- 6.5.3. The nearest human receptors are to the south of the Proposed Scheme and are properties along East Street (approximately 120m south of the Proposed Scheme site boundary), Prospect Place, Hirwaun Place, Union Place, Hendrefadog Street, Edmondess Street, Brynheulog Terrace, Brynbedw Road, Church Terrace, Gwernllyn Terrace, Park Street, Arfryn terrace and Keith Street.
- 6.5.4. The Proposed Scheme is located within a Site of Importance for Nature Conservation (SINC) and the two other ecological receptors designated as Sites of Special Scientific Interest (SSSI) are Craig Pont Rhondda, approximately 3km south-west and Waun Goch, Penrhiw-Caradoc, approximately 3.5km north-east of the Proposed Scheme. The SINC is not a statutory designated site and would typically be of a low dust sensitivity. Additionally, the SSSIs are much further away and, as such, air quality impacts and dust impacts at these sites are unlikely to be significant.
- 6.5.5. Baseline data are available from RCTCBC local monitoring campaign and Department for Environment, Food and Rural Affairs (Defra) 'Background Mapping data for local authorities'¹⁸.

Dust Emissions

- 6.5.6. The nearest human dust emissions receptors are to the south of the Proposed Scheme and are properties along East Street (approximately 120m south of the Proposed Scheme boundary), Prospect Place, Hirwaun Place, Union Place, Hendrefadog Street, Edmondess Street, Brynheulog Terrace, Brynbedw Road, Church Terrace, Gwernllyn Terrace, Park Street, Arfryn terrace and Keith Street.

¹⁸ <https://uk-air.defra.gov.uk/data/laqm-background-home>

6.5.7. As mentioned above, the Proposed Scheme is located within a SINC and the two other nearest ecological receptors designated as SSSIs are Craig Pont Rhondda, approximately 3km south-west and Waun Goch, Penrhiw-Caradoc, approximately 3.5km north-east of the Proposed Scheme. The SINC is not a statutory designated site and would typically be of a low dust sensitivity. However, the SSSIs are much further away, and as such air quality impacts and dust impacts at these sites are unlikely to be significant.

Monitoring Data

6.5.8. RCTCBC currently undertakes automatic monitoring at four locations. However, the closest is located over 4km away and is not, therefore, representative of conditions within the vicinity of the site area. They also undertake NO₂ diffusion tube monitoring at a range of locations across their authority. The details of the data collected at six of the nearest monitoring sites to the Proposed Scheme site boundary are presented in Table 6.5.

Table 6.5 RCTCBC NO₂ Diffusion Tube Monitoring Data.

(Site ID) and Site Name	Grid Location (X, Y)	Distance from the site (km)	Type	Annual Mean NO ₂ Concentration (µg/m ³)				
				2014	2015	2016	2017	2018
(41) East Rd, Tylorstown ^(a)	300954, 195137	0.8	Roadside	53.4	54.0	55.4	50.9	42.5
(93) High Street, Ferndale ^(a)	299895, 196907	1.6	Roadside	52.8	54.0	56.4	49.3	43.8
(101) Long Row, Blaenllechau	299674, 197673	2.3	Urban Background	7.4	7.6	9.4	7.3	6.9
(106) Partridge Rd, Llwynypia ^(a)	299851, 193991	2.3	Roadside	44.4	43.9	45.9	43.5	36
(107) High Street, Ferndale ^(a)	299880, 196937	1.6	Roadside	35.7	34.5	41.1	35.3	31.5
(116) North Rd, Ferndale	299841, 197107	1.7	Roadside	31.9	34.0	31.1	26.2	24.4

Notes: Bold exceeds the annual mean NAQO of 40 µg/m³.

(a) - within an AQMA.

6.5.9. Table 6.5 indicates that the annual mean NO₂ NAQO of 40µg/m³ is exceeded mostly at roadside monitoring sites within an AQMA, however NO₂ concentrations have been decreasing in all locations from 2014 to 2018. The NAQO threshold is 40µg/m³.

6.5.10. Defra provides modelled background concentrations for each 1x1km grid across all local authority areas from a base year of 2018. This data is projected up to 2030. Table 6.6 presents the estimated background concentrations for the Proposed Scheme area in 2019.

Table 6.6 2019 Defra Background Mapped Concentrations.

Defra Grid Square Coordinates (X,Y)	Defra Background Concentration ($\mu\text{g}/\text{m}^3$)		
	NO ₂	PM ₁₀	PM _{2.5}
300500, 196500	6.9	11.7	7.6
300500, 195500	6.5	11.5	7.5
301500, 195500	6.7	11.4	7.5
301500, 196500	6.0	10.9	7.2
Annual mean NAQO	40	40	10

- 6.5.11. Background concentrations for the grid squares within which the Proposed Scheme resides are all well below the annual mean NAQOs in 2019.

6.6. Preliminary Impact Assessment

Air Quality

- 6.6.1. The excavation process will be solely within the Proposed Scheme site boundary and with minimum offsite transportation of less than 25 HDVs expected, as such traffic-related air quality impacts of NO₂ and PM₁₀ are unlikely to be significant as most of the traffic movements will be along a disused tramway over 1km away from the nearest receptors.
- 6.6.2. Similarly, traffic related air quality impacts are unlikely to be significant within the nearby Tylorstown AQMA, located 1km from the Proposed Scheme.

Dust Emissions

- 6.6.3. Emissions of dust to air from removal and transport of colliery material during the works can occur during the preparation of the land, extraction, processing, handling and transportation of materials. Emissions can vary substantially from day to day, depending on the level of activity, the specific operations being undertaken, and the weather conditions. The most noticeable air quality impact likely to arise during minerals activities is dust accumulation resulting from deposition, which can lead to disamenity due to the soiling of surfaces.
- 6.6.4. The following activities listed in Table 6.7 are proposed during the operation of the Proposed Scheme along with their respective residual dust magnitude.

Table 6.7 Dusty Activities and their Residual Dust Magnitude.

Site Activity	Description	Maximum Residual source magnitude
Site preparation and restoration	Site area of >10ha, no bunds, 100,000 tonnes material moved,>5 HDVs, high moisture content	Large Adverse
Spoil extraction	<20ha, use of hydraulic excavator, coarse material and/or high moisture content, <200,000tpa	Small Adverse
Materials Handling	<5 loading plant, hardstanding, operated within 50m of site boundary, coarse material and/or high moisture content	Large Adverse
On-site transportation	Paved roads, <250 HDVs, compacted aggregate,>500m haul road length,15mph speed	Large Adverse
Spoil processing	Not applicable	None
Stockpiles and exposed surfaces	2.5ha, within 50m of site boundary, daily transfer operations, material of low dust potential and/or high moisture content, <200,000tpa	Large Adverse
Off-site transportation	Not applicable	None

6.6.5. Using the dust magnitude in Table 6.7, the residual dust source of the entire operation is expected to be **Large**. On this basis, the risk of dust and the potential dust soiling effects on the nearby receptors have been estimated and reported below, in Table 6.8 and Table 6.9. The Pathway effectiveness has been estimated based on the frequency of potentially dusty winds which revealed an ineffective pathway. This is because the percentage of yearly winds over 5m/s on dry days was less than 3% for all receptors during the times they are located downwind of the Proposed Scheme site boundary.

Table 6.8 Risk of Mineral Dust Impacts.

Receptor	Residual source emissions	Pathway effectiveness	Estimation of dust impact risk
R1	Large	Ineffective	Low Risk
R2	Large	Ineffective	Low Risk
R3	Large	Ineffective	Low Risk
R4	Large	Ineffective	Low Risk
R5	Large	Ineffective	Low Risk
R6	Large	Ineffective	Low Risk

Table 6.9 Magnitude of Dust Effect.

Receptor	Receptor sensitivity	Estimation of dust impact risk	Magnitude of dust effect
R1	High	Low Risk	Slight Adverse Effect
R2	High	Low Risk	Slight Adverse Effect
R3	High	Low Risk	Slight Adverse Effect
R4	High	Low Risk	Slight Adverse Effect
R5	High	Low Risk	Slight Adverse Effect
R6	High	Low Risk	Slight Adverse Effect

6.6.6. The mineral dust assessment has revealed that all sensitive human receptors have a low dust impact risk but a **Slight** adverse magnitude of dust effects. However, with the implementation of the recommended mitigation measures outlined in section 6.7 below, the overall dust effect is anticipated to be **Negligible**.

6.6.7. Human health effects are reported in Table 6.10.

Table 6.10 Human Health Impacts.

Area	Background PM ₁₀ concentrations (µg/m ³)	Significance of Effect
Human Receptors (R1 – R7)	11.7	Not significant

6.6.8. The overall human health effects due to the Proposed Scheme are deemed insignificant as the background PM₁₀ level is less than 17µg/m³ as shown in Table 6.6.

Summary

6.6.9. Based on the assessment above, impacts of to human health from the Proposed Scheme are **Not Significant** due to the low background PM₁₀ concentrations in the area.

6.7. Mitigation, Enhancement and Monitoring

6.7.1. In line with the IAQM Mineral Dust Guidance, various mitigation measures are suggested to be put in place for the Proposed Scheme:

- *“existing woodland/hedgerows along site boundaries should be retained where possible;*
- *regular clearing, grading and maintenance of haul routes;*
- *setting appropriate site speed limit;*
- *if practicable, set site-specific and enforceable speed limits (e.g. 10mph. on unmade routes);*
- *evenly loading vehicles to avoid spillages;*

- *regular application of water, whether by bowser or by fixed sprays, in dry conditions;*
- *use paved roads where practicable, ensure mobile plant has upward directing exhausts and radiator fan shields;*
- *minimise handling and reduce drop heights;*
- *dampen material, for example, wetting down of rock stockpiles prior to crushing operation;*
- *maintain good standards of all plant and equipment;*
- *control and restrict the duration of the site activities where practicable;*
- *storing material under cover, and protecting material from wind;*
- *dampen material using sprays, mists, microfoam or foam; and*
- *vegetate exposed surfaces, e.g. overburden mounds, with quick growing plants”*

6.8. Residual Impact Assessment

6.8.1. The methods outlined within this report have been considered effective at reducing the magnitude of dust and traffic emissions, and therefore, **no significant residual effects** are expected.

6.9. Cumulative Effects

6.9.1. Activities associated with Phases 2/3 of the Tylorstown Landslip Slip project are likely to coincide with the proposed Phase 4 works. Emergency works are currently being undertaken to remove material that slipped into the river and transport it to receptor sites along the Afon Rhonda Fach. This aspect of the works is expected to be finalised prior to Phase 4 works commencing in 2022. However, further works to create permanent landforms and landscaping at Receptor Sites A and B will be required and could be concurrent with Phase 4 works. These works do not directly interact with the assessment areas but are just adjacent to the Red Line Boundary. It is therefore considered that no cumulative effects on air quality receptors will arise as a result. It is assumed that the magnitude of dust emissions from construction of other developments in the area will be reduced by appropriate measures as set out within their respective environmental management controls, and therefore, no cumulative effects for air quality are expected.

6.10. Summary

6.10.1. The mineral dust assessment indicated that impacts to human health from the Proposed Scheme are not anticipated to be significant due to the low background PM₁₀ concentrations in the area. Due to the low dust impact risk, the Proposed Scheme is deemed to have an insignificant effect to human health and therefore basic good practice mitigation measures have been suggested to minimise dust impacts as much as possible.

7. Cultural Heritage

7.1. Introduction

- 7.1.1. The purpose of this chapter is to assess the potential impacts of the Proposed Scheme on the historic environment. The chapter employs a 250m (radius) study area centred on the Red Line Boundary (RLB) of the Proposed Scheme for all existing information pertaining to the historic environment. The RLB of the Proposed Scheme, which has a total area of 31ha, lies within The Rhondda (HLW(MGI)5) Landscape of Special Historic Interest and is therefore subject to an Assessment of the Significance of the Impact of the Development on the Historic Landscape (ASIDOHL2).
- 7.1.2. All heritage assets within this study area have been assessed for potential direct and indirect (visual) impacts. The ASIDOHL2 considers the potential impacts on the setting and significance of statutory designated sites and Historic Landscape Character Areas (HLCAs) within the Registered Historic Landscape. Zone of Theoretical Visibility (ZTV) Analysis, using viewpoints sited around the red line of the Proposed Scheme, has been conducted to identify any potentially affected sites in the wider landscape outside the Registered Historic Landscape (to the east).

7.2. Legislation and Policy

- 7.2.1. **Planning Policy Wales (PPW 11th Edition¹⁹)** sets out the land use planning policies of the Welsh Government. Chapter 6 sets out the Welsh Government's policy towards the historic environment. It states *"The planning system must take into account the Welsh Government's objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being of present and future generations. The historic environment is a finite, non-renewable and shared resource and a vital and integral part of the historical and cultural identity of Wales. It contributes to economic vitality and culture, civic pride, local distinctiveness and the quality of Welsh life. The historic environment can only be maintained as a resource for future generations if the individual historic assets are protected and conserved. Cadw's published Conservation Principles highlights the need to base decisions on an understanding of the impact a proposal may have on the significance of an historic asset."*
- 7.2.2. Underpinning PPW are a series of legislative powers and TANs. The Planning (Wales) Act 2015 sets out a series of legislative changes to deliver reform of the planning system in Wales, to ensure that it is fair, resilient and enables Development. The 2015 Act also introduces a mandatory requirement to undertake pre-application consultation for certain types of Development. The Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016 defines in Schedule 4(I) the parameters and definitions for the requirement of pre-application consultation by Welsh Ministers, particularly in response to the effect of statutory designated monuments, buildings, and parks and gardens.
- 7.2.3. Advice on archaeology and buildings in the planning process is contained in Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology and Welsh Office

¹⁹ Welsh Government (2021); Planning Policy Wales - Edition 11.

Circular 1/98 Planning and the Historic Environment, which updates Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas following the Shimizu (U.K.) Ltd. v. Westminster City Council Judgement (February 1997). Detailed advice on Environmental Impact Assessment is contained within Welsh Office Circular 11/99 Environmental Impact Assessment.

- 7.2.4. Any works affecting an ancient monument and its setting are protected through implementation of the Ancient Monument and Archaeological Areas Act 1979. In Wales, the 1979 Act has been strengthened by The Historic Environment (Wales) Act 2016. The 2016 Act makes important improvements for the protection and management of the Welsh historic environment. It also stands at the centre of an integrated package of secondary legislation (Annexes 1-6), new and updated planning policy and advice, and best-practice guidance on a wide range of topics (TAN 24 Historic Environment). Taken together, these will support and promote the careful management of change in the historic environment in accordance with current conservation philosophy and practice. Following adoption of the TAN 24 Historic Environment on 31st May 2017, Welsh Office Circulars 60/96 Planning and the Historic Environment: Archaeology; 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas; and 1/98 Planning and the Historic Environment have been cancelled.
- 7.2.5. The Ancient Monument and Archaeological Areas Act 1979 and The Historic Environment (Wales) Act 2016 sets out a presumption in favour of preservation in-situ concerning sites and monuments of national importance (scheduled/listed), and there exists in the current Planning Policy Wales (Chapter 6) a presumption in favour of preservation in-situ of all types of heritage assets.
- 7.2.6. Cadw are the Welsh Government body responsible for determining applications for Scheduled Monument Consent (SMC) and is a statutory consultee for certain types of Developments affecting Scheduled Ancient Monuments, World Heritage Sites and Registered Historic Parks, Gardens and Landscapes, Strategic Environmental Assessments and scoping opinions for Environmental Impact Assessments (PPW 2021). Cadw published their Conservation Principles for the sustainable management of the historic environment in Wales in 2011. These principles provide the basis upon which Cadw discharges its statutory duties, makes decisions or offers advice about changes to historic assets. Cadw further advise that the Conservation Principles should also be used by others (including owners, developers and other public bodies) to assess the potential impacts of a Development proposal on the significance of any historic asset/assets and to assist in decision-making where the historic environment is affected by the planning process (PPW 2021).
- 7.2.7. Important or historic hedgerows (and boundaries) are protected under The Environment Act 1995 (section 95). The Hedgerow Regulations 1997 (under the 1995 Act) provides protection and guidance for those development/agricultural activities outside of planning. The regulations permit the removal of any hedgerow (including any length of hedgerow) for *'carrying out Development for which planning permission has been granted'* provided the loss of the hedgerow has been properly assessed against the benefits of the proposed Development.
- 7.2.8. Following review in 1998, a simplified set of assessment criteria was proposed where all substantially complete boundaries (hedgerows) that predate 1845 were to be afforded consideration/protection. The Environment, Transport and Regional Affairs Committee's Report 'The Protection of Field Boundaries' 1999 was acknowledged by Government, but no amendments were made to the 1997 regulations. Judicial Review of the application in 2002

of the regulations (Flintshire County Council v NAW and Mr J T Morris) has clarified the interpretation of some of the criteria (see The Hedgerow Regulations 1997, Schedule 1, Part 2 Archaeology and History and Section below).

7.3. Assessment Methodology

Heritage Impact Assessment

7.3.1. The purpose of a desk-based assessment as set out by the *Chartered Institute for Archaeologists* (2014, revised 2020) is to gain an understanding of the historic environment resource in order to formulate as required:

- an assessment of the potential for heritage assets to survive within the Area of Study;
- an assessment of the significance of the known or predicted heritage assets considering, their archaeological, historic, architectural and artistic interests;
- strategies for further evaluation whether or not intrusive, where the nature, extent or significance of the resource is not sufficiently well defined;
- an assessment of the impact of proposed Development or other land use changes on the significance of the heritage assets and their settings;
- strategies to conserve the significance of heritage assets, and their settings;
- design strategies to ensure new Development makes a positive contribution to the character and local distinctiveness of the historic environment and local place-shaping; and
- proposals for further archaeological investigation within a programme of research, whether undertaken in response to a threat or not.

7.3.2. In addition to the above, the objectives of desk-based assessment are:

- an assessment of available information to determine the extent and character of heritage assets, in local, regional and national contexts;
- an assessment of the significance of heritage assets considering all of the cultural heritage values that people associate with it, or which prompt them to respond to it;
- an assessment of impact (physical or visual) on heritage assets and their setting;
- the careful consideration and presentation of mitigation recommendations aimed at reducing the impact of the Development on heritage assets and their setting; and
- finally, the presentation of this information in a written report and the preparation and deposition of an archive of data generated by the assessment in line with professional standards.

Methodology: Assessing the Value of Cultural Heritage Assets

- 7.3.3. Cultural heritage assets are categorised according to the only values that are nationally agreed in the Department of Transport/Welsh Office/Scottish Office Design Manual for Roads and Bridges. Formerly Vol. 11 Section 3 Part 2 (HA 208/07 Cultural Heritage) 2007, amended 2009 (DMRB 2007), as amended January 2020 LA 106 Revision 1. A cultural heritage asset is an individual archaeological site or building, a monument or group of monuments, an historic building or group of buildings, an historic landscape etc., which, together with its setting, can be considered as a unit for assessment.
- 7.3.4. The assessment of the historic environment includes the interrogation of a number of sources (but not limited to):
- statutory designated monuments, buildings and landscapes (including conservation Areas, parks, gardens and battlefields);
 - Regional Historic Environment Record (HER);
 - National Monuments Record (NMR);
 - aerial photographic archives;
 - local and national archives; and
 - cartographic and documentary sources.
- 7.3.5. Information on statutory designated sites (World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Conservation Areas, Registered Landscapes, Battlefields, Parks and Gardens) was obtained from Cadw (Received 30/11/20) and accessed through Cof Cymru - National Historic Assets of Wales (a Welsh Government online mapping resource). Information recorded on the Regional Historic Environment Record (Received 02/12/20) and National Monuments Record (NMR Enquiry no. RC20-0639. Received 30/11/20) were assessed as was collections of aerial photographs held by the Central Register of Air Photography for Wales (Received 25/11/20; Full list available in Volume 3, Appendix 7.1). Cartographic Archives held by The National Library of Wales and photographic archives held by Rhondda Cynon Taf Library were also consulted. Due to Covid-19, all archives were closed to the public making the usual physical research impossible however digital online collections were utilised and proved very informative.
- 7.3.6. The assessment reviewed the existing information pertaining to the Historic Environment based on a primary 250m (radius) study area centred on NGR ST 01510 96174. A selection of statutory designated sites was assessed outside the study area (up to 1km radius) for the impact to their setting (see Volume 2: V2-S07-0001).
- 7.3.7. A walkover survey was undertaken on Monday 7th December 2020. The weather was initially foggy but cleared up to be generally clear; overcast with outbreaks of oblique winter sunlight. Heritage assets within the primary 250m (radius) study area and designated sites within a 1km (radius) study area were visited and assessed for direct and/ or indirect (visual) effects of the Proposed Scheme and key views to and from the proposed site were photographed. Historic Landscape Character Areas were visited and were assessed for potential direct and/ or indirect (visual) effects of the Proposed Scheme and key views to and from the Proposed Scheme were photographed.
- 7.3.8. Important or historic hedgerows were assessed according to current legislation that details the following criteria:

- the hedgerow marks the boundary, or part of the boundary, of at least one historic parish or township; and for this purpose, “historic” means existing before 1850;
- the hedgerow incorporates an archaeological feature which is (a) included in the schedule of monuments compiled by the Secretary of State under Section 1 (schedule of monuments) of the Ancient Monuments and Archaeological Areas Act 1979(7); or (b) recorded at the relevant date in a Historic Environment Record;
- the hedgerow (a) is situated wholly or partly within an archaeological site included or recorded as mentioned in paragraph 2 or on land adjacent to and associated with such a site; and (b) is associated with any monument or feature on that site;
- the hedgerow (a) marks the boundary of a pre-1600AD estate or manor recorded at the relevant date in a Historic Environment Record or in a document held at that date at a Record Office; or (b) is visibly related to any building or other feature of such an estate or manor;
- the hedgerow (a) is recorded in a document held at the relevant date at a Record Office as an integral part of a field system pre-dating the Enclosure Acts; or (b) is part of, or visibly related to, any building or other feature associated with such a system, and that system (i) is substantially complete; or (ii) is of a pattern which is recorded in a document prepared before the relevant date by a local planning authority, within the meaning of the 1990 Act, for the purposes of Development control within the authority’s Area, as a key landscape characteristic; and
- There are other criteria relating to rights of way and ecology.

7.3.9. Understanding value is subjective beyond any statutory or registered designation and is based on the professional experience and knowledge of the assessor. Other factors do contribute to the overall assessment of value (and significance) of heritage assets and the assessment criteria below contributes to an overall robust assessment framework.

Table 7.1. Factors for assessing the value of heritage assets (after Table 5.1 DMRB 2019/2020).

Value			Criteria
A*	Very High	International/National	World Heritage Sites (including nominated sites). Assets of acknowledged international importance. Assets that can contribute significantly to acknowledged international research objectives.
A	High	National	Scheduled Monuments (including proposed sites). Undesignated assets of schedulable quality and importance. Assets that can contribute significantly to acknowledged national research objectives.
B	Medium	Regional	Designated or undesignated assets that contribute to regional research objectives.
C	Low	Local	Designated and undesignated assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with potential to contribute to local research objectives.
D	Negligible	Local	Assets with very little or no surviving archaeological interest.
U	Unknown	Unknown	The importance of the resource has not been ascertained.

Table 7.2. Significance of adverse effect to heritage assets (matrix).

Adverse Effect	Category					
	A*	A	B	C	D	U
Very High	Major	Major	Major	Moderate	Moderate	Unknown
High	Major	Major	Major	Moderate	Moderate	Unknown
Moderate	Major	Major	Moderate	Moderate	Slight	Unknown
Slight	Major	Moderate	Moderate	Slight	Slight	Unknown
None	None	None	None	None	None	None

7.3.10. The criteria below is adapted from notes made in Annex 2 of the DMRB Vol. 11 Section 3 Part 2 (HA 208/07 Cultural Heritage) 2007 (amended 2009 (DMRB 2007), as amended January 2020 LA 106 Revision 1) that refer to the Scheduling Criteria as set out by the Ancient Monument and Archaeological Areas Act 1979 and The Historic Environment (Wales) Act 2016 and finally Stage 4 Evaluating Relative Importance as set out in ASIDOHL2, Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (2nd Edition 2007). While comprehensive, the criteria should not be regarded as definitive, rather they are indicators which contribute to a wider judgement based on the professional experience of the assessor and the circumstance and context of the assessment and heritage asset. An ASIDOHL2 is a staged approach to assessing the significance of impact to historic landscapes (and constituent character Areas) as characterised in the Register of Landscapes of Outstanding Historic Interest in Wales (Pt 2.1, 1998) and Register of Landscapes of Special Historic Interest in Wales (Pt 2.2, 2001) to the method set out in the Guide to Good Practice on Using the register of Landscapes of Historic Interest in Wales in the Planning and Development Process (revised 2nd Edition 2007).

7.3.11. **Rarity:** there are some monument categories, which in certain periods are so scarce that all surviving examples which still retain some archaeological potential should be preserved. This should be assessed in relation to what survives today, since elements of a once common type may now be rare.

- Very high: sole survivor of its type;
- High: very few sites of this type are known;
- Medium: the site is not unusual but cannot be considered common; and
- Low: the site is quite common.

7.3.12. **Documentation and association:** the significance of a heritage asset may be enhanced by the existence of records of previous investigations or, in the case of more recent monuments, by the supporting evidence of contemporary written records. Furthermore, any important historical associations relating to the heritage asset, such as institutions, cultural figures, movements or events, will enhance value. The survival of documentation and/or

historic association that increases our understanding of a heritage asset will raise its importance, though this is difficult to quantify owing to the extremely varied nature of documentary and historical material. Therefore, a professional judgment is given based on the actual amount or importance of evidence and its academic value.

- Very High: a highly significant, authentic and nationally well-known association(s) and/or complete documentary record, or exceptionally important sources available;
- High: a significant, authentic and regionally well-known association(s) and/or considerable quantity of relevant material, or highly important sources available;
- Moderate: an authentic, but less significant, perhaps locally well-known association(s) and/or some relevant material, or moderately important sources available;
- Low: unauthenticated or a little-known association(s) and/or little relevant material, or only modestly important sources available; and
- None: no known associations and/or relevant material available.

7.3.13. **Group Value:** relates to the diversity (or similarity) of elements including their structural and functional coherence. The value of a single monument (such as a field system) may be greatly enhanced by its association with related contemporary monuments (such as a settlement and cemetery) or with monuments of different periods.

- Very high: largely complete interconnected complex of heritage assets or landscapes (e.g. UNESCO World Heritage Site);
- High: significant survival of an interconnected complex of heritage assets;
- Moderate: some surviving elements of an interconnected complex of heritage assets; some disintegration has occurred; and
- Low: single or unconnected/unrelated groups of heritage assets.

7.3.14. **Survival/Condition:** the survival of a monument's archaeological potential both above and below ground is a particularly important consideration and should be assessed in relation to its present condition and surviving features. The Historic Environment Records (HERs) of the four Welsh Archaeological Trusts note the condition of sites according to the following criteria:

- Intact: the site is intact;
- Near intact: the site is nearly intact;
- Damaged: the site has been moderately damaged;
- Near destroyed: the site has nearly been destroyed;
- Destroyed: the site has been destroyed;
- Restored: the site has been restored;
- Moved: the site has been moved (usually finds); and
- Not known: the condition of the site is not known.

7.3.15. To these criteria, the following assessment can be applied

- Very Good: elements surviving in very good condition for their class;
- Good: elements surviving in good or above average condition for their class;
- Moderate: elements surviving in moderate or average condition for their class;
- Fair: elements surviving in fair or below average condition for their class; and
- Poor: elements surviving in poor condition for their class.

Methodology: Assessing Potential Effects to Cultural Heritage Assets

Direct Effects

- 7.3.16. Direct Effects are outcomes resulting from an assessment of the impact of the proposed development on the heritage asset or landscape. The direct effect of a course of action (e.g. development) can only be assessed once the assessment criteria above has been completed and potential outcomes fully understood (as far as any development proposal or construction design is reasonably understood). The direct effect of the proposed Development on heritage assets has been assessed using the following criteria:
- Very High: total loss of the integrity of the heritage asset(s).
 - High: significant loss of integrity to the heritage asset(s), significant reduction of group and rarity values.
 - Moderate: some loss of integrity to heritage asset(s) and reduction in value.
 - Slight: slight loss of integrity to heritage asset(s) and value.
 - None: no perceived or identified effect, or loss in value.
 - Beneficial: Development will protect, preserve, or enhance the heritage asset resulting in an increase in value.
- 7.3.17. The Magnitude of Direct Effects are outcomes resulting from an assessment of the impact of the Proposed Scheme on the heritage asset or landscape. The direct effect of a course of action (e.g. development) can only be assessed once the assessment criteria above has been completed and potential outcomes fully understood (as far as any development proposal or construction design is reasonably understood).

Indirect (Visual) Effects

- 7.3.18. Assessing Indirect Effects (visual) to heritage assets is intrinsically linked to setting and significance (see below). The criteria below are adapted from standard EIA evaluation criteria and Stage 3 Assessment of Indirect Impacts of Development as set out in ASIDOHL2, Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (2nd Edition 2007). Assessment is confined to sites of International, National and in some cases Regional value.
- Very severe: the key views and/or essential lines of sight to and from the heritage asset are dominated or obscured by the Development resulting in severance of cultural heritage links;
 - Severe: the key views and/or essential lines of sight to and from the heritage asset are interrupted by the Development resulting in partial severance of cultural heritage links;

- Considerable: the key views and/or essential lines of sight to and from the heritage asset are significantly visible resulting in limited severance of cultural heritage links;
- Moderate: the key views and/or essential lines of sight to and from the heritage asset are visible resulting in some severance of cultural heritage links;
- Slight: the key views and/or essential lines of sight to and from the heritage asset are noticeable resulting in diminished cultural heritage links;
- Very slight: the key views and/or essential lines of sight to and from the heritage asset are noticeable resulting in little discernible severance of cultural heritage links; and
- None: the key views and/or essential lines of sight to and from the heritage asset are not noticeable resulting in no severance of cultural heritage links.

Setting and Significance

- 7.3.19. The Setting of Historic Assets in Wales 2017 (The Historic Environment (Wales) Act 2016, Annex 6) explains what setting is, how it contributes to the significance of a historic asset and why it is important. It also outlines the principles used to assess the potential impact of Development or land management proposals on the settings of World Heritage Sites, ancient monuments (scheduled and unscheduled), Listed Buildings, registered historic landscapes, parks and gardens, and conservation areas. These principles, however, are equally applicable to all individual historic assets, irrespective of their designation.
- 7.3.20. Certain major developments require pre-application consultation with the local planning authority and, where specialist advice is required, the Welsh Ministers through Cadw. Any Development likely to directly or indirectly (visual) effect a statutory designated heritage asset or high value undesignated heritage asset and its setting will likely require 'consultation before grant of permission' under the Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016, schedule 4 (I)(i) and (ii) if the Proposed Scheme meets any of the following criteria:
- development likely to affect the site of a registered historic park or garden or its setting;
 - development is within a registered historic landscape that requires an Environmental Impact Assessment and ASIDOHL2;
 - development likely to have an impact on the outstanding universal value of a World Heritage Site;
 - development is within 0.5km from any point of the perimeter of a Scheduled Monument;
 - development is within 1km from the perimeter of a Scheduled Monument and is 15m or more in height or has an Area of 0.2ha or more;
 - development is within 2km from the perimeter of a Scheduled Monument and is 50m or more in height or has an Area of 0.5ha or more;
 - development is within 3km from the perimeter of a Scheduled Monument and is 75m or more in height, or has an Area of 1ha or more; and

- development is within 5km from the perimeter of a Scheduled Monument and is 100m or more in height or has an Area of 1ha or more.
- 7.3.21. An assessment of the impact of the Proposed Scheme on the setting of the statutory designated heritage asset or high value undesignated heritage asset will be required if any of the criteria in paragraph 7.3.20 above are met. The assessment of the setting of heritage assets follows the four-stage approach detailed in the Setting of Historic Assets in Wales 2017 (The Historic Environment (Wales) Act 2016, Annex 6):
- Stage 1: Identify the historic assets that might be affected by a proposed change or development and their significance;
 - Stage 2: Define and analyse the settings to understand how they contribute to the ways in which the historic assets are understood, appreciated and experienced;
 - Stage 3: Evaluate the potential impact of a proposed change or Development on those settings; and
 - Stage 4: Consider options to mitigate the potential impact of a proposed change or Development on those settings.
- 7.3.22. The assessment of significance is intrinsically linked to the setting (see paragraphs 7.3.19 to 7.3.20 above) and value (see criteria in paragraph 7.3.13 above) of a heritage asset/registered landscape, park and garden.
- 7.3.23. The significance of an historic asset embraces all of the cultural heritage values that people associate with it, or which prompt them to respond to it. These values tend to grow in strength and complexity over time, as understanding deepens and people's perceptions evolve (Conservation Principles for the sustainable management of the historic environment in Wales 2011, p10).
- 7.3.24. There are four values that need to be considered when assessing significance and these are set out in Cadw's Conservation Principles for the sustainable management of the historic environment in Wales:
- **Evidential value:** relates to those elements of a heritage asset that can provide evidence about past human activity, including its physical remains or historic fabric. These may be visible and relatively easy to assess, or they may be buried below ground, under water or be hidden by later fabric. These remains provide the primary evidence for when and how a heritage asset was made or built, what it was used for and how it has changed over time. The unrecorded loss of historic fabric represents the destruction of the primary evidence. Additional evidential values can be gained from documentary sources, pictorial records and archaeological archives or museum collections. To assess the significance of this aspect of an asset, all this evidence needs to be gathered in a systematic way and any gaps in the evidence identified.
 - **Historical value:** a heritage asset might illustrate a particular aspect of past life or it might be associated with a notable family, person, event or movement. These illustrative or associative values of a heritage asset may be less tangible than its evidential value but will often connect past people, events and aspects of life with the present. The functions of a heritage asset are likely to change over time and so the full range of changing historical values might not become clear until all the evidential values have been collated. Historical values are not so

easily diminished by change as evidential values and are harmed only to the extent that adaptation has obliterated them or concealed them.

- **Aesthetic value:** relates to the way in which people draw sensory and intellectual stimulation from a heritage asset. This might include the form of a heritage asset, its external appearance and how it lies within its setting. It can be the result of conscious design or it might be a seemingly fortuitous outcome of the way in which a heritage asset has evolved and been used over time, or it may be a combination of both. The form of an asset normally changes over time. Sometimes earlier pictorial records and written descriptions will be more powerful in many people's minds than what survives today. Some important viewpoints may be lost or screened, or access to them may be temporarily denied. To assess this aspect of an asset, again the evidence of the present and past form must be gathered systematically. This needs to be complemented by a thorough appreciation on site of the external appearance of an asset in its setting. Inevitably understanding the aesthetic value of a heritage asset will be more subjective than the study of its evidential and historical values. Much of it will involve trying to express the aesthetic qualities or the relative value of different parts of its form or design. It is important to seek the views of others with a knowledge and appreciation of the heritage asset on what they consider to be the significant aesthetic values.
- **Communal value:** relates to the meanings that a heritage asset has for the people who relate to it, or for whom it figures in their collective experience or memory. It is closely linked to historical and aesthetic values but tends to have additional or specific aspects. Communal value might be commemorative or symbolic. For example, people might draw part of their identity or collective memory from a heritage asset or have emotional links to it. Such values often change over time and they may be important for remembering both positive and uncomfortable events, attitudes, or periods in Wales's history. Heritage assets can also have social value, acting as a source of social interaction, distinctiveness or coherence; economic value, providing a valuable source of income or employment; or they may have spiritual value, emanating from religious beliefs or modern perceptions of the spirit of a place.

7.3.25. The first stage of assessing significance is by understanding the value of the heritage asset by carefully considering its history, fabric and character and then comparing these values with other similarly designated or types of heritage asset locally, regionally or if necessary, nationally. The outcome of this process is a Statement of Significance, which is partly a subjective exercise based on the assessor's experience and knowledge.

Methodology: Assessment of the Significance of the Impact of the Development on the Historic Landscape (ASIDOHL2)

7.3.26. Cadw, and the Countryside Council for Wales (now Natural Resources Wales) with support from the four regional Welsh Archaeological Trusts (WATs), published together with the International Council on Monuments and Sites (ICOMOS UK) the first part (2.1) of the Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales²⁰. Part 1

²⁰ Cadw/CCW/ICOMOS (1998); Register of Landscapes of Outstanding Historic Interest in Wales.

deals with Registered Parks and Gardens, Part 2.1: Landscapes of Outstanding Historic Interest and Part 2.2: regional Landscapes of Special Historic Interest.

7.3.27. Cadw note “...*the Register is a means of recognising historic landscapes as one of the nation’s most valuable cultural assets, and as special, often fragile and irreplaceable, parts of our heritage*”. The Historic Environment (Wales) Act 2016 provides a statutory duty to maintain the registers and the registers are key factors in the planning process. Any development likely to directly or indirectly (visual) effect a statutory designated heritage asset or high value undesignated heritage asset and its setting will likely require ‘*consultation before grant of permission*’ under the Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016, schedule 4 (l)(i) and (ii) if the proposed development meets any of the following criteria:

- development likely to affect the site of a registered historic park or garden or its setting; and
- development is within a registered historic landscape that requires an Environmental Impact Assessment and ASIDOHL2.

7.3.28. Cadw then implemented an ambitious programme of Historic Landscape Characterisation in the early 2000s, which was undertaken by the four regional Welsh Archaeological Trusts (WATs), which further refined the definitions and character of the constituent parts of the individual historic landscapes. Each historic landscape area being sub-divided into a number of Historic Landscape Character Areas (HLCAs). These HLCAs provide the units for ASIDOHL2 assessment.

7.3.29. At a national level an all-Wales Landscape Characterisation Assessment, LANDMAP, was completed in 2012 by Natural Resources Wales and resulted in five datasets or ‘aspects’; Geological Landscape, Landscape Habitat, Visual and Sensory, Historic Landscape and Cultural Landscape. The Historic Landscape aspect, which compliments the work already carried out by GGAT, assessed landscape areas based on a hierarchy of four levels with the main LANDMAP Historic Landscape Aspect Areas being equal to a Level 3 assessment and the Registered Historic Landscape Characterisation being equal to a Level 4 as outlined in the table below. These LANDMAP areas are not considered further in this chapter but are discussed in the Landscape Chapter (Chapter 8) below.

Table 7.3 LANDMAP Historic Landscape classification hierarchy (Natural Resources Wales 2016, 4).

Level 1	Level 2	Level 3	Level 4
Dominant context	Dominant land use	Dominant landscape pattern	Historic landscape detail
At the most basic Level, in terms of human influence, the modern landscape can be divided between rural and built up areas.	At Level 2 the dominant land use in the modern landscape is defined. In the rural environment, this is either agricultural or non-agricultural. In the built environment, it is a choice between settlement, industrial or infrastructure.	At Level 3, the dominant visual pattern in the landscape, which has been created by the land use class identified in Level 2, should be selected. It is at Levels 3 and 4 that the physical remains in the landscape relating to past activities are actually defined and mapped.	The patterns in the landscape at Level 3 are further defined at Level 4 which is a finer grain, sometimes even site-specific, usually reflecting a specific historic activity in either space or time (or usually both). [e.g. Registered Historic Landscape Characterisation]

- 7.3.30. The method for conducting an ASIDOHL2 assessment is set out by Cadw in ASIDOHL2 Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (2nd Edition 2007). The assessment utilises the HLCAs as a basic unit of measurement, which can be variable as each HLCA may not be entirely representative of the wider historic landscape character and value (e.g. an agricultural character area forming part of an industrial historic landscape). Nevertheless, the HLCAs contribute to the value of the wider historic landscape in ASIDOHL2 terms. The ASIDOHL2 assessment is broken into five stages. Stage 1 is the compilation of contextual data, usually in the form of baseline information for an archaeological desk-based assessment. Stages 2-4 assesses each HLCA for direct and indirect effects by the proposed development and Stage 5 combines the results of Stages 2-4 to produce an assessment of the overall impact on the Historic Landscape (Cadw 2007, Table 1, 15).
- 7.3.31. Heritage assets are categorised according to the only values that are nationally agreed in the Department of Transport/Welsh Office/Scottish Office Design Manual for Roads and Bridges Vol. 11 Section 3 Part 2 (HA 208/07 Cultural Heritage) 2007, amended 2009 (DMRB 2007), as amended January 2020 (see Table 7.1 above). Cadw published their Conservation Principles for the sustainable management of the historic environment in Wales in 2011. These principles provide the basis upon which Cadw discharges its statutory duties, makes decisions or offers advice about changes to historic assets. Cadw further advise that the Conservation Principles should also be used by others (including owners, developers and other public bodies) to assess the potential impacts of a development proposal on the significance of any historic asset/assets and to assist in decision-making where the historic environment is affected by the planning process (PPW 2021).
- 7.3.32. There are four values that need to be considered when assessing significance and these are set out in Cadw's Conservation Principles for the sustainable management of the historic environment in Wales: Evidential value; Historical value; Aesthetic value and Communal value. These values are outlined above.

7.4. Baseline Conditions

Location, Topography & Geology (Volume 2: V2-S07-0001-0004)

- 7.4.1. The Proposed Scheme is located within the South Wales Coalfield on the steep eastern slope of the Rhondda Fach valley. The Red Line Boundary (RLB) extends up onto the ridge of Cefn Gwyngul, which forms the topographical and administrative boundary between the Rhondda and the Cynon valleys and has a maximum height of 470mOD at Carn-y-Pigwyn to the north-west of the Proposed Scheme. The RH02 'Old Smokey' Tip (TT05) is approximately 40m in height above the surrounding natural topography and provides a distinctive landmark to the surrounding Rhondda Fach valley landscape (Volume 2: V2-S07-0001-0004).
- 7.4.2. The underlying geology comprises Brithdir Member sandstone (Pennant sandstone) with bands of Rhondda member mudstone, siltstone and sandstone. These deposits date to the Carboniferous period (308-315 million years ago) and are indicative of a local environment previously dominated by rivers²¹. Seams of coal are preserved in thin layers within these deposits and trial coal levels recorded on historic mapping indicate extractive activity in the study area. Soils are free draining acid loamy soils on the valley slope with very acid loamy upland soils with a wet peaty surface on the ridge²². Vegetation comprises bracken and rough grassland with some areas of upland heath.

Registered Historic Landscapes, Parks & Gardens (Volume 2:V2-S07-0001-0003)

- 7.4.3. The Proposed Scheme lies within The Rhondda Historic Landscape of Special Historic Interest (HLW(MGI)5). Cadw and ICOMOS (2001)²³ state in the Register that:
- “The Rhondda, comprising the valleys of the Rhondda Fawr and the Rhondda Fach in the Glamorgan uplands, contains one of the largest and best-known mining conurbations and coalfield communities in Britain. Although devoid of its former industrial base, the area retains intact its supporting infrastructure, and is the most important industrial and cultural landscape of its kind in Wales. The area includes communities of distinctive terraced housing, public and municipal buildings, Anglican churches, Nonconformist chapels, cemeteries, breweries, public houses, shops and schools, most retaining their original architectural characteristics; important and significant historic and continuing social, political, spiritual, educational and cultural associations.” (Cadw 2001, p58).*
- 7.4.4. A Historic Landscape Character Assessment, carried out by Gwent Glamorgan Archaeological Trust (GGAT) (Robertson 2001), produced a series of 36 Historic Landscape Character areas (HLCAs). These provide the units of assessment for the ASIDOHL2.
- 7.4.5. The RLB of the Proposed Scheme straddles two Historic Landscape Character Areas (HLCAs). The first is Rhondda Fach: Eastern Enclosed Valley Sides (HLCA023), which contains both RH01 Llanwonno Upper Tip (TT01) and RH02 'Old Smokey' Tip (TT05, GGAT 07879m) and is described as “*relict agricultural landscape to an extent modified by industrial*

21 British Geological Society. 2020. Geology of Britain Viewer. (Accessed 09/12/20). [Geology Of Britain 3D \(bgs.ac.uk\)](https://www.bgs.ac.uk/geology-of-britain-viewer/)

22 Cranfield University. 2020. Soilsclapes Viewer (www.landis.org.uk/soilsclapes) (Accessed 09/12/20).

23 Cadw/CCW/ICOMOS. 2001. Register of Landscapes of Special Historic Interest in Wales. Cadw.

development; distinctive field boundaries; documentary evidence of medieval/post-medieval agricultural practice and settlement; post-medieval upland settlement (longhouses); industrial landscape associated with mineral extraction, predominantly coal; ancient woodland and modern forestation” (Robertson 2001). The second is Rhondda Uplands (HLCA030), which contains the proposed Receptor Site and is described as “upland mountain sheepwalk, partially forested; multi-period and multi-functional landscape; prehistoric settlement and funerary landscape; early communication corridor; Roman and medieval military structures; early medieval administrative boundaries; medieval upland settlement; post-medieval industrial landscape; relict upland agricultural landscape; documentary and place name evidence” (ibid).

- 7.4.6. Six additional HLCAs were identified for potential indirect (visual) impacts and were included in the ASIDOHL2 assessment (Volume 2: V2-S07-0001 and 0002). The six additional HLCAs are Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020), Rhondda Fach: Western Enclosed Valley Sides (HLCA024). Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027). ‘Ynyshir’ (HLCA017) and ‘Porth’ (HLCA001) were considered for assessment but it was found that the streetscape and tree cover of these settlements blocked any potential indirect (visual) impact and as a result these HLCAs were eliminated from the ASIDOHL2. Likewise, ‘Ffaldau’ (HLCA022) was considered for assessment but was found to be too distant, and too oblique, for any visual impact. All other HLCAs were eliminated from the assessment as too distant and/or having no line of visibility.
- 7.4.7. No further Historic Landscapes were considered for assessment as they were considered too distant; the nearest being Merthyr Tydfil (HLW(MGI)2) located 6.5km to the north-east.
- 7.4.8. The study area does not include any Registered Parks & Gardens, the nearest being Aberfan (PGW(Gm)69(MER)) located 5.8km to the northeast, Ynysangharad Park (PGW(Gm)3) located 6.8km to the south-east and Aberdare Park (PGW(Gm)2) located 6.7km to the north/north-west.

Conservation Areas

- 7.4.9. The Conservation Area of Llanwonno (CA509) is located c.590m to the east of the Proposed Scheme and is described as *“a small and isolated conservation area situated entirely in the countryside far from any built-up areas. This conservation area contains two Listed Buildings: a church (LB81029) [and Grave of Guto Nyth Bran (LB81030)] and a pub dating from the 19th century”* (RCT 2011).

Scheduled Ancient Monuments and Listed Buildings (Volume 2: V2-S07-0004)

- 7.4.10. There are no Scheduled Ancient Monuments (SAMs) within the 250m (radius) study area, the nearest being Carn-y-Wiwer Cairnfield & Platform Houses (SAMGM323, NPRN307766, GGAT04575m, GGAT00581-2m) located 720m to the south/south-east which is included in the assessment for potential indirect (visual) effects.
- 7.4.11. All other identified SAMs were eliminated from the assessment as too distant and/or having no line of visibility with the proposed site. These SAMs include Carn-y-Pigwn Round Cairn (SAMGM372) located 914m to the north, Mynydd Ty’n-tyle Cairns (SAMGM574) located 1.68km to the west and Twyn y Bridallt Roman Camp (SAMGM259) located 1.7km to the north-west.

- 7.4.12. There are no Listed Buildings (LBs) within the primary 250m (radius) study area, however there are five Grade II Listed Buildings located within a secondary 1km (radius) study area. Church of St Gwynno (LB81029) and Grave of Guto Nyth Bran (LB81030) are located c.650m to the east, and Welfare Hall (LB18284, NPRN414737), Church of Our Lady Penrhys (LB17659, NPRN14064) and Penuel Calvinistic Methodist Chapel (LB17658) are located within the Registered Historic Landscape to the west. Further Grade II Listed Buildings located within the wider Registered Historic Landscape were eliminated from the assessment as too distant and/ or having no line of visibility with the Proposed Scheme site.

Archaeological and Historical Background

Prehistoric

- 7.4.13. Mesolithic findspots occur in upland locations throughout The Rhondda, and indeed the Glamorgan uplands. The stone tool distribution of flint microliths, often associated with charcoal, would suggest that the uplands appear to have been populated with isolated or temporary upland hunting camps by hunter-gatherer groups as part of a seasonal migration pattern between the coastal lowlands and the uplands (Lewis and Dunning 2003). Whilst there are no Mesolithic finds in the present study area there is a findspot on Cefn Gwyngul c. 1.5km north of the Proposed Scheme in the form of a quartzite macehead discovered in c.1952 (GGAT00539m). Further local findspots include Mesolithic blades at Craig Bedwyn (GGAT00879m) to the northwest and a flint assemblage at Craig Yr Aber near Maerdy that included flint cores, flakes and microliths (GGAT00947m) (GGAT 2000).
- 7.4.14. The Neolithic period (after 4500BC to before 2300BC) represents a vast economic and social upheaval in comparison to the preceding Mesolithic period. Societal changes occurred in funerary and ritual practices and megalithic monument building, the adoption of agriculture led to a more sedentary settlement pattern with stylistic changes in lithic tool production, including the widespread adoption of the stone axe in its many forms that presumably assisted in the largescale deforestation of the period. Evidence for Neolithic activity in the area is represented predominantly by findspots including a flint scraper at nearby Twyn-y-Brydallt (GGAT00542), flint arrowheads (e.g. GGAT01778m) and stone axes (e.g. GGAT00049m). A Neolithic hut settlement site was excavated at Cefn Glas on Mynydd Ystradffernol (GGAT01764m) in 1973 with the investigations uncovering a hut (or huts) structure featuring post holes, two hearths and associated lithics and charcoal that produced a date of 2160BC (Clayton & Savoury 1990). It is of note that there are no examples of Neolithic funerary monuments in the vicinity as these are concentrated on the more fertile lowlands to the south.
- 7.4.15. In contrast, the uplands of The Rhondda feature a significant number of Bronze Age burial cairns positioned along the crest of the upland ridges and overlooking the valleys below. The Bronze Age (after 2300 BC to before 700 BC) represents a period of social and technological change, with new forms of material culture and monumentality subtly different from the preceding Neolithic. The round barrow or cairn replaces the chambered tomb as the most common funerary monument in the landscape together with new pottery styles (Beaker), lithic technologies and the use of copper and bronze. Less than a kilometre to the north of the proposed Proposed Scheme lies Carn-y-Pigwn (SAMGM372, NPRN307753, GGAT00552m); described as “situated on the ridge top in moorland the cairn measures c.12m high with an Ordnance Survey trig point on the top” (Cadw 2020). Carn-y-Wiwer Cairnfield (SAMGM323, NPRN307766, GGAT04575m) lies a kilometre to the south-west of the Proposed Scheme and is described as “19 cairns lie in moorland on a ridge spread over

approximately one acre, are turf covered and range in size from 3m in diameter and 0.3m high and 6m in diameter and 0.5m high" (Cadw 2020). The cairns are found in association with two pairs of medieval house platforms and later plough marks. Further cairns survive on the opposite side of the Rhondda Fach valley at Mynydd Ty'n-tyle and at Tarren Maerdy. In addition, local findspots include a discovery at a hoard of two bronze socketed axes (GGAT00580m) at Wattstown and a further axe at Tarren Maerdy (GGAT01877m). Environmental evidence gained from excavations nearby at Crug yr Afan (SAMGm233, GGAT00722w) indicates that by the end of the Bronze Age the uplands had largely been cleared of woodland and replaced with heather moorland, resulting in the subsequent formation of a peaty palaeosoil overlying and obscuring the relict prehistoric, Roman and Early-medieval landscapes (Crampton 1967). It is considered possible that the intact marshland observed in the location of the proposed Receptor Site may have such archaeological potential.

- 7.4.16. The Iron Age (after AD700 to before AD43) marks another societal and economic change. The Silures tribe are recognised as a fierce and successful tribe inhabiting south-east Wales at this time. Iron production becomes the dominant material culture with a move to a more tribal hierarchical society, based on kingship, economic and military ties manifested (archaeologically) in large hillforts. There is no evidence of Iron Age activity in the Rhondda Fach valley, the nearest being a defended enclosure in St Gwynno Forest (GGAT08328m) to the east. Several notable examples do exist above the Rhondda Fawr valley including the Hen Dre'r Gelli iron age hut settlement (GGAT000478, 06101m) excavated in 1903-6 (Griffith 1906) which is believed to be *"the largest undefended Iron Age settlement site in south-east Wales"* (Robertson 2001) and an iron age hillfort at Maendy Camp (SAMGM099, GGAT00053m) excavated in 1901 (Williams 1902, Wiggins and Evans 2005).

Roman and Early medieval

- 7.4.17. The Roman invasion of Britain started in AD43 with around four legions and as many auxiliaries under General Aulus Plautius in southeast England. The conquest of Britain took over 40 years with the initial advance into lowland Britain stopping at the River Severn and legionary fortresses constructed at Gloucester (*Glevum*) in AD49-50, then Usk (*Burrium*) and Cardiff in the mid-50s to establish forward bases deep in Silurian territory. The historian Tacitus records the Second Augustus Legion (*Legio II Augusta*) being defeated in AD52 somewhere in the south Wales valleys by the Silures and losing at least two cohorts. During the AD60s Wales was relatively quiet with Governor Gaius Suetonius Paulinus rushing back from his subjugation of Anglesey to concentrate on the Iceni uprising. However, within 20 years the Silures and the rest of Wales were largely defeated. Consolidation of the conquest in south Wales is evidenced with the construction in around AD75 of a legionary fortress at Caerleon and forts, often at river crossings, at Loughor (*Leucarum*) and Neath (*Nidum*) and along strategic routes in the hinterland at Coelbren, Caerphilly, Gelligaer and Penydarren.
- 7.4.18. The Roman marching camp of Twyn y Brydallt (SAMGM259, GGAT00541m) is located along the upland ridge c.1.7km to the north-west of the Proposed Scheme. It is described as *"a roman marching camp of irregular shape and about 16 acres in area"* (GGAT HER) with *"well-preserved upstanding earthworks largely remaining on the northwest and northeast sides"* (Cadw 2000). The site *"encloses the summit of a prominent ridge and was built by a Roman army as a temporary base. The camp encloses an area of about 7.3ha and is defined by well-preserved sections of rampart and ditch. The enclosure is unusually irregular. Three entrances survive, all featuring internal claviculae (curving in-turned sections of rampart). Its unusual form and position suggest that this is the camp of an*

unsuccessful and worried army" (RCAHMW 1976b p99-101). The site, which may be linked to a possible Roman road to the north of the valley, represents an otherwise isolated Roman presence save for a small number of dispersed findspots.

- 7.4.19. With the departure of the Roman centralised government in around AD410 very little written record survives of the Rhondda area in the period between the 5th and 11th centuries A.D. Evidence for Early medieval activity is largely confined to placename evidence including Llanwonno originating from the early Christian saint St Gwynno whose church contains a fragment of early medieval cross (GGAT00544m) dated to 8th-9th century (Redknapp & Lewis 2007). On a wider scale, the Rhondda boasts a series of cross-ridge dykes that excavations have shown to date to the Early-medieval period (Lewis 2006, RCAHMW 1976c, Crampton 1966). These landscape features cross the ancient ridgeway routes of the Rhondda uplands and are believed to correspond with the administrative boundaries of the upland commotes and cantrefs (Robertston 2001). The nearest of these to the Proposed Scheme being Bedd Eiddil Dyke (SAMGM285, GGAT02266m), which crosses the Twyn Croes Cefyn-Ilechau-uchaf ffordd route that passes Twyn Y Bryddallt Roman camp (SAMGM259) and Castell Nos medieval ringwork (SAMGM408) (Lewis 2006) and is likely to continue south-eastwards along the ridge and past the Proposed Scheme.

Medieval

- 7.4.20. At the time of the Norman conquest of England, the Rhondda Valleys was part of the combined Kingdoms of Gwent, Gwynllŵg and Morgannwg, ruled at that time by Caradog ap Gruffydd (1075-81) and later Iestyn ap Gwrgan (1081-91), who's defeat to Robert Fitzhamon Lord of Gloucester in around 1093 essentially handed over the lowlands of Glamorgan to Norman control (RCAHMW 1991, 8-11). The uplands from Llantrisant to Brecon and in an arc across to the River Neath in the west and Rhymney Valley formed the Welsh commotal lordships of Blaenau Morgannwg, which remained independent until well into the 13th century when Earls Richard and his successor Gilbert II de Clare consolidated Norman control through the construction of a ring of forts.
- 7.4.21. Castell Nos (SAMGM408, GGAT00036m) is a medieval motte and bailey castle situated on the eastern bank of the Rhondda Fach River, which marked the western boundary of the Lordship of Meisign. Not far to the east lies the aforementioned Early-medieval routeway crossed by the Bedd Eiddil Dyke. RCAHMW describe Castell Nos as "*35m N-S by 12m E-W with no artificial defences to the E and S but bounded to the N and W with a modest ditch. Castell Nos is considered to be a medieval Welsh fortification, probably built by Maredudd ap Caradog of Meisgyn in the late 12th century*" (RCAHMW 1991, 146). Medieval ecclesiastical sites close to the Proposed Scheme include the parish church (LB81029, GGAT00547m) and holy well (GGAT00543m) of Llanwonno to the east. In addition, a medieval pilgrimage site belonging to the Cistercian abbey of Llantarnam lies on the opposite slopes of the valley at Penrhys consisting of grange, chapel, holy well and hostelry (GGAT00578m) and associated pilgrims' way (GGAT08702m).
- 7.4.22. Meanwhile, medieval domestic sites are represented by upland house platforms. Less than 1km to the south-east of the Proposed Scheme lies Carn-y-wiwer (SAMGM23), a site already mentioned above on account of its Bronze Age cairn cemetery, but which also represents a well-preserved example of medieval upland settlement in the form of two groups of paired house platforms that are post-dated by later ridge and furrow plough marks (RCAHMW 1982, 39). Insight into the nature of upland settlement is strengthened by the common occurrence of 'Hendre' and 'Hafod' place names that are indicative of a seasonal

use of common pasture. Meanwhile, 'Coed' place names are suggestive of areas of woodland. A 16th century account written by Leland describes the Rhondda as an area that produced "*barley, oats but little wheat*" (ibid).

Post-medieval

- 7.4.23. Early 19th century maps of The Rhondda illustrate a pre-industrial, agricultural landscape that was in great contrast to what was soon to follow. The archaeological evidence indicates a continuation of upland settlement with rural dwellings such as the three unit long house at Blaenllechau Farm (NPRN18051) and farmhouse at Cefyn-llechau-uchaf (NPRN18284, GGAT01534m) (RCAHMW 1988) as well as agricultural buildings such as (TT17) found close to Llanwonno Upper Tip (TT01). These sites are set in an increasingly enclosed agricultural landscape bounded by distinctive drystone walls, examples of which survive in close proximity to the Proposed Scheme. The 1842 Tithe apportionment and plan of the Parish of Llanwonno in the County of Glamorgan describes a 'sheepwalk' along the Cefn Gwygul ridge indicating the continuation of some common grazing.
- 7.4.24. The coal industry began in earnest in the Rhondda valley in the early 19th century when Walter Coffin sank his first pit at Dinas in 1811 (Rees 1975, 90; Robertson 2001). Prior to this, coal had been mined in shallow drifts or bell pits, mainly to produce coke for the iron industry. The 1842 tithe apportionment (See Volume 3, Appendix 7.2) indicates that Pendyrus Isha Farm, which encompasses much of the Proposed Scheme, was at this time owned by John Homfrey who is presumably of the Industrialist Homfrey family. This could be indicative of an early intention to exploit the coal seams in the Pennant Series of the Rhondda Fach eastern valley slope. The 1876 First Edition Ordnance Survey map illustrates a number of coal levels (TT11-TT13) in the study area which serves as further evidence of this activity. A significant growth in coal mining occurred in the early 19th century as a result of the huge demand for steam coal to power engines for industry and locomotion (Rees 1975, 88). The demand came from both home and abroad and the expansion of canal and railway systems allowed for the transport of coal to the Bute Docks in Cardiff. The Rhondda Fach branch of the Taff Vale Railway extended from Porth to Ferndale in 1856²⁴. The Rhondda soon found itself at the centre of an industry that had international significance (RCAHMW 1994) and the decision in the late 19th century for the Royal Navy to use "*superior Welsh 'smokeless' coal*" further increased demand.
- 7.4.25. The first shaft in the Rhondda Fach valley was sunk in 1857 at Blaenllechau by David Davis, which was later known as Ferndale No.1. Meanwhile Cynllwyn-Du Colliery was opened in 1858 by Thomas Wayne and was later renamed as Pontygwaith Colliery. Situated between the two, Pendyrus Colliery was opened in 1872 when the mineral rights were purchased by Alfred Tylor of Tylor's Colliery Company, after whom the colliery settlement of Tylorstown was named. Here steam coal was reached in 1876 after which time the colliery developed rapidly. Pendyrus Colliery was purchased by David Davis & Sons in 1894 and became known as Pits No.6 and No.7 of the Ferndale Colliery. Pontygwaith was also purchased by Davis in 1896 and became pit No.8 (Robertson 2001), which was sunk to a depth of 606

²⁴ Barrie, D.S.M. 1994. 'South Wales'. Volume VII of A Regional History of the Railways of Great Britain. David St John Thomas Publisher: Nairn

yards making it the deepest shaft in the Rhondda²⁵. Together these pits were known as the Tylorstown pits.

- 7.4.26. These collieries initially tipped their spoil on the bare ground surrounding the collieries themselves and along the Rhondda Fach riverbank, but they quickly ran out of space in their immediate surroundings (Volume 3, Appendix 7.3, Plates 1-3). As a solution tramways were constructed linking the Pendyrus and Pontygwaith sites and extending along the riverbanks and by 1919 an incline tramway (TT06) was constructed to carry tip material to a new location on top of Cefn Gwyngul (TT05) (Volume 3, Appendix 7.3, Plate 4). A further incline tramway (TT03) from Ferndale to the tip site was constructed by 1945 (Volume 3, Appendix 7.3, Plates 5-7) with further tips (TT01 & TT02) deposited on the valley side that remained largely intact until the recent Storm Dennis landslide. A consequence of this industrialisation was the considerable reduction of native woodland. This deforestation no doubt began as a result of demands for timber for charcoal making and ship building but was accelerated by the constant need for timber pit props in the expanding mines. In response, a large number of fir plantations were planted in the denuded upland landscape, many of which are maintained today including the Gwynno Forest north of the proposed Receptor site.
- 7.4.27. Pendyrus and Pontygwaith Collieries were both constructed within a dense woodland setting on the banks of the Rhondda Fach River and on the line of the new Rhondda Fach branch of the TVR. It is not until the 1900 2nd Edition Ordnance Survey map that we see the construction of the terraced pithead settlements of Tylorstown, Stanleytown and Pontygwaith. This is in contrast to Ferndale Colliery to the north which featured a 1st phase settlement (Davies 1968, Robertson 2001) that was already in place by 1876. Tylorstown featured a linear grid layout that included a church, vicarage, chapels and schools (ibid) and grew to include public buildings and Workers' Institutes, including Welfare Hall (LB18284, NPRN414737). Stanleytown is unique in the Rhondda for having a known date of construction; the group of eighty terraced houses was built in 1895 by the Stanley Building Club and architect T.R. Phillips of Pontypridd (Newman 1995, 113, 641; RCAHMW 1994, 148). The narrow topography of the Rhondda Fach valley meant that over time these settlements grew up its steep slopes, thereby overlooking the colliery below and creating the iconic valley terraces that epitomise the Welsh coal mining landscape.
- 7.4.28. In their heyday the Tylorstown Pits employed around 3000 men and boys. The demand for coal was unrelenting until the Naval fleet switched to oil in c.1915, followed by the Great Depression in the 1930s that saw the gradual closure of the iron, steel and tinsplate works on which the coal industry was so dependent (Rees 1975. 96). Tylorstown Pits No.6 & No.7 were closed in 1936 and the remainder in 1960. The last remaining pit in The Rhondda was at nearby Maerdy Colliery, which closed its doors in 1990. Today the majority of former colliery sites have been demolished and undergone a process of redevelopment; for instance, the site of Pendyrus Colliery in Tylorstown now features a leisure centre complex.

Previous Studies

- 7.4.29. In 2008 Govannon Consultancy carried out an archaeological desk-based assessment of the value and significance of the surviving coal tips of the Heads of the Valleys area, including the tips at Tylorstown, in order to provide guidance to local planning authorities regarding sites and features post under threat from development or disturbance. Tylor's

²⁵ RCAHMW (1994), 148; www.welshcoalmines.co.uk, accessed 18/01/20.

Newydd Tips (GGAT 07879m), which is the subject of the Proposed Scheme, was assessed as a Category A site on account of “*the variety of tips, for the remarkable landscape location and for the visual impact and visibility not only of the “Matterhorn” [RH02 ‘Old Smokey’ (TT05)] but also of the valley-side tips, and for their location within an identified Historic Landscape*” (Govannon Consultancy, 2008). The findings of this assessment have been refined in the present study through the georeferencing of historic map and aerial photograph data (Volume 2: V2-S07-0005).

Cartographic Evidence and Aerial Photographs (Volume 2: V2-S07-0001-0005, and Volume 3, Appendix 7.3, Plates 5-10)

- 7.4.30. The 1842 tithe map of the parish of Llanwonno shows that the study area sits within an upland agricultural landscape typical of the Rhondda area containing dispersed farmsteads such as nearby Blaenllechau Farm (NPRN18051) and ‘Pendyrri Isha’ and associated agricultural buildings (e.g. agricultural building TT17) set in enclosed pasture and braided with footpaths.
- 7.4.31. The 1876 First Edition Ordnance Survey map indicates that there is little change to the study area at this time although benchmarks and embankment symbols illustrated along the road north of the site (modern Blaenllechau Road) suggest that the transport route is cut and surfaced. A few trial coal levels are indicated on the hillslope. Pendyrri Colliery lies in the valley alongside the Taff Valley Railway – Rhondda Fach branch. The colliery is represented by an ‘engine house’ and two ‘shafts’ and a small number of ancillary buildings with modest spoil heaps in the immediate vicinity. There is very little associated workers’ housing which is focused further north at Ferndale.
- 7.4.32. The 1900 Second Edition Ordnance Survey map shows little change again within the study area; however, Pendyrri Colliery is greatly enlarged and a network of tramways along the Rhondda Fach River enable the establishment of spoil tips along its banks. The colliery town of Tylorstown has now been constructed. The Cynllwyn-Du Colliery further south has similarly developed and the two are linked by tramway.
- 7.4.33. The 1919 Third Edition Ordnance Survey map shows that the two collieries have since developed further and an incline tramway (TT06) has been installed from the Cynllwyn-Du Colliery to the brow of the hill and (into the study area) where a winding engine house (TT07) is also illustrated. The size of the resulting spoil tip (‘Old Smokey’ Tip TT05) appears to be already fairly substantial, an indicator of the rapid pace of work at this time. The incline tramway also services a quarry (TT14) downslope of the spoil tip.
- 7.4.34. The 1945 aerial photograph (Volume 3, appendix 7.3, Plate 5) records the second incline tramway (TT03) and associated winding engine house (TT04). The tramway leads to the Upper and Lower Llanwonno Tips (TT01 & TT02), which are well established and largely the same form as had survived until the recent landslide event. The ‘Old Smokey’ tip (TT05) is vastly increased in size and now resembles its present profile. It appears to be serviced by its own local tramway or aerial cable system and features a number of ancillary buildings. The 1962 Edition Ordnance Survey Map agrees with the aerial photographs and informs us that the quarry (TT14) is disused by this time.
- 7.4.35. Subsequent aerial photographs show the site falling into disuse over time but appear to indicate that the tramway (TT03) has been maintained as a footpath or accessway up to the present day. The modern path appears to ‘dog-leg’ towards the main road to the north via a

north-west/south-east aligned footpath, leaving the south-eastern c.400m of the tramroad in a relict condition.

Site Visit

- 7.4.36. Heritage assets within the primary 250m (radius) study area and designated sites within a 1km (radius) study area were visited and assessed for direct and/or indirect (visual) effects of the Proposed Scheme and key views to and from the proposed site were photographed. Six Historic Landscape Character Areas were visited and were assessed for potential direct and/ or indirect (visual) effects of the Proposed Scheme and key views to and from the Proposed Scheme were photographed.
- 7.4.37. It was observed that the majority of sites identified on historic mapping and aerial photography were visible on the ground with the exception of structures (TT08) and (TT09) although areas of bare ground indicated their likely location. Some surface disturbance to Tramway (TT03) was noted as a result of what appeared to be machine surface scraping to enable access for emergency works. The tramway surface was scraped down to natural ground in places indicating that some archaeological deposits may have been disturbed or lost in this process. However, a good portion of the eastern end of the tramway appeared to be in an intact relict state. Tramway (TT06) was observed to be in good relict condition although the transport route for emergency works appeared to have caused some disturbance to a narrow section at its northern terminus end. Tramway engine houses (TT04) and (TT07) were found to survive as brick and concrete rubble although the footprint of both appeared to be relatively intact. No winding mechanism or other machinery was visible. The proposed Receptor Site did not feature industrial waste deposits as was anticipated but was instead noted as an established upland marsh/ bog featuring a variety of grasses and rushes.
- 7.4.38. The only statutory designated site to be flagged as having a significant indirect visual impact was Welfare Hall, Tylorstown (LB18284, NPRN414737), which backs onto the proposed site - the steeply sloping topography making the site, particularly Tramway (TT03), a relatively dominant backdrop to the Listed Building from the position of the main road.
- 7.4.39. A further site visit was planned to visit the remaining heritage assets, however, the most recent Covid-19 Lockdown (December 2020-ongoing) prevented the visit. Therefore, the Scheduled Ancient Monument 'Carn-y-wiwer Cairnfield and Platform Houses (SAMGM323, NPRN307766, GGAT04575m, GGAT00581-2m), 'Penuel Calvinistic Methodist Chapel' (LB17658), 'Wattstown' (HLCA018) and 'Triangulation Point' (TT18) sites were not visited. As a result, the assessment on these sites have been carried out using a mixture of GIS terrain mapping (Zone of Theoretical Visibility), Google Earth, contour maps, aerial photographs and taking into consideration existing surface features such as forestry and built environment using Digital Surface Models (DSM) generated by LiDAR.

7.5. Preliminary Impact Assessment

Identified Heritage Assets

Sites of Archaeological and Historical Interest

- 7.5.1. The only known heritage asset within the RLB is Tylor's Newydd Tips Group Site (GGAT 07879m). For the purposes of this assessment it was necessary to break down the site into

individual elements in order to enable a full assessment of the impact of the Proposed Scheme on the site. This process increased the number of heritage assets within the RLB from one to 11. A further nine new sites, as well as three known sites, were identified within a 250m (radius) study area.

- 7.5.2. The earliest features within the 250m study area are represented by the first phases of the Pendyrus Colliery (NPRN80497) and Cynllwyn Du Collieries (NPRN260002) located on the Rhondda Fach valley bottom on the banks of the river and adjacent to the TVR line. However, both of these sites are now demolished. The first evidence of extractive activity on the eastern valley slope is a number of old Coal Levels that appear on the 1876 2nd Edition Ordnance Survey map (TT11-TT13). The first phase of tipping on the site is represented by a SW/NE aligned incline tramway (TT06) that ran from Cynllwyn Du Colliery up to the location of RH02 'Old Smokey' tip (TT05) on the ridge of Cefn Gwyngul, which by 1919 was already fairly substantial. The remains of the tramway winding engine house (TT07) is situated at its NE terminal end. Associated with Tramway (TT06) is a large quarry (TT14) and tramway (TT15). The second phase of tipping is represented by incline tramway (TT03) that runs from a winding engine house (TT04) located adjacent to the 'Old Smokey' tip, down the slope towards the NW where RH01 Llanwonno Upper and Lower tips are situated (TT01 & TT02). These features first appear on 1945 aerial photographs, at which point the 'Old Smokey' tip also features a number of associated tramways/tracks and structures (TT08-10). Apart from the latter mentioned structures, all of these heritage assets are identifiable in the landscape today, which together represent a well-preserved industrial landscape. The recent landslide has of course had an effect on the coherence of the site but overall, the main elements survive in fair condition.
- 7.5.3. The site visit noted that the location of the proposed Receptor Site was currently occupied by intact upland marsh and not industrial waste deposits as expected. The potential for buried prehistoric archaeological deposits here as outlined above means that an additional heritage asset (TT19) must be considered for impact assessment.
- 7.5.4. For the assessment of setting and significance of statutory designated heritage assets, one Scheduled Ancient Monument, Carn-y-Wiwer Cairnfield and Platform Houses (GM323, NPRN307766, GGAT04575m, GGAT00581-2m), five Grade II Listed Buildings and one Conservation Area have been identified within a secondary 1km (radius) study area. The potential direct and indirect impacts of the Proposed Scheme on heritage assets have been assessed and are described below.

Historic Landscape Character Areas

- 7.5.5. The Proposed Scheme is located within The Rhondda (HLW(MGI)5) Landscape of Special Historic Interest. Specifically, the RLB of the site straddles two Historic Landscape Character Areas (HLCAs) with the Upper and Lower Llanwonno Tips (TT01 & TT02; RH01), Tramway (TT03) and other assessed heritage assets lying in Rhondda Fach: Eastern Enclosed Valley Sides (HLCA24) and the proposed Receptor Site lying in Rhondda Uplands (HLCA30). Zone of Theoretical Visibility (ZTV) analysis indicated that six further HLCAs had potential for indirect (visual) effects and as a result these were included in the ASIDOHL2 assessment. The six additional HLCAs are Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020), Rhondda Fach: Western Enclosed Valley Sides (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027). Ynyshir (HLCA017) and Porth (HLCA001) were considered for assessment but it was found that the streetscape and tree cover of these

settlements blocked any potential indirect (visual) impact and as a result these HLCAs were eliminated from the ASIDOHL2. Likewise, 'Ffaldau' (HLC A022) was considered for assessment but was found to be too distant, and too oblique, for any visual impact. All other HLCAs were eliminated from the assessment as too distant and/or having no line of visibility. The potential direct and indirect impacts of the Proposed Scheme on the Historic Landscape have been the subject of an ASIDOHL2 assessment as detailed in Section 7.

Table 7.4. Identified Heritage Assets.

ID	Name	NGR	Period	Type	Designation	Designation ID	Value
Within Proposed Scheme							
GGAT 07879 m	Tylor's Newydd Tips Group Site	ST 01976 95595	Post-medieval	Spoil heap complex	None		A
TT01	RH01 Llanwonno Upper Tip	ST 01176 96297	Post-medieval	Coal tip	None		B
TT02	Llanwonno Lower Tip	ST 00930 96251	Post-medieval	Coal tip	None		B
TT03	Tramway	ST 01632 95954	Post-medieval	Tramway	None		B
TT04	Tramway engine house	ST 01986 95853	Post-medieval	Structure	None		B
TT06	Tramway	ST 01550 95518	Post-medieval	Tramway	None		B
TT07	Tramway Engine House	ST 01846 95889	Post-medieval	Structure	None		B
TT08	Structure, site of	ST 01891 95777	Post-medieval	Structure	None		C
TT09	Structure, site of	ST 02125 95729	Post-medieval	Structure	None		C
TT10	Track	ST 02084 95721	Post-medieval	Track	None		C
TT19	Buried prehistoric landscape (Potential)	ST 02150 95633	Prehistoric	Buried deposits	None		C
Within 250m							
TT05	RH02 'Old Smokey' Tip	ST 01966 95593	Post-medieval	Coal tip	None		B
TT11	Old coal level	ST 01592 95925	Post-medieval	Level	None		C
TT12	Old trial level	ST 01649 95745	Post-medieval	Level	None		C
TT13	Old trial level	ST 01470 95862	Post-medieval	Level	None		C
TT14	Quarry	ST 01520 95788	Post-medieval	Quarry	None		C
TT15	Tramway	ST 01523 95688	Post-medieval	Tramway	None		B
TT16	Reservoirs x 2	ST 01226 95894	Post-medieval	Reservoir	None		C
TT17	Barn, remains of	ST 00990 96567	Post-medieval	Barn	None		C

TT18	Triangulation Point, Site of	ST 02377 95328	Post-medieval	Triangulation Point	None		D
NPRN 80497	Pendyrus Colliery, site of	ST 01129 95896	Post-medieval	Colliery	None		C
GGAT0 4096m	Level, Tylorstown	ST 01063 96544	Post-medieval	Level	None		C
Within 1km			Statutory Designated Sites only				
GM323, NPRN3 07766, GGAT0 4575m, GGAT0 0581-2m	Carn-y-Wiwer Cairnfield & Platform Houses	ST 02675 94143	Prehistoric	Cairn field	SAM	GM323	A
LB1828 4, NPRN4 14737	Welfare Hall, Tylorstown	ST 01084 95423	Post-medieval	Religious building	LB Grade II	LB18284	B
LB1765 9, NPRN1 4064	Church of Our Lady Penrhys	ST 00268 96287	Post-medieval	Religious building	LB Grade II	LB17659	B
LB1765 8	Penuel Calvinistic Methodist Chapel	ST 00020 96700	Post-medieval	Religious building	LB Grade II	LB17658	B
LB8102 9, GGAT0 0946m	Church of St Gwynno	ST 03006 95608	Post-medieval	Religious building	LB Grade II	LB81029	B
LB8103 0, NPRN3 10062	Grave of Guto Nyth Bran	ST 03018 95603	Post-medieval	Grave	LB Grade II	LB81030	B
CA509	Llanwonno Conservation Area	ST 03006 95608	n/a	n/a	Conservation Area	CA509	A

Assessment of Potential Impacts of the Development on Heritage Assets

Direct Impacts

- 7.5.6. The potential impacts of the Proposed Scheme on heritage assets has been assessed using the design information provided by Redstart on behalf of Rhondda Cynon Taf Council. The proposed Llanwonno Tip Relocation Project will by its very nature have a direct impact on the Tylor's Newydd Tips Group Site (GGAT07879m). The direct impact to the overall site has been assessed as **High**.
- 7.5.7. The assessment identified the individual physical elements that comprise the Tylor's Newydd Tips site and concluded that a total of 10 of these elements would be subject to a direct impact from the Proposed Scheme. RH01 Llanwonno Upper Tip (TT01) has already suffered damage as a result of the landslip event and will be mostly removed by the Proposed Scheme, therefore the direct impact has been assessed as **Very Severe**. Tramway (TT03), which provides access to the RH01 Llanwonno Tips, is proposed to be widened to 6m in order to serve as a transport corridor for the relocation works. The

tramway has already experienced some surface damage as a result of the ongoing emergency works. The direct impact of the Proposed Scheme has been assessed as **High**.

- 7.5.8. Tramway (TT06) lies intact in a relict state with possible *in-situ* sleepers observed during our site visit. The proposed transport route crosses the northern terminal end of Tramway (TT06) where some direct impact has already occurred as a result of the initial landslide and ongoing emergency works. However, the proposed works affect a very small percentage of the total linear therefore the direct impact has been assessed as **Slight**.
- 7.5.9. The remains of two winding engine houses (TT04) and (TT07) have been identified within the RLB and will be directly impacted by the Proposed Scheme. However, the current construction design avoids any direct groundworks in this area. There remains a risk that these heritage assets could be accidentally damaged during the construction phase. As a result, the direct impact has been assessed as **Low**.
- 7.5.10. Structures (TT08) and (TT09) were identified on 1945 aerial photographs and subsequent Ordnance Survey maps and are located within the proposed Receptor Site. No structural remains were observed during the site visit; however, the footings may survive underground and if so, these would be subject to a direct impact assessed as **Low**. Track (TT10) is also located within the proposed Receptor Site and the direct impact has been assessed as **High**.
- 7.5.11. In addition, there is high potential for evidence of buried prehistoric landscape (TT19) sealed beneath the upland marsh palaeosol that stretches across most of the proposed Receptor Site. This landscape feature forms a key element of the Rhondda Uplands Historic Landscape Character Area (HLCA030). The potential direct impact here has therefore been assessed as **High**.

Table 7.5 Summary of heritage assets subject to direct impacts.

Receptor ID and sensitivity	Impact and resulting Effect	Magnitude	Significance
Tylor's Newydd Tips Group Site (GGAT07879m)	Direct physical impact Groundworks associated with Proposed Scheme has potential to physically affect heritage assets within this group site as detailed below.	High Adverse	Major
RH01 Llanwonno Upper Tip (TT01)	Direct physical impact Substantial removal of heritage asset.	Very High Adverse	Major
Tramway (TT03)	Direct physical impact Widening of tramway for proposed transport corridor will damage or destroy archaeological remains of a significant proportion of the heritage asset.	High Adverse	Major
Tramway (TT06)	Direct physical impact Proposed transport corridor will cut across this heritage asset, bisecting it from its associated Winding Engine House (TT07).	Slight Adverse	Moderate
Potential buried prehistoric landscape (TT19)	Direct physical impact The proposed Receptor Site is situated on intact marshland that has potential for buried prehistoric landscape which may be damaged or destroyed by the deposition of tip material.	High Adverse	Major
Track (TT10)	Direct physical impact Located in the proposed Receptor Site this asset will be affected by the deposition of tip material.	High Adverse	Moderate
Winding engine house remains (TT04 & TT07)	Potential direct physical impact As the Proposed Scheme stands the heritage assets should not be affected however measures should be put in place to protect them from accidental damage during groundworks.	Low Adverse	Moderate
Structures (TT08 & TT09)	Potential direct physical impact Located in the proposed Receptor Site, whilst there are no standing remains it is likely that the footings survive underground and could be affected by the deposition of tip material.	Low Adverse	Moderate

Indirect (Visual) Impacts

- 7.5.12. For the purposes of the assessment of indirect impacts from the Proposed Scheme on heritage assets, only assets within a primary 250m (radius) study area and statutory designated heritage assets within a secondary 1km (radius) study area have been assessed.
- 7.5.13. Nine sites linked to Tylor's Newydd Tip Group Site (GGAT07879m) and two additional sites were identified within a 250m (radius) study area as having a potential indirect (visual)

impact from the Proposed Scheme. The Tylor's Newydd Tip Group Site (GGAT07879m) itself has been assessed as being subject to an overall **Severe** indirect (visual) effect and as a Value A site will be included in the ASIDOHL2 below. RH02 'Old Smokey' Tip (TT05) lies outside the RLB of the Proposed Scheme but sits directly adjacent to the proposed Receptor Site and prominently overlooks both the Receptor Site to the north-east and the Llanwonno Tips (TT01 & TT02) and Tramway (TT03) to the north-west. The site will therefore be subject to a significant indirect (visual) impact which has been assessed as **Moderate**. The remainder of extractive features (TT11 – TT16) lie downslope to the west of RH02 'Old Smokey' Tip (TT05) and as a result would have no intervisibility with the Receptor Site, which is positioned behind it to the east. These sites have been assessed as being subject to only a **Very Slight** indirect (visual) impact from the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) to the north-west and the widening of the Tramway (TT03).

- 7.5.14. The removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) will also have a **Very Slight** indirect (visual) impact on the remains of an agricultural building (TT17) located approximately 100m to the north. The formation of the proposed Receptor Site will have a **Moderate** indirect (visual) impact on Triangulation Point (TT18), located approximately 100m to the south-east.
- 7.5.15. The assessment has concluded that there will be no indirect (visual) effect to Carn-y-Wiwer Cairnfield & Platform Houses (SAMGM323, NPRN307766, GGAT04575m, GGAT00581-2m). Welfare Hall, Tylorstown (LB18284, NPRN414737) was assessed as being subject to a **Moderate** indirect (visual) impact with the widening of the Tramway (TT03) being the most significant intervention. The steep topography of the valley slope, featuring Tramway (TT03), forms a distinct backdrop to the Welfare Hall, and to Tylorstown in general. The impact on Church of Our Lady Penrhys (LB17659, NPRN14064) was assessed as **Very Slight** due to minor intervisibility with the site and Penuel Calvinistic Methodist Chapel (LB17658) was assessed as being subject to no indirect (visual) impact. Church of St Gwynno (LB81029, GGAT00946m), Grave of Guto Nyth Bran (LB81030, NPRN310062) and Llanwonno Conservation Area (CA509) were all found to suffer no indirect (visual) impact.

Table 7.6. Summary of heritage assets subject to indirect (visual) impacts.

Receptor ID and sensitivity	Impact and resulting Effect	Magnitude
Tylor's Newydd Tips Group Site (GGAT07879m)	Indirect visual effects Visual effects to the group site as a whole as a result of the Proposed Scheme.	Severe Adverse
RH02 'Old Smokey' tip (TT05)	Indirect visual effects Visual effects to heritage assets caused by the new Receptor Site as well as the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Moderate Adverse
Heritage assets within primary (250 m radius) study area	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Very Slight Adverse
Welfare Hall, Tylorstown (LB18284)	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Moderate Adverse
Church of our Lady Penrhys (LB17659)	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Very Slight Adverse

Setting and Significance

- 7.5.16. The assessment of the potential impact of the Proposed Scheme on the setting and significance of heritage assets is confined to statutory designated heritage assets of International and National value (A* and A class). These include Scheduled Ancient Monuments, Registered Landscapes, Parks and Gardens and sometimes Grade I and I* Listed Buildings. Grade II and II* buildings are considered if their setting includes or is included with a Registered Landscape or Park and Garden.
- 7.5.17. Only one statutory designated site was assessed as having a potential impact on setting and significance; Grade II Listed Welfare Hall, Tylorstown (LB18284, NPRN414737) which is therefore included in the ASIDOHL2. Tylor's Newydd Tips (GGAT07879m), which has been assessed as a Value A group site, has also been assessed for setting effects as part of the ASIDOHL2.

Table 7.7. Full assessment of the potential direct, indirect (visual) and setting impacts of the Proposed Scheme on heritage assets.

ID	Name	NGR	Period	Type	Designation	Designation ID	Value	Rarity	Documentation/ Association	Group Value	Survival/Condition	Direct Effect	Significance of Direct Effect	Indirect Effect	Setting Effect Yes/No
Within Proposed Scheme															
GGAT 07879m	Tylor's Newydd Tips Group Site	ST 01976 95595	Post-medieval	Spoil heap complex	None	None	A	High	Moderate	High	Near intact/ Good	High Adverse	Major	Severe	Yes
TT01	RH01 Llanwonno Upper Tip	ST 01176 96297	Post-medieval	Coal tip	None	None	B	High	Moderate	High	Damaged/ Fair	Very High Adverse	Major	None	n/a
TT02	Llanwonno Lower Tip	ST 00930 96251	Post-medieval	Coal tip	None	None	B	High	Moderate	High	Intact/ Good	None	None	None	n/a
TT03	Tramway	ST 01632 95954	Post-medieval	Tramway	None	None	B	Medium	Low	High	Near intact/ Fair	High Adverse	Major	None	n/a
TT04	Tramway engine house	ST 01986 95853	Post-medieval	Structure	None	None	B	Medium	Low	High	Near destroyed/ Poor	Low Adverse	Moderate	None	n/a
TT06	Tramway	ST 01550 95518	Post-medieval	Tramway	None	None	B	Medium	Low	High	Near intact/ Fair	Slight Adverse	Moderate	None	n/a
TT07	Tramway engine house	ST 01846 95889	Post-medieval	Structure	None	None	B	Medium	Low	High	Near destroyed/ Poor	Low Adverse	Moderate	None	n/a
TT08	Structure, site of	ST 01891 95777	Post-medieval	Structure	None	None	C	Low	None	High	Destroyed	Low Adverse	Moderate	None	n/a
TT09	Structure, site of	ST 02125 95729	Post-medieval	Structure	None	None	C	Low	None	High	Destroyed	Low Adverse	Moderate	None	n/a
TT10	Track	ST 02084 95721	Post-medieval	Track	None	None	C	Low	None	High	Near intact/ Fair	High Adverse	Moderate	None	n/a
TT19	Buried prehistoric landscape (Potential)	ST 02150 95633	Prehistoric	Buried deposits	None	None	C	Medium	None	Low	unknown	High Adverse	Major	None	n/a
Within 250m															
TT05	RH02 'Old Smokey' Tip	ST 01966 95593	Post-medieval	Coal tip	None	None	B	High	Low	High	Near intact/ Good	None	None	Moderate	n/a
TT11	Old coal level	ST 01592 95925	Post-medieval	Level	None	None	C	Low	None	High	Not known	None	None	Very slight	n/a
TT12	Old trial level	ST 01649 95745	Post-medieval	Level	None	None	C	Low	None	High	Not known	None	None	Very slight	n/a
TT13	Old trial level	ST 01470 95862	Post-medieval	Level	None	None	C	Low	None	High	Not known	None	None	Very slight	n/a
TT14	Quarry	ST 01520 95788	Post-medieval	Quarry	None	None	C	Low	None	High	Intact/ Moderate	None	None	Very slight	n/a
TT15	Tramway	ST 01523 95688	Post-medieval	Tramway	None	None	B	Medium	None	High	Near intact/ Fair	None	None	Very slight	n/a
TT16	Reservoirs x 2	ST 01226 95894	Post-medieval	Reservoir	None	None	C	Low	None	Low	Not known	None	None	Very slight	n/a
TT17	Agricultural building, remains of	ST 00990 96567	Post-medieval	Barn	None	None	C	Low	None	Low	Near destroyed/ Poor	None	None	Very slight	n/a
TT18	Triangulation Point, Site of	ST 02377 95328	Post-medieval	Triangulation Point	None	None	D	Low	None	High	Not known	None	None	Moderate	n/a
NPRN 80497	Pendyrus Colliery, site of	ST 01129 95896	Post-medieval	Colliery	None	None	C	Medium	Low	High	Destroyed	None	None	None	n/a
GGAT04096m	Level, Tylorstown	ST 01063 96544	Post-medieval	Level	None	None	C	Low	None	High	Not known	None	None	Very slight	n/a
Within 1km		Statutory Designated Sites only													
GM323, NPRN307766, GGAT04575m, GGAT00581-2m	Cam-y-Wiwer Cairnfield & Platform Houses	ST 02675 94143	Prehistoric	Cairnfield	SAM	GM323	A	High	None	Moderate	Damaged/ Moderate	None	None	None	No
LB18284, NPRN414737	Welfare Hall, Tylorstown	ST 01084 95423	Post-medieval	Religious building	LB Grade II	LB18284	B	Low	Low	High	Intact/ Moderate	None	None	Moderate	Yes
LB17659, NPRN14064	Church of Our Lady Penrhys	ST 00268 96287	Post-medieval	Religious building	LB Grade II	LB17659	B	Low	Low	Moderate	Intact/ Moderate	None	None	Very slight	No
LB17658	Penuel Calvinistic Methodist Chapel	ST 00020 96700	Post-medieval	Religious building	LB Grade II	LB17658	B	Low	Low	Moderate	Intact/ Moderate	None	None	None	No
LB81029, GGAT00946m	Church of St Gwynno	ST 03006 95608	Post-medieval	Religious building	LB Grade II	LB81029	B	Medium	Low	Low	Intact/ Moderate	None	None	None	No
LB81030, NPRN310062	Grave of Guto Nyth Bran	ST 03018 95603	Post-medieval	Grave	LB Grade II	LB81030	B	High	Low	Low	Intact/ Good	None	None	None	No
CA509	Llanwonno Conservation Area	ST 03006 95608	n/a	n/a	Conservation Area	CA509	A	High	Low	Low	Intact/ Moderate	None	None	None	No

7.6. Assessment of the Significance of the Impact of the Development on the Historic Landscape (ASIDOHL2)

Registered Landscapes, Parks and Gardens Identified for ASIDOHL2

- 7.6.1. The Proposed Scheme comprises the relocation of the RH01 Llanwonno Upper Tip (TT01), which forms part of 'Tylor's Newydd Tips' (GGAT07879m), to a new Receptor Site located behind RH02 'Old Smokey' Tip (TT05). This work is essential in order to stabilise the Rhondda Fach valley eastern slope following a landslide of tip material during Storm Dennis in February 2020. The Receptor Site is proposed to be c.500m long x c.125m wide, with a maximum height of 9m, and will be landscaped to minimise visual impact. A series of drainage swales and attenuation ponds will be installed around the Receptor Site in order to control water run-off. Following the removal of most of RH01 Llanwonno Upper Tip (TT01), this site will also be landscaped to include re-profiling and the construction of drainage swales and herringbone drains to manage water run-off. This area will be vegetated to minimise visual impact. It is proposed that a historic incline tramway (TT03) is widened to 6m for use as a transport corridor for the removal of the material. The RLB of the Proposed Scheme, which has a total area of 31ha, lies within The Rhondda (HLW(MGI)5) Landscape of Special Historic Interest and is therefore subject to an Assessment of the Significance of the Impact of the Development on the Historic Landscape (ASIDOHL2).
- 7.6.2. The RLB straddles two Historic Landscape Character Areas (HLCAs). The section containing the target tip for relocation, RH01 Llanwonno Upper Tip (TT01), associated Tramway (TT03) and a small section of the proposed Receptor Site is situated in Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023) and occupies 20ha of the HLCA.
- 7.6.3. Rhondda Fach Eastern Enclosed Valley sides (HLCA 023) is characterised as:
"relict agricultural landscape to an extent modified by industrial development; distinctive field boundaries; documentary evidence of medieval/ post-medieval agricultural practice and settlement; post-medieval upland settlement (longhouses); industrial landscape associated with mineral extraction, predominantly coal; ancient woodland and modern forestation" (Robertson 2001. p154).
- 7.6.4. The remainder of the RLB, containing the majority of the proposed Receptor Site and the site compound, is situated in Rhondda Uplands (HLCA 030) and occupies 11ha of the HLCA.
- 7.6.5. Rhondda Uplands (HLCA 030) is a landscape of some importance and is characterised as:
"upland mountain sheepwalk, partially forested; multi-period and multi-functional landscape; prehistoric settlement and funerary landscape; early communication corridor; Roman and medieval military structures; early medieval administrative boundaries; medieval upland settlement; post-medieval industrial landscape; relict upland agricultural landscape; documentary and placename evidence" (Robertson 2001. P186).
- 7.6.6. The EIA identified the potential for an indirect (visual) impact on a further six additional HLCAs; Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020), Rhondda Fach: Western Enclosed Valley Sides (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027). All other HLCAs were eliminated from the assessment as too distant and/or having no line of visibility with the Proposed Scheme.

Statutory Designated Sites Identified for ASIDOHL2

- 7.6.7. The only known heritage asset within the RLB is the Tylor's Newydd Tips group site (GGAT 07879m). For the purposes of the EIA the individual elements within the site were identified and assessed for potential direct and indirect impacts as described in Section 7.7. A potential for buried prehistoric landscape (TT19) was also identified in the location of the proposed Receptor Site, which is currently occupied by intact upland marsh and peat bog that previous excavations in The Rhondda area have indicated has the potential to seal prehistoric, Roman and Early-medieval archaeological remains. The 250m (radius) study area featured some further extractive features such as quarry and trial level sites as well as surviving examples of the pre-industrial agricultural landscape as evidenced by the remains of agricultural building (TT17).
- 7.6.8. There are no Scheduled Ancient Monuments (SAMs) in the Proposed Scheme, however, the Tylor's Newydd Tips group site was assigned an 'A' Value in the Heads of the Valleys Spoil Tips Significance Assessment (Govannon Consultancy 2008) and has therefore been included in the ASIDOHL2 assessment. A secondary 1km (radius) buffer was applied to the RLB that identified one SAM 'Carn-y-Wiwer Cairnfield and Platform Houses' (SAM GM323, NPRN307766, GGAT04575m, GGAT00581-2m) that may be subject to indirect (visual) and/or setting impacts. However, the EIA assessment established that the SAM and its setting has no intervisibility with the Proposed Scheme and could therefore be eliminated from the ASIDOHL2.
- 7.6.9. Three Grade II Listed Buildings located within the Registered Historic Landscape were included in the EIA and only one of these, Welfare Hall, Tylorstown (LB18284, NPRN414737), was considered to be subject to **Moderate** indirect (visual) impact and the potential for an impact on its setting. Church of Our Lady Penrhys (LB17659, NPRN14064) was assessed as being subject to a '**Very Slight**' impact and Penuel Calvinistic Methodist Chapel (LB17658) was assessed as having **no** indirect visual impact.

Stage 2: Assessment of Direct Physical Impact on Registered Historic Landscape The Rhondda (HLW(MGI)5)

- 7.6.10. The RLB encompasses an area of 31ha which represents 0.31% of the total area of The Rhondda (HLW(MGI)5) Registered Historic Landscape (10044ha). As described above, the RLB straddles two HLCAs:
- Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023) has a total area of 656ha. The maximum area of this HLCA that could be directly affected by the Proposed Scheme is 20ha which represents 3.05% of the HLCA and 0.20% of the total area of the Historic Landscape; and
 - Rhondda Uplands (HLCA 030) has a total area of 2717ha. The maximum area of this HLCA that could be directly affected by the Proposed Scheme is 11ha which represents 0.4% of the HLCA and 0.11% of the total area of the Historic Landscape.

Table 7.8. ASIDOHL2 Stage 2: Direct Impacts on HLCA 023.

ASIDOHL2 Stage 2: Assessment of Direct Physical Impact on Historic Character Area Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023)				
(a) Absolute Impact (Loss of Area)			Magnitude and Score	
20ha of a total of 656ha = 3.05%			Very Slight Adverse - 1	
(b) Relative and Landscape Impacts (Loss of known characteristics or Elements) and scores				
Element/ % of loss	Category	Magnitude	Landscape Value (c)	Landscape Value Effect
7ha loss of total 20ha of surviving coal tips in HLCA = 35% (Already partially destroyed by landslide)	A - 4	Moderate Adverse - 3	High – 5 Part of Tylor’s Newydd Tips (GGAT 07879m) Key element: Industrial landscape associated with mineral extraction, predominantly coal	Moderately Reduced - 3
c.542m loss of total c.1064m of Tramway (TT03) = 50.94%	B - 3	Severe Adverse - 5	High – 5 Part of Tylor’s Newydd Tips (GGAT 07879m) Key element: Industrial landscape associated with mineral extraction, predominantly coal	Moderately Reduced - 3
4m of total c.900m of Tramway (TT06) = 0.44%	B - 3	Very Slight Adverse - 1	High – 5 Part of Tylor’s Newydd Tips (GGAT 07879m) Key element: Industrial landscape associated with mineral extraction, predominantly coal	Very Slightly Reduced - 1
Summary of the Magnitude of Direct, Physical Impact on (HLCA 023)				
Score			Grading	
10			Moderate Adverse	

Table 7.9 ASIDOHL2 Stage 2: Direct Impacts on HLCA 030.

ASIDOHL2 Stage 2: Assessment of Direct Physical Impact on Historic Character Area Rhondda Uplands (HLCA 030)				
(a) Absolute Impact (Loss of Area)			Magnitude and Score	
11ha of a total of 2717ha = 0.4%			Very Slight Adverse - 1	
(b) Relative and Landscape Impacts (Loss of known characteristics or Elements) and scores				
Element/ % of loss	Category	Magnitude	Landscape Value (c)	Landscape Value Effect
Potential loss of 5ha of total 2717ha buried prehistoric landscape (TT19) = <1%	C - 2	Very Slight - 1	Very High – 6 Key element: Prehistoric settlement and funerary landscape	Very Slightly Reduced - 1
Summary of the Magnitude of Direct, Physical Impact on (HLCA 023)				
Score			Grading	
10			Moderate Adverse	

Table 7.10 ASIDOHL2 Stage 2: Summary of Overall Impact.

Summary of Overall Direct, Physical Impacts on Historic Landscape Character Areas		
HLCA	Score	Grading
HLCA023	10	Moderate
HLCA030	10	Moderate

Stage 3: Assessment of Indirect Impact on Registered Historic Landscape

- 7.6.11. Stage 3 describes and quantifies indirect impacts of the development on theoretically and physically visible Registered Landscapes, individual HLCAs and/ or HLCAs connected by setting to HLCAs in the Proposed Scheme. Indirect impacts are sub-divided into two potential impacts: Indirect Physical impacts and Indirect (Non-Physical) Visual impacts.
- 7.6.12. Indirect Physical impacts can result from an increased risk of exposure, increased management needs, the severance or fragmentation of related elements, frustration or cessation of historic land-use practices and the frustration of access leading to decreased opportunities for education and enjoyment of the amenity elements (Cadw 2007, 20, i-v).
- 7.6.13. Indirect (Non-Physical) Visual impacts can occur as a result of impacts to elements of an HLCA from which the development can be seen (views to and from) or obstructed (direct line of site); the creation of inappropriate visual connections and finally the visual impact of the Proposed Scheme itself in relation to the existing historic character of the HLCA when considering its form and appearance (Cadw 2007, 21, i-v).

- 7.6.14. These elements include Internationally and Nationally important heritage assets (Value A* and A), identified within a 1km (radius) buffer area (Scheduled Ancient Monuments, Registered Landscapes, Parks & Gardens) as well as Grade I and II* Listed Buildings and sometimes Grade II Listed Buildings (if situated within a Registered Landscape or Park & Garden).
- 7.6.15. Indirect Impacts have been assessed using site visits, contour maps, aerial photographs and taking into consideration existing surface features such as forestry and built environment using Digital Surface Models (DSM) generated by LiDAR. Indirect Visual Impacts have been assessed utilising the criteria set out above in accordance with ASIDOHL2 guidelines.

Indirect Physical Impacts (a)

- 7.6.16. Based on the present assessment it is considered that the Proposed Scheme has potential to have Indirect (Physical) Impact on up to four Historic Landscape Character Areas; 'Rhondda Fach Eastern Enclosed Valley Sides' (HLCA 023), 'Rhondda Uplands' (HLCA 030), 'Wattstown' (HLCA018) and 'Pontygwaith, Tylorstown and Stanleytown' (HLCA019). A full description of these HLCAs has been included in Stage 4 below.

Indirect (non-physical) Visual Impacts (b)

- 7.6.17. The EIA identified a single SAM, 'Carn-y-Wiwer Cairnfield & Platform Houses' (GM323, NPRN307766, GGAT04575m, GGAT00581-2m), at potential risk of Indirect (Non-Physical) Visual Impact. However, the EIA assessment established that the SAM and its setting has no intervisibility with the Proposed Scheme and could therefore be eliminated from the ASIDOHL2.
- 7.6.18. Three Grade II Listed Buildings within the Registered Historic Landscape were also assessed for indirect (Non-Physical) Visual Impact; Welfare Hall, Tylorstown (LB18284, NPRN414737) which was assessed as being subject to a **Moderate** indirect impact, Church of Our Lady Penrhys (LB17659, NPRN14064) which was assessed as **Very Slight** and Penuel Calvinistic Methodist Chapel (LB17658) assessed as **No Impact**.
- 7.6.19. Following site visits and detailed assessment as described above, it was considered that eight HLCAs have the potential for Indirect Visual Impact; Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023), Rhondda Uplands (HLCA 030), Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020), Rhondda Fach Western Enclosed Valley Sides (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027).
- 7.6.20. Table 7.11 below presents the criteria and process behind the Stage 3 assessment which, when completed, results in an overall Magnitude of Indirect Impact for each HLCA.

Table 7.11. ASIDOHL2 Stage 3: Indirect Impacts.

ASIDOHL2 Stage 3(a): Assessment of Indirect (physical) Impacts on Historic Character Areas											
Impacts											Assessment Score (Average)
HLCA	Increased risk of exposure, erosion, disturbance and decay during and consequent to development	Magnitude & Score	Increased management needs to maintain elements habitat, water levels, new access provision, etc.	Magnitude & Score	Severance, fragmentation, dislocation or alteration of functional connections between related items.	Magnitude & Score	Frustration or cessation of historic land use practices	Magnitude & Score	Frustration of access leading to decreased opportunities	Magnitude & Score	
HLCA 023	A - 4	Severe Adverse - 5	None	0	A - 4	Considerable - 4	None	0	None	0	3.4
HLCA 030	A - 4	Severe Adverse - 5	None	0	A - 4	Severe Adverse - 5	None	0	None	0	3.6
HLCA 018	None	0	None	0	B - 3	Very Slight Adverse - 1	None	0	None	0	0.8
HLCA 019	None	0	None	0	B - 3	Moderate Adverse - 3	None	0	None	0	1.2
ASIDOHL2 Stage 3(b): Assessment of Indirect (non-physical) Visual Impacts on Historic Character Areas											
Impacts											Assessment Score (Average)
HLCA	Views to/from Element Partially Altered	Magnitude & Score	Visual Connections between Related Elements Occluded/ Obstructed	Magnitude & Score	(Inappropriate) Visual Connections between Elements not intended to be inter-visible	Magnitude & Score	Development Form (scale, distribution of features)	Magnitude & Score	Development Appearance (size, shape, colour of features)	Magnitude & Score	
HLCA 023	A - 4	Considerable - 4	None	0	None	0	2.7	Moderate Adverse - 3	2.7	Moderate Adverse - 3	3.88
HLCA 030	A - 4	Considerable - 4	None	0	None	0	2.7	Moderate Adverse - 3	2.7	Moderate Adverse - 3	3.88
HLCA018	B - 3	Very Slight Adverse - 1	None	0	None	0	1.3	Very Slight Adverse - 1	1.3	Very Slight Adverse - 1	1.72
HLCA 019	B - 3	Moderate Adverse - 3	None	0	None	0	2	Slight Adverse - 2	2	Slight Adverse - 2	2.8

HLCA 020	B - 3	Very Slight Adverse - 1	None	0	None	0	1.3	Very Slight Adverse - 1	1.3	Very Slight Adverse - 1	1.72
HLCA 024	B - 3	Very Slight Adverse - 1	None	0	None	0	1.3	Very Slight Adverse - 1	1.3	Very Slight Adverse - 1	1.72
HLCA 025	B - 3	Very Slight Adverse - 1	None	0	None	0	1.3	Very Slight Adverse - 1	1.3	Very Slight Adverse - 1	1.72
HLCA 027	B - 3	Very Slight Adverse - 1	None	0	None	0	1.3	Very Slight Adverse - 1	1.3	Very Slight Adverse - 1	1.72

Summary of Indirect Impacts to Historic Character Areas			
HLCA	Indirect Physical Impact	Indirect Visual Impact	Overall Magnitude of Indirect Impacts adjusted to 28 Point Scale (3(a)+3(b)) x 28 ÷ 20
HLCA 023	3.4	3.88	10 – Moderate Adverse
HLCA 030	1.8	3.88	8 – Slight Adverse
HLCA018	0.8	1.72	4 – Slight Adverse
HLCA 019	1.2	2.8	6 – Slight Adverse
HLCA 020	0	1.72	2 - V Slight Adverse
HLCA 024	0	1.72	2 – V Slight Adverse
HLCA 025	0	1.72	2 – V Slight Adverse
HLCA 027	0	1.72	2 – V Slight Adverse

Stage 4: Evaluation of Relative Importance

- 7.6.21. Stage 4 evaluates the relative importance of parts and elements (sites, monuments and landscapes) of HLCAs which may be directly or indirectly, wholly or partially, affected by the proposed development in relation to:
- (a) The whole of the HLCA(s) concerned, and/or;
 - (b) The whole of the Registered Historic Landscape, followed by;
 - (c) An evaluation of the relative importance of the HLCA(s) concerned with the national context.
- 7.6.22. Stage 4 should then be completed with a determination of the average, overall value of all the HLCAs (or part thereof) affected (Cadw 2007, 23-28).
- 7.6.23. The criteria for determining the relative importance or value of HLCAs (and their constituent elements or parts) in Stage 4, steps (a), (b) and (c) are as follows (Cadw 2007, 24-5):
- Rarity;
 - Representativeness;
 - Documentation;
 - Group Value;
 - Survival;
 - Condition;
 - Coherence;
 - Integrity;
 - Potential;
 - Amenity; and
 - Associations.
- 7.6.24. As noted above, the Proposed Scheme's RLB encompasses a total area of 31ha split over two HLCAs; Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023) has and affected area of 20ha representing 3.05% of the HLCA and 0.20% of The Rhondda (HLW(MGI)5) Registered Historic Landscape as a whole. Rhondda Uplands (HLCA 030) has an affected area of 11ha representing 0.4% of the HLCA and 0.11% of the Registered Historic Landscape.
- 7.6.25. A further six HLCAs have been identified as having an indirect impact (see Stage 3); Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020), Rhondda Fach Western Enclosed Valley Sides (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027).
- 7.6.26. The following section will address each HLCA in turn providing an Evaluation of Relative Importance of each affected area as set out above. By means of providing context each HLCA evaluation will be followed by an extract of the HLCA key characteristics and descriptions sourced from The Rhondda Historic Landscape Characterisation Report (Robertson 2001).

Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023)

7.6.27. Key Historic Landscape Characteristics:

“Relict agricultural landscape to an extent modified by industrial development; distinctive field boundaries; documentary evidence of medieval/ post-medieval agricultural practice and settlement; post-medieval upland settlement (longhouses); industrial landscape associated with mineral extraction, predominantly coal; ancient woodland and modern forestation”.

7.6.28. HLCA Description:

“Rhondda Fach: Eastern Enclosed Valley Sides is characterised as an area of enclosed valley side, the surviving extent of medieval/post-medieval enclosure, which had formerly been common grazing and wooded hillside. The field boundaries are of the clawdd type though chronological progression to large dry-stone walling is discernible. The cartographic record and place name evidence indicates seasonal agricultural settlement and extensive woodland during the medieval period, i.e. Hafodau and Coedcae place names. Small remnants of ancient woodland, on formerly extensively wooded slopes, also typify the area. The area is dominated by post-medieval farmsteads, and their associated enclosures of small irregular fields (ruined stone field boundaries). The surviving farmsteads, predominantly longhouse regional types, are generally set on sheltered, gently sloping hillside/spur locations above valley bottom. There has been some industrial incursion into the area and sites include, quarries, coal levels, inclines, coal tips, some of which are even today dramatic landscape features e.g. that of the disused workings above Cefn-Ilechau-uchaf, Tylorstown”. (Robertson 2001. p154).

7.6.29. The Evaluation of the relative importance of the part of HLCA 023 directly and/or indirectly affected by development has been undertaken in Table 7.12 below.

Table 7.12 Evaluation of the relative importance of the part of HLCA 023 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity					✓	
Representativeness					✓	
Documentation				✓		
Group Value		✓				
Survival		✓				
Condition		✓				
Coherence			✓			
Integrity			✓			
Potential				✓		
Amenity				✓		
Associations			✓			
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity				✓		
Representativeness					✓	
Documentation				✓		
Group Value		✓				
Survival		✓				
Condition		✓				
Coherence		✓				
Integrity			✓			
Potential				✓		
Amenity				✓		
Associations			✓			
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity			✓			
Representativeness					✓	
Documentation				✓		
Group Value		✓				
Survival		✓				
Condition		✓				
Coherence		✓				
Integrity			✓			
Potential				✓		
Amenity				✓		
Associations			✓			
Overall Evaluation Scores						
(a)	(b)	(c)	Equation Score		Overall Score	
Total(a) = 40 Total(a)/55x100=72.72	Total(b) = 42 Total(b)/55x100=76.36	Total (c) = 43 Total(c)/55x100=78.18	75.75		76 - High	

*which may be directly or indirectly, wholly or partially affected by the proposed development.

Rhondda Uplands (HLCA 030)

7.6.30. Key Historic Landscape Characteristics:

“Upland mountain sheepwalk, partially forested; multi-period and multi-functional landscape; prehistoric settlement and funerary landscape; early communication corridor; Roman and medieval military structures; early medieval administrative boundaries; medieval upland settlement; post-medieval industrial landscape; relict upland agricultural landscape; documentary and place name evidence”.

7.6.31. HLCA Description:

“Rhondda Uplands is a landscape of some importance and is characterised as largely open upland ridge, typical of mountain sheepwalk. Extensive recent forestation has taken place. The area displays a variety of archaeologically important sites of all periods since, and including the Mesolithic. The area is dominated, literally, by prehistoric funerary monuments, burial cairns of the Bronze Age, such as Carn Fach and Carn-y-Biga. Prehistoric settlement in the area dates back to the Mesolithic period; and includes for example Hen Dre'r Mynydd, a late-prehistoric/Romano-British settlement site of national importance. Early lines of communication are found throughout the area, e.g. the ridge way route of Y Gefn-ffordd. The area contains archaeologically important military structures of Roman and medieval date, i.e. Twyn y Briddallt Roman marching camp and the medieval castle of Castell Nos, near Maerdy. Characteristic features of the uplands are the early medieval administrative boundaries, or cross dykes, such as Ffos Toncenglau, and Twyn Croesffordd dyke. The landscape is also characterised by medieval upland settlement, usually comprising paired platform houses. Medieval and post-medieval agricultural features and practices, etc. are evidenced by place-name, cartographic and other documentary sources; and relict agricultural features mostly of post-medieval date survive including upland sheepwalk boundaries and sheepfolds. The impact of industrial mineral extraction varies across the area; the remains include, coal levels and workings, waste tips, and stone quarries and associated features, such as tramways/inclines. Tourism, primarily outdoor leisure activity, such as hill-walking and riding, has been encouraged in the area; forest walks have been demarcated, parking and local information provided, e.g. the information boards near the Hen Dre'r Mynydd settlement site” (Robertson 2001. P186).

7.6.32. The Evaluation of the relative importance of the part of HLCA 030 directly and/ or indirectly affected by development has been undertaken in Table 7.13 below.

Table 7.13 Evaluation of the relative importance of the part of HLCA 030 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						✓
Representativeness					✓	
Documentation						✓
Group Value						✓
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations						✓
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area0020on the Register						
Rarity					✓	
Representativeness					✓	
Documentation					✓	
Group Value						✓
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations						✓
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity						✓
Representativeness					✓	
Documentation					✓	
Group Value						✓
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations						✓
Overall Evaluation Scores						
(a)	(b)	(c)	Equation Score			Overall Score
Total(a) = 24 Total(a)/55x100=43.6 4	Total(b) = 26	Total (c) = 25 Total(c)/55x100= 45.45	45.45			45 - Considerable

	Total(b)/ 55x100= 47.27			
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*which may be directly or indirectly, wholly or partially affected by the proposed development.

Wattstown (HLCA018)

7.6.33. Key Historic Landscape Characteristics:

“Compact 2nd phase pithead settlement associated with a single colliery; planned, compact settlement of linear terraces, with later 3rd phase additions including hillside estate; predominant colliery constructed housing - good examples of post-legislation colliery housing; residential colliery settlement with limited functional/morphological variety; historic associations”.

7.6.34. HLCA Description:

“Wattstown originated as a 2nd phase colliery-built pithead settlement, and though since extended it has failed to develop beyond a residential colliery settlement; thus on functional and urban morphological grounds the settlement has a very low rating (group E following Davies system) as no distinct commercial centre has evolved (Davies 1968), probably due to its proximity to Ynyshir and Porth. Wattstown is distinct both on urban morphological and functional grounds, and in terms of topography from its adjacent neighbours of HLCA 017 Ynyshir to the south and HLCA 019 Pontygwaith, Tylorstown and Stanleytown and is differentiated from them as a pithead settlement based on a single colliery with a legacy of predominantly colliery built housing illustrative of housing-types typical of the period following the implementation of the legislative controls of the 1870s. The settlement, though relatively late in the history of the Rhondda, retains much of the character of a non-developed, largely single function pithead colliery settlement, rare overall in the Rhondda and as such is a recognisable, distinct and important character area. It represents an industrial settlement of considerable interest, with uniformity and cohesion of character, despite the loss of its associated colliery. The historic character of the colliery settlement merits recognition in its own right. Conservation and public awareness policies should be implemented to encourage appropriate development” (Robertson 2001. P131).

7.6.35. The Evaluation of the relative importance of the part of HLCA 018 directly and/ or indirectly affected by development has been undertaken in Table 7.14 below.

Table 7.14 Evaluation of the relative importance of the part of HLCA 018 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity					✓	
Representativeness				✓		
Documentation					✓	
Group Value				✓		
Survival		✓				
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity				✓		
Representativeness				✓		
Documentation					✓	
Group Value				✓		
Survival			✓			
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
Overall Evaluation Scores						
(a)	(b)	(c)	Equation Score		Overall Score	
Total(a) = n/a	Total(b) = 32 Total(b)/55x100=58.18	Total (c) = 32 Total(c)/55x100=58.18	58.18		58 - Considerable	

*which may be directly or indirectly, wholly or partially affected by the proposed development.

Pontygwaith, Tylorstown and Stanleytown (HLCA019)

7.6.36. Key Historic Landscape Characteristics:

“A composite colliery settlement area comprising three closely associated 2nd phase ‘pithead settlements associated with two/three collieries; residential settlements with post-1880s housing stock, including colliery-built housing, with minor functional/morphological variety and commercial development”.

7.6.37. HLCA Description:

“Pontygwaith, Tylorstown and Stanleytown are characterised as linear grid-plan colliery settlements, which originated as 2nd phase colliery settlements with minor 3rd phase additions. The settlement is representative of a group of second phase pithead settlements (category B after Jones), the grouping classed by Jones as category Ab, that is large, compact and regular blocks of settlement, constructed during the second and third phases of colliery settlement (Jones 1969). From the late 19th century, the settlements developed in an organized grid fashion colonizing the valley bottom and steep valley sides in association with the main collieries of the area to produce linear, planned settlements of linear terraces. More use of the valley sides for residential purposes is made, due to geographical constraints. The settlements have remained strongly residential in character and have suffered relatively low commercial development; Davies places Pontygwaith and Tylorstown in group D of his functional and morphological indices (the smaller Stanleytown is purely residential, i.e. group E); essentially distinguished by conversion of houses with wooden shop fronts typical of the very late 19th or early 20th centuries with a few modern shop fronts and distinctive commercial premises. The area is distinct both on urban morphological and functional grounds, from its larger neighbour of Ferndale to the north and in terms of topography from its adjacent neighbour Wattstown to the south, which is a pithead settlement based on a single colliery. The settlements, though relatively late in the history of the Rhondda, retain much character typical of the Rhondda Fach, good examples of linear terraces (i.e. Stanleytown). The historic character of the colliery settlement merits recognition in its own right. Conservation and public awareness policies should be implemented to encourage appropriate development”. (Robertson 2001. P135).

7.6.38. The Evaluation of the relative importance of the part of HLCA 019 directly and/ or indirectly affected by development has been undertaken in Table 7.15 below.

Table 7.15 Evaluation of the relative importance of the part of HLCA 019 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity					✓	
Representativeness				✓		
Documentation					✓	
Group Value				✓		
Survival			✓			
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity				✓		
Representativeness				✓		
Documentation					✓	
Group Value				✓		
Survival			✓			
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
Overall Evaluation Scores						
(a)	(b)	(c)		Equation Score	Overall Score	
Total(a) = n/a	Total(b) = 31 Total(b)/55x100=56.36	Total (c) = 32 Total©/55x100= 58.18		57.27	57 - Considerable	

*which may be directly or indirectly, wholly or partially affected by the proposed development.

Blaenllechau and Ferndale (HLCA020)

7.6.39. Key Historic Landscape Characteristics:

“A composite colliery settlement area comprising two closely associated 1st phase ‘pithead’ settlements associated with a single colliery; rare example of early pithead colliery-built settlements in the Rhondda Fach; Ferndale: planned, compact nucleated 1st phase settlement of linear terraces, grid-pattern and ribbon layouts, with mostly 2nd phase additions; Blaenllechau: a 1st phase linear terraced hillside settlement, originating as isolated rows, with ribbon development and 2nd phase additions; residential settlements retaining typical housing and converted commercial properties, including colliery built housing, building-club and speculative housing; interesting 19th century buildings, i.e. Tre-Rhondda Chapel and Workmen’s Institute; large cemetery serving surrounding area; moderately developed commercial centre (Ferndale only)”.

7.6.40. HLCA Description:

“Blaenllechau and Ferndale is characterised as 1st phase pithead settlements associated with a single colliery - Ferndale Colliery. Blaenllechau, a first phase pithead settlement of small isolated terraces or cottage groupings, generally of the Row type, which form fragments of colliery settlement, sees a renewal of house construction during the second phase (category C3 after Jones). Ferndale, also a first phase pithead settlement, (initially category C1 after Jones), subsequently expanded, largely during the second phase, to produce a composite colliery settlement around its nucleus of early first phase development, Aa category (Jones 1969). The mixed nature of properties along the main High Street of Ferndale is due to the relatively early process of commercialisation of the former residential area, which did not develop to such an extent as say Treorchy or Porth, though on functional and urban morphological grounds has a moderately high grade, and belongs to group C of Davies functional grade of centres, where it ranks above Penygraig (the smaller Blaenllechau is largely residential, i.e. would belong to group E). The commercial centre of Ferndale is characterised primarily on the basis of house conversion, though distinctive commercial premises of two stories and modern shop fronts are in evidence (Davies 1968). Ferndale is distinct from the adjacent settlements of HLCA 019 Pontygwaith, Tylorstown and Stanleytown to the south and HLCA 021 Maerdy lies to the northwest, on grounds of both historical development and urban morphology and functionality, and as such it accordingly merits recognition in its own right requiring the implementation of distinct conservation and public awareness policies, which, while allowing for development, should maintain its distinctiveness”. (Robertson 2001. P141).

7.6.41. The Evaluation of the relative importance of the part of HLCA 020 directly and/ or indirectly affected by development has been undertaken in Table 7.16 below.

Table 7.16 Evaluation of the relative importance of the part of HLCA 020 directly and/ or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/ or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity					✓	
Representativeness				✓		
Documentation				✓		
Group Value				✓		
Survival			✓			
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity				✓		
Representativeness				✓		
Documentation				✓		
Group Value				✓		
Survival			✓			
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
Overall Evaluation Scores						
(a)	(b)	(c)		Equation Score	Overall Score	
Total(a) = n/a	Total(b) = 32 Total(b)/55x100=58.18	Total (c) = 33 Total(c)/55x100=60		59.09	59 - Considerable	

*which may be directly or indirectly, wholly or partially affected by the proposed development

Rhondda Fach Western Enclosed Valley Sides (HLCA024)

7.6.42. Key Historic Landscape Characteristics:

“Prehistoric funerary landscape; relict agricultural landscape to an extent modified by industrial development; distinctive field boundaries; documentary evidence of medieval/postmedieval agricultural practice and settlement; medieval upland settlement; post-medieval upland farmsteads (longhouses); industrial landscape associated with mineral extraction, predominantly coal; ancient woodland and modern forestation”.

7.6.43. HLCA Description:

“Rhondda Fach: Western Enclosed Valley Sides is characterised as an area of enclosed valley side, which represents the surviving extent of medieval/post-medieval enclosure, which had formerly been common grazing and wooded hillside. Little is known of the archaeological remains of the area, the few known sites include prehistoric funerary monuments and medieval house platform settlement. The cartographic record and place name evidence indicates extensive woodland during the medieval/early post-medieval period, i.e. Coedcae place names; small remnants of ancient woodland, and modern forestation on the slopes of Craig Rhondda-fach and on the slopes of Moel-uchaf typify the area. Relict postmedieval enclosures of small irregular fields (ruined stone field boundaries) survive extensively in the south of the area and the usual field boundaries are of the clawdd type, though chronological progression to large dry-stone walling is discernible. The few surviving farmsteads, predominantly longhouse regional types, all lie outside the area and have been subsumed by relatively recent urban development. There has been some industrial incursion into the area and sites include, quarries, coal levels, inclines, coal tips and finds”. (Robertson 2001. P157)

7.6.44. The Evaluation of the relative importance of the part of HLCA 024 directly and/ or indirectly affected by development has been undertaken in Table 7.17 below.

Table 7.17 Evaluation of the relative importance of the part of HLCA 024 directly and/ or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity					✓	
Representativeness		✓				
Documentation						✓
Group Value				✓		
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity				✓		
Representativeness		✓				
Documentation						✓
Group Value				✓		
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential				✓		
Amenity				✓		
Associations					✓	
Overall Evaluation Scores						
(a)	(b)	(c)		Equation Score	Overall Score	
Total(a) = n/a	Total(b) = 30 Total(b)/55x100=54.55	Total (c) = 31 Total(c)/55x100=56.36		55.46	55 - Considerable	

*which may be directly or indirectly, wholly or partially affected by the proposed development.

'Mynachdy Penrhys' (HLCA025)

7.6.45. Key Historic Landscape Characteristics:

"Upland landscape; core area of medieval grange and pilgrimage site; historic, cultural and religious significance; relict post-medieval field system and farmstead(s); minimal industrial influence on the landscape; early communications; documentary evidence; modern social housing, forestry and leisure use".

7.6.46. HLCA Description:

"Mynachdy Penrhys is an interesting and historically important area, dominated archaeologically, culturally, and visibly by features associated with the medieval Cistercian grange and pilgrimage site of Penrhys, although earlier archaeological periods are represented (i.e. prehistoric burial cairns). The area comprises the core of a formerly more extensive medieval grange, which included a chapel, hostelry, and holy well. The area has strong historic and cultural associations, with documentary and cartographic references and fieldname evidence i.e. Cae'r Eglwys and Erw Beddau. Other characteristics include relict post-medieval field systems and farmstead(s), unenclosed upland sheepwalk and early communication corridor. Industrial influence on the landscape has been minimal restricted to a small number of coal levels, tips and quarries". (Robertson 2001, p162)

7.6.47. The Evaluation of the relative importance of the part of HLCA 025 directly and/ or indirectly affected by development has been undertaken in Table 7.18 below.

Table 7.18 Evaluation of the relative importance of the part of HLCA 025 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity	✓					
Representativeness	✓					
Documentation				✓		
Group Value					✓	
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity				✓		
Potential			✓			
Amenity				✓		
Associations			✓			
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity					✓	
Representativeness				✓		
Documentation				✓		
Group Value					✓	
Survival				✓		
Condition				✓		
Coherence				✓		
Integrity			✓			
Potential				✓		
Amenity				✓		
Associations			✓			
Overall Evaluation Scores						
(a)	(b)	(c)		Equation Score	Overall Score	
Total(a) = n/a	Total(b) = 38 Total(b)/55x100=69.09	Total (c) = 29 Total(c)/55x100=52.73		60.91	61- High	

*which may be directly or indirectly, wholly or partially affected by the proposed development.

'Brith-Weunydd & Troed-y-Rhiw' (HLCA027)

7.6.48. Key Historic Landscape Characteristics:

"Relict agricultural landscape to an extent modified by industrial development; distinctive and possibly early boundaries; formerly part of medieval Cistercian grange; post-medieval upland settlement (longhouses); early communications corridor; remnant ancient woodland and Coedcae field names; industrial landscape associated with mineral extraction, predominantly coal".

7.6.49. HLCA Description:

"Brith-weunydd and Troed-y-rhiw is characterised as an area of enclosed valley side, the surviving extent of late medieval (early post-medieval) enclosure, which had formerly been part of the medieval monastic grange of Penrhys and therefore closely associated to HLCA025 Mynachdy Penrhys. The area is extensively characterised by late medieval/early postmedieval relict field system and farmstead(s) with enclosures of small to large irregular fields (stone and hedged boundaries). Relict boundaries associated with the division of the monastic property during the late medieval period may yet survive on the ground; the area would benefit from further survey to establish this and add to the general understanding of the development of upland medieval monastic granges. A possible prehistoric ridge way route along Cefn-y-Rhondda also traverses the area. Coedcae field names indicate the area was formerly more extensively wooded, while cartographic evidence allows an insight into the areas post-medieval development. The landscape of the area has been extensively modified during the last 150 years by industrial extraction of minerals, predominantly coal, but also building stone, industrial sites include quarries, coal levels, former tramways, inclines, and waste tips" (Robertson 2001, p170).

7.6.50. The Evaluation of the relative importance of the part of HLCA 027 directly and/ or indirectly affected by development has been undertaken in Table 7.19 below.

Table 7.19 Evaluation of the relative importance of the part of HLCA 027 directly and/or indirectly affected by development.

Evaluation of the relative importance of the part of the HLCA directly and/or indirectly affected by development						
Criteria ↓	Value →	V High/ V Good (5)	High/ Good (4)	Mod/ Med (3)	Low (2)	V Low/ Poor (1)
(a) Relative Importance of affected area* in relation to the whole Historic Landscape Character Area						
Rarity						
Representativeness						
Documentation						
Group Value						
Survival						
Condition						
Coherence						
Integrity						
Potential						
Amenity						
Associations						
(b) Relative importance of affected area* in relation to the whole Historic Landscape Area on the Register						
Rarity	✓					
Representativeness	✓					
Documentation			✓			
Group Value					✓	
Survival			✓			
Condition			✓			
Coherence			✓			
Integrity			✓			
Potential			✓			
Amenity			✓			
Associations			✓			
(c) Relative importance of affected area* in relation to the relative importance of the HLCA(s) concerned within the national context						
Rarity					✓	
Representativeness					✓	
Documentation			✓			
Group Value			✓			
Survival			✓			
Condition			✓			
Coherence			✓			
Integrity			✓			
Potential		✓				
Amenity			✓			
Associations			✓			
Overall Evaluation Scores						
(a)	(b)	(c)			Equation Score	Overall Score
Total(a) = n/a	Total(b) = 36 Total(b)/55x100=65.45	Total (c) = 32 Total(c)/55x100=58.18			61.82	62 - High

7.6.51. Table 7.20 below depicts the evaluation scores of the areas within HLCAs affected by the Proposed Scheme.

Table 7.20. Stage 4: Relative Importance of Affect Areas within HLCAs.

Overall Evaluation Scores for Relative Importance of Affected Areas*	
HLCA	Overall Value
HLCA 023	76 - High
HLCA 030	45 - Considerable
HLCA018	58 - Considerable
HLCA 019	57 - Considerable
HLCA 020	59 - Considerable
HLCA 024	55 - Considerable
HLCA 025	61 - High
HLCA 027	62 - High
Average Evaluated Landscape Value in Relation to the Development	
Overall Total Value	Grade
59	Considerable

*Affected areas which may be directly or indirectly, wholly or partially affected by the proposed development were assessed for relative importance in relation to (a) the whole of the HLCA(s) concerned, (b) the whole of the Registered Historic Landscape and (c) the national context.

Stage 5: Assessment of Overall Significance of Impact

7.6.52. The following stage combines the results of Stages 2 to 4 to produce an ‘assessment of the overall significance of the impact of development and the effect that altering the Historic Character Area(s) concerned has on the whole of the Historic Landscape area on the Register’ (Cadw 2007, 28). The effect of the development on each Historic Landscape Character Area (HLCA) is scored and the value assessed in relation to the likely loss and consequent reduction in value of the Historic Landscape on the Register. The results are set out in the following table.

Table 7.21. Summary of Overall Impact of the development on Historic Landscapes on the Register.

Summary of the Overall Significance of the Impact of Development on Landscapes of Historic Interest				
HLCA	Value of Historic Character Area (based on stage 4 results)	Impact of Development (Based on stage 2 and 3 results)	Reduction of value of the Historic Landscape Area on Register	Overall Significance of Impact
HLCA 023	High Key elements of high intrinsic importance and/or condition and/or group value, and/or uncommon elsewhere in this or other historic landscape areas on the Register Score: 7	Medium Moderate land loss and consequent fragmentation and/or visual intrusion causing some key elements to be removed or changed so that group value and/or coherence and /or integrity are diminished, and/or amenity value reduced. Score: 5	Medium Development impact on key elements is such that there is some, but still appreciable, reduction in the overall value of the historic landscape area on the Register. Score: 6	18 – Fairly Severe
HLCA 030	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register Score: 5	Medium Moderate land loss and consequent fragmentation and/or visual intrusion causing some key elements to be removed or changed so that group value and/or coherence and /or integrity are diminished, and/or amenity value reduced. Score: 5	Low Development impact on key elements is such that there is slight reduction in the overall value of the historic landscape area on the Register. Score: 3	13 - Moderate
HLCA018	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register Score: 5	Low Slight land loss and consequent fragmentation and/or visual intrusion causing limited numbers of key elements to be removed or changed so that group value and/or coherence and/or integrity are slightly diminished, and/or amenity value slightly reduced. Score: 3	Very Low Development impact on key elements is such that the value of the historic landscape area on the Register remains essentially unchanged. Score: 1	9 - Slight
HLCA 019	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register Score: 5	Medium Moderate land loss and consequent fragmentation and/or visual intrusion causing some key elements to be removed or changed so that group value and/or coherence and /or integrity are diminished, and/or amenity value reduced. Score: 4	Medium Development impact on key elements is such that there is some, but still appreciable, reduction in the overall value of the historic landscape area on the Register. Score: 4	13 - Moderate
HLCA 020	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register Score: 5	Very Low Marginal land loss and consequent fragmentation and/or visual intrusion causing negligible changes to elements and their values. Score: 1	Very Low Development impact on key elements is such that the value of the historic landscape area on the Register remains essentially unchanged. Score: 1	7 - Slight
HLCA 024	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register Score: 5	Very Low Marginal land loss and consequent fragmentation and/or visual intrusion causing negligible changes to elements and their values. Score: 2	Very Low Development impact on key elements is such that the value of the historic landscape area on the Register remains essentially unchanged. Score: 1	8 – Slight
HLCA 025	Medium Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register	Very Low Marginal land loss and consequent fragmentation and/or visual intrusion causing negligible changes to elements and their values. Score: 2	Very Low Development impact on key elements is such that the value of the historic landscape area on the Register remains essentially unchanged.	9 - Slight

	Score: 6		Score: 1	
HLCA 027	<p>Medium</p> <p>Key elements of varying intrinsic importance and/or condition and/or group value and/or generally typical of this or other historic landscape areas on the Register</p> <p>Score: 6</p>	<p>Very Low</p> <p>Marginal land loss and consequent fragmentation and/or visual intrusion causing negligible changes to elements and their values.</p> <p>Score: 2</p>	<p>Very Low</p> <p>Development impact on key elements is such that the value of the historic landscape area on the Register remains essentially unchanged.</p> <p>Score: 1</p>	9 - Slight

ASIDOHL2 Concluding Statement

- 7.6.53. The ASIDOHL2 process considered the potential impact of the Proposed Scheme on all historic landscapes on the Register, with the identification of just a single landscape being affected, The Rhondda (HLW(MGI)5) Landscape of Special Historic Interest. The remaining landscapes on the Register were discounted as having no impacts.
- 7.6.54. Stage 2 of the ASIDOHL2 process identified direct physical impacts on two Historic Landscape Character Areas within The Rhondda (HLW(MGI)5) Historic Landscape; Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023) and Rhondda Uplands (HLCA 030).

Summary of Direct Impact

- 7.6.55. Whilst the direct impact on some important industrial elements within Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023) is fairly severe, e.g. Tramway (TT03), (see Section 7.7) the absolute direct physical impact to the HLCA as a whole is **Very Slight**, with the maximum affected area representing 3.05% of the HLCA or 0.20% of the Historic Landscape. The Magnitude of Direct Impact, which considers the impact in relative terms, has been assessed as **Moderate Adverse**.
- 7.6.56. The direct physical impact on Rhondda Uplands (HLCA 030) as a whole would also be **Very Slight**, with the maximum affected area being 0.4% of the HLCA or 0.11% of the Historic Landscape. As a result, the absolute direct physical impact on The Rhondda (HLW(MGI)5) Historic Landscape as a whole would be **Very Slight**, with only 0.31% of its total area being affected by the Proposed Scheme. The Magnitude of Direct Impact here has been assessed as **Moderate Adverse**.

Summary of Indirect Impact

- 7.6.57. The ASIDOHL2 process identified a total of six additional HLCAs as being potentially affected (indirectly) by the proposed development. One SAM was identified as having a potential for indirect impact, but the site was as assessed as (see section 7.7 above) having no impacts.
- 7.6.58. Stage 3(a) assessed these HLCAs for the potential for indirect (physical) impacts on statutory landscapes, sites and monuments. Stage 3(b) assessed these HLCAs for the potential for indirect (non-physical) Visual Impacts. The Magnitude of Indirect Impacts to Rhondda Fach Eastern Enclosed Valley Sides' (HLCA023) has been assessed as **Moderate Adverse**. A **Slight Adverse** impact has been assessed for 'Rhondda Uplands' (HLCA030), 'Wattstown' (HLCA018) and 'Pontygwaith, Tylorstown & Stanleytown' (HLCA019) and a **Very Slight Adverse** impact has been assessed for 'Blaenllechau & Ferndale' (HLCA020), 'Rhondda Fach Western Enclosed Valley Sides (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027).
- 7.6.59. The relative importance of parts or elements of HLCAs which may be directly or indirectly, wholly or partially, affected by the proposed development were considered in Stage 4. The remaining overall (combined) averaged landscape value was assessed as **High** for Rhondda Fach Eastern Enclosed Valley Sides (HLCA 023), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027) and **Considerable** for Rhondda Uplands (HLCA 030), Wattstown (HLCA018), Pontygwaith, Tylorstown and Stanleytown (HLCA019), Blaenllechau and Ferndale (HLCA020) and Rhondda Fach Western Enclosed Valley Sides (HLCA024).
- 7.6.60. The final (Stage 5) ASIDOHL2 assessment process identified the assessment of the overall significance of the impact of development and the effect that altering the Historic Landscape Character Area(s) (HLCA) concerned has on the whole Historic Landscape area on the

Register (Cadw 2007, p58). The effect of the development on each HLCA was scored and the value assessed in relation to the likely loss and consequent reduction in value of the HLCA on the Register.

- 7.6.61. The impact on 'Rhondda Fach Eastern Enclosed Valley Sides' (HLCA023) received an overall significance of **Fairly Severe**. This is due to the direct impact occurring to a number of 'key elements' that make up the 'extractive' key characteristic of the historic landscape character area (Stage 2 & 3) together with the relative value of the well-preserved tip site within the Rhondda Historic Landscape (Stage 4).
- 7.6.62. Impact on 'Rhondda Uplands' (HLCA030) and 'Pontygwaith, Tylorstown and Stanleytown' (HLCA019) both result in a **Moderate** overall significance. Whilst 'Rhondda Uplands' (HLCA030) also has a direct impact from the proposed Receptor Site, this has less of an effect on the 'key characteristics' of the historic landscape character area as a whole. However, the introduction of the Receptor Site to the HLCA will have an impact on indirect (visual) and setting effects when compared to the HLCA's key characteristics. The result for 'Pontygwaith, Tylorstown and Stanleytown' (HLCA019) reflects the indirect visual and setting effects of the Proposed Scheme on the settlement it overlooks, particularly on Welfare Hall (LB18284, NPRN414737).
- 7.6.63. The remaining five HLCAs have a **Slight** overall significance of impact. This is reflective of the general low level visual impact that the Proposed Scheme will have on the surrounding landscape, namely 'Wattstown' (HLCA018), 'Blaenllechau & Ferndale' (HLCA020) and 'Rhondda Fach Western Enclosed Valley Sides' (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027).

7.7. Mitigation, Enhancement and Monitoring

- 7.7.1. Following the results of the heritage impact assessment (Section 7.5) and the ASIDOHL2 assessment (Section 7.6), the following mitigation strategies are recommended.

Short-term Impacts

- 7.7.2. It is recommended that Tramway Winding Engine Houses (TT04 and TT07) and the intact relict section of Tramway (TT03) are, as far as is reasonable, preserved *in situ*. It is also recommended that the direct impact to Tramway (TT06), where it is crossed by the proposed transport corridor, is minimised. In order to achieve this, it is recommended that a curtilage fence be erected around these assets for the duration of the project in order that they are avoided by the proposed groundworks and transport routes. Alternatively, if direct impact is unavoidable, these assets could be mitigated by archaeological excavation and a preservation by record as described below.

Long-term Impacts

- 7.7.3. It is recommended that a detailed topographical survey be carried out. This will provide a condition survey of the Tylor's Newydd Tips Group Site (GGAT 07879m) as well as offer an opportunity to properly 'ground truth' and systematically record the archaeological features identified on historic mapping and observed during the site visit. A remote survey, such as by drone or LiDAR, would allow this work to be carried out without requiring access to the unstable and unsafe tip material and landslip area.
- 7.7.4. It is recommended that a series of four archaeological investigation trenches should be excavated prior to the widening of the existing Tramway (TT03). An appropriate strategy would be to place two trenches across the proposed transport route to record a sample cross section

of the tramway. An additional trench across the unused relict section of Tramway (TT03) would allow for a comparison with the former two. It is recommended that a fourth trench be placed across Tramway (TT06) to record a sample cross section and mitigate the area lost where it is bisected by the proposed transport corridor.

- 7.7.5. It is recommended that the proposed Receptor Site should be subject to an archaeological Strip, Map and Record (SMR) prior to the commencement of the Proposed Scheme in order to identify and record any buried prehistoric landscape deposits that may be preserved *in situ* beneath the intact upland marsh that currently inhabits this ground. This process would also allow for the archaeological recording of any buried remains of Structure (TT09) and Track (TT10) as well as any other unknown archaeological features. The SMR should include any drainage swales, channels and attenuation ponds. It should also include any temporary transport routes in the vicinity of the Receptor Site. It is of note that this manner of excavation can also facilitate the sensitive removal and/ or relocation of ecologically significant habitat material.
- 7.7.6. It is recommended that an archaeological watching brief be placed on the final stages of the removal of material from RH01 Upper Llanwonno Tip (TT01). The purpose of this is to identify and record any unknown archaeological features that may be discovered *in situ* either within or beneath the tip material. The watching brief would include the proposed drainage works for this site and would mitigate any archaeological features encountered.
- 7.7.7. Finally, it is recommended that the proposed Receptor Site and the RH01 Upper Llanwonno Tip (TT01) sites are sensitively landscaped to minimise indirect (visual) impact to surrounding heritage assets and historic landscape character areas. It is also recommended that Tramway (TT03) is sensitively resurfaced following the completion of the Proposed Scheme to minimise indirect (visual) impact to surrounding heritage assets and to enable a continuation of physical and cultural links between the Tylorstown colliery settlement and associated industrial landscape.

7.8. Residual Impact Assessment

Construction Phase

- 7.8.1. Provided that the mitigation measures noted above are followed then the residual direct impact of the Proposed Scheme on heritage assets can be reduced to **'None'**.
- 7.8.2. The removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03) would have a permanent direct impact, however, the application of a topographical survey and archaeological investigation trenches would ensure 'preservation by record' thus reducing the direct residual impact to **'None'**. Likewise, the trench across Tramway (TT06) would mitigate the direct residual impact here to **'None'**.
- 7.8.3. The topographical survey would also ensure the proper recording of tramway engine houses (TT04) and (TT07) and would inform the application of a curtilage to these assets to ensure their protection for the duration of the proposed works.
- 7.8.4. The archaeological Strip, Map and Record of the proposed Receptor Site would mitigate any direct impact to buried prehistoric landscape remains (TT19) as well as to structure (TT09) and track (TT10), thus reducing the direct residual impact to **'None'** with a residual significance of 'None'.

Operational Phase

- 7.8.5. The preservation *in-situ* of Tramway Winding Engine Houses (TT04) and (TT07) and the relict section of Tramway (TT03), and minimising the impact on Tramway (TT06) would be hugely beneficial for the long-term conservation of the archaeological, cultural and historic landscape value of the Tylor's Newydd Tip site.
- 7.8.6. The sensitive landscaping of the proposed Receptor Site and the RH01 Upper Llanwonno Tip (TT01) site, together with the resurfacing of Tramway (TT03) will minimise the indirect (visual) impact to surrounding heritage assets and historic landscape character areas. However, the proposed changes will be permanent and there will be a residual impact to the individual elements. In particular, the overall residual indirect (visual) impact to Tylor's Newydd Tip (GGAT 07879m) group site as a whole will be **Moderate**, which will have a **Major** significance. Welfare Hall, Tylorstown (LB18284, NPRN414737) has been assessed as being subjected to a **Moderate** indirect (visual) impact, which will have a **Moderate** significance.
- 7.8.7. It is recognised that the significant health and safety concerns related to unstable tip material in the wake of the 2020 Storm Dennis landslide make the Proposed Scheme of long-term benefit to the community of Tylorstown. The consideration of the residual effects to heritage assets should therefore be judged within this significant health and safety context and the wider public benefit.

Table 7.22. Residual Direct Physical Impacts of the Proposed Scheme following recommended mitigation (Construction Phase).

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
CH M01	RH01 Llanwonno Upper Tip (TT01)	Direct physical effect Removal of a substantial part of the heritage asset	Very High Adverse	Preservation by record: <ul style="list-style-type: none"> Topographic survey 	None	None
CH M02	Tramway (TT03)	Direct physical impact Widening of tramway for proposed transport corridor will damage or destroy archaeological remains of a significant proportion of the heritage asset	High Adverse	Preservation by record: <ul style="list-style-type: none"> Topographic survey X3 archaeological trenches across tramline 	None	None
CH M03				Preservation <i>in situ</i> : <ul style="list-style-type: none"> Installing a curtilage fence around the remaining unaffected portion of the tramway will protect the heritage asset from accidental damage during groundworks. 		
CH M04	Tramway (TT06)	Direct physical impact Proposed transport corridor will cut across this heritage asset, bisecting it from its associated Winding Engine House (TT07)	Slight Adverse	Preservation by record: <ul style="list-style-type: none"> Topographic survey X1 archaeological trench across tramline 	None	None

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
CH M05	Potential buried prehistoric landscape (TT19)	<p>Direct physical impact</p> <p>The Proposed Receptor Site is situated on intact marshland that has potential for buried prehistoric landscape which may be damaged or destroyed by the deposition of tip material.</p>	High Adverse	<p>Preservation by record:</p> <ul style="list-style-type: none"> Archaeological strip, map and record of Proposed Receptor Site prior to the commencement of groundworks 	None	None
CH M06	Winding engine house remains (TT04 & TT07)	<p>Potential direct physical impact</p> <p>As the Proposed Scheme stands the heritage assets should not be affected however measures should be put in place to protect them from accidental damage during groundworks.</p>	Low Adverse	<p>Preservation <i>in situ</i>:</p> <ul style="list-style-type: none"> Installing a curtilage fence around the Winding Engine House remains will protect these heritage assets from accidental damage during groundworks. 	None	None
CH M07	Structures (TT08 & TT09)	<p>Potential direct physical impact</p> <p>Located in the Proposed Receptor Site, whilst here are no standing remains it is likely that the footings survive underground and could be affected by the deposition of tip material.</p>	Low Adverse	<p>Preservation by record:</p> <ul style="list-style-type: none"> Archaeological strip, map and record of Proposed Receptor Site prior to the commencement of groundworks 	None	None
CH M08	Potential buried archaeological deposits beneath RH01 Llanwonno Upper Tip (TT01)	<p>Potential direct physical impact</p> <p>There is potential for unknown archaeological deposits beneath the tip material that may be damaged by groundworks</p>	None	<p>Preservation by record:</p> <ul style="list-style-type: none"> Archaeological watching brief of the final phases of tip removal as the excavation reach natural ground. 	None	None

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
CH M09	Rhondda Fach Eastern Enclosed Valley sides (HLCA023)	Direct physical impact of Proposed Scheme will result in 3.05% absolute loss of HLCA and relative loss of HLCA key elements	Moderate Adverse	Natural landscaping of the Receptor Site and Llanwonno Upper Tip and sensitive surfacing of incline tramway.	Moderate Adverse	Moderate
	Rhondda Uplands (HLCA 030)	Direct physical impact of Proposed Scheme will result in 0.4% absolute loss of HLCA and relative loss of HLCA key elements	Moderate Adverse		Moderate adverse	Moderate

Table 7.23. Residual Indirect (Visual) Impacts of the Proposed Scheme following recommended mitigation (Operational Phase).

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
CH M09	Tylor's Newydd Tips Group Site (GGAT07879m)	Indirect visual effects Visual effects to the site as a whole due to the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01), the widening of Tramway (TT03) and the new Receptor Site.	Severe Adverse	Natural landscaping of the Receptor Site and Llanwonno Upper Tip and sensitive surfacing of incline tramway.	Severe Adverse	Severe
	RH02 'Old Smokey' tip	Indirect visual effects Visual effects to heritage assets caused by the new Receptor Site as well as the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Moderate Adverse		Moderate Adverse	Moderate
	Heritage assets within primary (250 m radius) study area	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Very Slight Adverse		Very Slight Adverse	Very Slight
	Welfare Hall, Tylorstown (LB18284)	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Moderate Adverse		Moderate Adverse	Moderate

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
	Church of our Lady Penrhys (LB17659)	Indirect visual effects Visual effects to heritage assets caused by the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01) and the widening of Tramway (TT03).	Very Slight Adverse		Very Slight Adverse	Very Slight
	Rhondda Fach Eastern Enclosed Valley sides (HLCA023)	Indirect physical and non-physical (visual) effects	Moderate Adverse		Moderate Adverse	Moderate
	Wattstown (HLCA018)	Indirect physical and non-physical (visual) effects	Moderate Adverse		Moderate Adverse	Moderate
	Rhondda Uplands (HLCA 030)	Indirect physical and non-physical (visual) effects	Slight Adverse		Slight Adverse	Slight
	Pontygwaith, Tylorstown and Stanleytown (HLCA019)	Indirect physical and non-physical (visual) effects	Slight Adverse		Slight Adverse	Slight
	Blaenllechau and Ferndale (HLCA020)	Indirect visual effects	Very Slight Adverse		Very Slight Adverse	Very Slight
	Rhondda Fach Western Enclosed Valley Sides (HLCA024)	Indirect visual effects	Very Slight Adverse		Very Slight Adverse	Very Slight
	Mynachdy Penrhys (HLCA025)	Indirect visual effects	Very Slight Adverse		Very Slight Adverse	Very Slight

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
	Brith-Weunydd & Troed-y-Rhiw (HLCA027)	Indirect visual effects	Very Slight Adverse		Very Slight Adverse	Very Slight

7.9. Summary

- 7.9.1. The Cultural Heritage Impact Assessment has identified the potential direct and indirect (visual) effects of the Proposed Scheme together with an assessment of the setting and significance of high value heritage assets. The ASIDOHL2 assessment considered the potential direct and indirect physical and non-physical (visual) impacts on the setting and significance of statutory designated sites and Historic Landscape Character Areas (HLCAs) within the Registered Historic Landscape.

Cultural Heritage Impact Assessment

- 7.9.2. The only heritage asset within the RLB of the Proposed Scheme is 'Tylor's Newydd Tips (GGAT 07879m), which was assessed as being subjected to an overall direct impact of **High**, with the significance of effect being **Major**. For the purposes of the assessment this group site was broken up into individual elements and a total of eleven heritage assets were identified in this process. Llanwonno Upper Tip (TT01), which is the subject of the relocation project will be subject to a **Very High** direct effect, with the significance of effect being **Major**. In addition, the Proposed Scheme will have a direct impact on Tramway (TT03) which has been assessed as **High**, with a significance of effect being **Major**. However, a portion of this tramway sits outside the proposed transport corridor and will remain intact and unaffected. Remains of Tramway Winding Engine Houses (TT04 & TT07) would be subject to a **Low** direct effect with a **Moderate** significance of effect.
- 7.9.3. The Proposed Scheme will have an overall **Slight** direct effect on the northern end of Tramway (TT06), with a significance of effect of **Moderate**. The remains of two post-medieval engine houses (TT04) and (TT05) will be subject to a **Low** direct effect. Two further structures (TT08) and (TT09) that were indicated on historic mapping were not visible on the ground but may survive underground and therefore have potential for a **Low** direct impact from the Proposed Scheme with a significance of effect being **Moderate**. Track (TT10) will also be subjected to a **High** direct effect with a significance of effect being **Major**. There is potential for sealed prehistoric deposits beneath the *intact* marsh palaeosol that occupies the proposed location of the Receptor Site. the Proposed Scheme has been assessed as having a **High** direct effect on this asset with the significance of effect being **Major**. There are a further eleven heritage assets within a 250m study area. The principle of these is the 'Old Smokey Tip' (TT05) which will suffer a **Moderate** indirect (visual) effect from the proposed Receptor Site. The remaining identified assets will be subjected to **Very Slight** indirect (visual) effects. Tylor's Newydd Tips Group Site (GGAT07879m) has been assessed as having an overall **Severe** indirect effect meaning that the key views and/or essential lines of sight to and from the heritage asset are interrupted by the Development resulting in partial severance of cultural heritage links.
- 7.9.4. One Scheduled Ancient Monument Carn-y-Wiwer Cairnfield & Platform Houses (SAMGM323, NPRN307766, GGAT04575m, GGAT00581-2m), five Grade II Listed Buildings and one Conservation Area located within a secondary 1km (radius) study area were assessed for indirect (visual) and setting effects. The assessment concluded that there would be **no** indirect (visual) or setting effects to Carn-y-Wiwer Cairnfield and Platform Houses (SAMGM323, NPRN307766, GGAT04575m, GGAT00581-2). The Proposed Scheme was assessed as having a **Moderate** indirect (visual) effect on Welfare Hall, Tylorstown (LB18284, NPRN14064), a **Very Slight** effect on the Church of Our Lady Penrhys (LB17659, NPRN14064) and **no** effect on the Penuel Calvinistic Methodist Church. The remaining three assets, Llanwonno Conservation Area (CA509), St Gwynno's Church (LB81029, GGAT00946m) and Grave of Guto Nyth Bran (LB81030, NPRN310062) were included in the EIA assessment but were found to be subjected to **no** effects.

ASIDOHL2

- 7.9.5. The ASIDOHL2 identified two HLCAs for potential direct effects. The Proposed Scheme was assessed as having a **Very Slight** absolute impact on the Rhondda Fach Eastern Enclosed Valley Sites (HLCA023), with the Magnitude of Direct Impact being **Moderate Adverse**, and 'a **Very Slight Adverse** absolute impact on the Rhondda Uplands' (HLCA030), with the Magnitude of Direct Impact being **Moderate Adverse**. Eight HLCAs were assessed for indirect physical and non-physical (visual) effects in Stage 3 of the ASIDOHL2 process and the relative importance of parts or elements of HLCAs which may be directly or indirectly, wholly or partially, affected by the Proposed Scheme were considered in Stage 4.
- 7.9.6. Stage 5 assessed the overall significance of the impact of the Proposed Scheme and the effect that altering the Historic Landscape Character Area(s) (HLCA) concerned has on the whole Historic Landscape area on the Register (Cadw 2007, p58). The 'Rhondda Fach Eastern Enclosed Valley Sides' (HLCA023) received an overall significance of impact of **Fairly Severe**. 'Rhondda Uplands' (HLCA030) and 'Pontygwaith, Tylorstown & Stanleytown' (HLCA019) both result in a **Moderate** overall significance of impact. The remaining five HLCAs have a **Slight** overall significance of impact, namely 'Wattstown' (HLCA018), 'Blaenllechau & Ferndale' (HLCA020) and 'Rhondda Fach Western Enclosed Valley Sides' (HLCA024), Mynachdy Penrhys (HLCA025) and Brith-Weunydd & Troed-y-Rhiw (HLCA027).
- 7.9.7. Mitigation recommendations for direct impacts include a topographic survey of the Tylor's Newydd Tip site, a series of four archaeological trenches across Tramway (TT03) (x3) and (TT06) (x1) and an archaeological Strip, Map and Record of the proposed Receptor Site. An archaeological watching brief on the final phase of tip removal is also recommended. Landscaping the proposed Receptor Site with a natural profile and resurfacing Tramway (TT03) following completion of the works will minimise indirect visual impact and contribute to the retention of cultural links between the Tylor's Newydd Tips (GGAT07879m) and the surrounding landscape.
- 7.9.8. The mitigation outlined above will ensure a 'Preservation by Record' that will reduce the direct impact of the Proposed Scheme on heritage assets to **None**. The removal of a substantial part of RH01 Llanwonno Upper Tip (TT01), the widening of Tramway (TT03) and the creation of the new tip at the proposed Receptor Site will have a permanent residual indirect visual effect on surrounding heritage assets and the wider Historic Landscape.

8. Landscape and Visual Effects

8.1. Introduction

- 8.1.1. This chapter will assess the landscape and visual effects of the Proposed Scheme.
- 8.1.2. Landscape is defined in the European Landscape Convention as ‘*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*’.
- 8.1.3. It also states that: “*Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of the landscape that make different places distinctive.*” (Landscape Institute and Institute of Environmental Management & Assessment, 2013).
- 8.1.4. Landscape impacts relate to the character of the landscape and consider impacts on landscape components, elements or features, within a landscape.
- 8.1.5. Visual impacts relate to changes to people’s views which arise as a result of changes in the composition of the landscape.
- 8.1.6. The purpose of the landscape and visual impact assessment (LVIA) is to determine the significance of effects on both the landscape character and the visual amenity of the study area.
- 8.1.7. The assessment establishes the baseline landscape characteristics and visual amenity, then identifies their value and sensitivity to change. The impacts of the Proposed Scheme on the landscape and visual amenity during construction and operation are identified. The effects of these impacts are measured based on the magnitude of change to the landscape or views and the significance of these effects are considered based on the sensitive of identified “receptors”.

Study Area

- 8.1.8. The landscape study area was established through desk-based research. After reviewing the designations and landscape character of the area, it was considered that a 1km buffer was proportionate for the Scheme.
- 8.1.9. Volume 2: Plan V2-S08/0001 illustrates the character areas within the study area for this assessment.
- 8.1.10. Visual impact can affect large areas extending from the Proposed Scheme where views in and out of the development site are possible. The visual envelope of the Proposed Scheme has been defined to focus the study area on visual receptors (people) likely to experience significant effects. The study area extends for a 1.5km envelope around the site considering the scale of the development.
- 8.1.11. The visual study area is shown on drawing V2-S10-0001, 0002 and 0003 in Volume 2: Plans, and was refined and agreed through consultation with the Local Authority. Within the study area boundary, a viewpoint study was agreed and carried out.
- 8.1.12. For this assessment, the base year has been set as 2021 and the completion of the Proposed Scheme will be 2022. Assumptions have therefore been made regarding changes to the views in the period between completing the assessment and the base year at completion. The assessment of both landscape character and visual impact was carried out for the base year and operation - Year 1 and Year 15.

8.2. Legislation and Policy

Planning Policy Wales

- 8.2.1. Planning Policy Wales²⁶ sets out the land use and planning policies of the Welsh Government. The key policies and paragraphs within the Planning Policy Wales which relate to landscape are:

Policy 3, Strategic and Spatial Choices: Placemaking In Action (Good Design Making Better Places)

- 8.2.2. Importantly, Paragraph 3.9 states *“The special characteristics of an area should be central to the design of a development. The layout, form, scale and visual appearance of a proposed development and its relationship to its surroundings are important planning considerations”*.
- 8.2.3. Paragraph 3.10 states *“In areas recognised for their particular landscape, townscape, cultural or historic character and value it can be appropriate to seek to promote or reinforce local distinctiveness. In those areas, the impact of the development on the existing character, the scale and siting of new development, and the use of appropriate building materials (including where possible sustainably produced materials from local sources), will be particularly important.”*

Policy 6 Distinctive & Natural Places

- 8.2.4. This policy includes the historic environment, green infrastructure and landscape.
- 8.2.5. The historic environment includes historic landscapes, townscapes, Conservation Areas (CA), Listed Buildings, Scheduled Monuments (SM) and historic Parks and Gardens. These features are assessed in more detail in the Chapter 7: Cultural Heritage of this ES.
- 8.2.6. Paragraph 6.2: Green infrastructure states *“Green infrastructure is the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect places”*.
- 8.2.7. Paragraph 6.2.4: Integrating Green Infrastructure and Development states *“Green infrastructure plays a fundamental role in shaping places and our sense of well-being, and are intrinsic to the quality of the spaces we live, work and play in. The planning system should protect and enhance green infrastructure assets and networks because of these multi-functional roles”*.
- 8.2.8. Paragraph 6.3.1 states *“Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. Landscape policy is guided by the European Landscape Convention”*.
- 8.2.9. Paragraph 6.33 states *“All the landscapes of Wales are valued for their intrinsic contribution to a sense of place, and local authorities should protect and enhance their special characteristics, whilst paying due regard to the social, economic, environmental and cultural benefits they provide, and to their role in creating valued places. Considering landscape at the outset of formulating strategies and policies in development plans and when proposing development is key to sustaining and enhancing their special qualities, and delivering the maximum well-being benefits for present and future generations as well as helping to deliver an effective and integrated approach to natural resource management over the long term”*.

²⁶ Welsh government (2021); Planning Policy Wales - Edition 11.

Characteristics of Local Landscapes

- 8.2.10. The conservation and, where appropriate, enhancement of local landscapes should be provided. This may include landscape features, characteristics and qualities of local significance, statutory Sites of Special Scientific Interest (SSSI) and non-designated Special Landscape Areas (SLAs).

Landscape Information

- 8.2.11. LANDMAP²⁷, which evaluates the geological landscape, landscape habitats, visual and sensory, cultural landscape and historic landscape aspects of the landscape of Wales, and provides the basis of a consistent, quality assured national approach to landscape assessment. LANDMAP has been used as resource to aid the assessment.

Rhondda Cynon Taf Local Development Plan

- 8.2.12. The Rhondda Cynon Taf Local Development Plan (LDP)²⁸ was adopted by the Council in March 2011. This provides the basis for determining planning applications, covering a 15-year period up to 2021. The policies and factors within them which relate to landscape are:
- Policy AW 6 - Design and Placemaking;
 - Policy AW 8: Protection and Enhancement of the Natural Environment; and
 - Policy AW 10: Environmental Protection and Public Health (includes light pollution).

8.3. Guidance

- 8.3.1. The following guidance documents were referred to during the production of this chapter:
- The ICE Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities, Third edition;
 - The Landscape Institute and Institute of Environmental Management & Assessment - Guidelines for Landscape and Visual Impact Assessment (Third Edition) 2013³;
 - Design Manual for Roads and Bridges (DMRB), Sustainability and Environmental Appraisal, LA104 - Environmental assessment and monitoring;
 - DMRB, Sustainability and Environmental Appraisal, LA107 Landscape and visual effects;
 - LANDMAP²⁹; and
 - LI_TGN-06-19_Visual_Representation.

²⁷ <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/landmap-the-welsh-landscape-baseline/?lang=en>

²⁸The Rhondda Cynon Taf Local Development Plan (LDP)
<https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/RelateddocumentsLDP20062021/AdoptedLocalDevelopmentPlan.pdf>

²⁹ LANDMAP <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/landmap-the-welsh-landscape-baseline/?lang=en>

8.4. Assessment Methodology

Establishing the baseline and study area

- 8.4.1. The landscape character areas were determined using LANDMAP along with the baseline information gathered during the site surveys.
- 8.4.2. A theoretical visual envelope referred to as the Zone of Theoretical Visibility (ZTV), was produced with GIS based computer modelling software as a tool to aid in the selection of viewpoints. This approach uses elevation data to create a bare earth digital terrain model of the study area and calculate inter-visibility between points or along lines radiating out from the development location, to construct a map showing the area from which the proposal may potentially be visible and those from which it is not visible. This was developed using a Digital Terrain Model (DTM) from Lidar data to a resolution of 2m. The same process was then repeated including surface features to create a surface model.
- 8.4.3. The ZTV identifies land that is visually connected (theoretically) with the Proposed Scheme. The graded colours reflect the percentage visibility of the proposed development from any particular viewpoint in the model. These viewpoints represent visual receptors (people) and are focussed on the more sensitive types of receptors (which are more likely to experience significant effects). The locations of viewpoints were focussed in visibility 'hot spots' identified by analysis and professional judgment i.e. areas showing the greatest visibility.
- 8.4.4. The viewpoints for the assessment were chosen by identifying potential receptors within the visual envelope. Ordnance Survey (OS) mapping, aerial photography and PRow data were all used to identify preliminary viewpoints. These were then tested using Google Street-View³⁰ (where coverage exists) and verification on site considering the screening effects of buildings and woodlands within the views.
- 8.4.5. A final viewpoint study plan was defined, and the viewpoints established as above. These viewpoints were then assessed in the field using the methodology outlined below.

Methodology for Baseline Field Surveys

- 8.4.6. Fieldwork was undertaken on the 1st of December 2020. The following tasks were carried out:
- Fill in the landscape character survey sheets to help establish the baseline and the landscape impact assessment;
 - check visibility of the development site from the viewpoints identified and agreed in the viewpoint study, to establish the visual baseline condition, and carry out a visual impact assessment for each viewpoint; and
 - identify and assess any additional viewpoints that would add significant value to the viewpoint study and add them to the assessment (where pertinent).
- 8.4.7. The landscape baseline at a local level is reported in the Landscape Character Areas: – Local section below and the viewpoint baseline assessments are reported in Table 8.7.
- 8.4.8. All viewpoints are selected as being representative, to illustrate a larger number of viewpoints that cannot all be included individually. For example, one house is representative of the views

³⁰ <https://www.google.co.uk/maps/place/Aberdare/@51.731871,-3.4824587,2755m/data=!3m1!1e3!4m5!3m4!1s0x486e38040fd70373:0x8bc7b59b6e630b7b!8m2!3d51.716154!4d-3.451816>

of a number of houses in a settlement and certain points may be chosen to represent views from key pathways.

- 8.4.9. The viewpoints were selected to represent views seen by the following groups:
- residents of dwellings;
 - pedestrians, cyclists and equestrians (PCE) using recreational footpaths, cycle routes or PRoWs; and
 - recreational users associated with the river corridor and public open space.
- 8.4.10. Receptor viewpoints were chosen carefully to:
- focus the study;
 - represent the receptors most significantly affected;
 - represent a proportional range of viewing distances in the study area;
 - represent a proportional range of receptor types in the study area; and
 - represent both static and moving receptors in the landscape.
- 8.4.11. In selecting the location of receptor viewpoints, they were split into two types: specific and representative.
- 8.4.12. A specific receptor viewpoint records the baseline view of a fixed viewer e.g. resident at a known location such as a dwelling, other small property, mapped feature, vantage point, or monument etc.
- 8.4.13. A representative receptor viewpoint records the baseline view of a moving viewer e.g. walker, commuter etc. in an unfixed location such as a road, path, cycle route, river, canal, common land, amenity area, open space, large community facility etc.
- 8.4.14. The final defined landscape and visual study area and receptors was agreed with Rhondda Cynon Taf County Borough Councils (RCTCBC) planning authority after the preliminary field work. Detailed field assessments of landscape character areas and viewpoints were focused within a 1 and 1.5km buffer from the Proposed Scheme. These are shown on V2-S8-0001, 0002 and 0003 in Volume 2: Plans.
- 8.4.15. For the purpose of this study, significant landscape and visual impacts are as defined in DMRB i.e. those which give rise to moderate, large or very large impacts (both adverse and beneficial).

Determining the sensitivity of the receptors

- 8.4.16. The sensitivity of each landscape and townscape character area and visual receptor was determined as a result of both a desk study and a site survey. The sensitivity rating is dependent on the nature of the proposed development and the ability of the existing landscape and visual receptor to accommodate the perceived changes. To ensure clarity and consistency, each receptor will be assigned a degree of sensitivity using the descriptors in Table 8.1 and Table 8.2 below.

Table 8.1 Landscape sensitivity (susceptibility and value) and typical descriptions

Sensitivity	Typical Description
Very high	Landscapes of very high international/national importance and rarity or value with no or very limited ability to accommodate change without substantial loss/gain (i.e. national parks, internationally acclaimed landscapes - UNESCO World Heritage Sites).
High	Landscapes of high national importance containing distinctive features/elements with limited ability to accommodate change without incurring substantial loss/ gain (i.e. designated areas, areas of strong sense of place - registered parks and gardens, country parks).
Medium	Landscapes of local or regional recognition of importance able to accommodate some change (i.e. features worthy of conservation, some sense of place or value through use/perception).
Low	Local landscape areas or receptors of low to medium importance with ability to accommodate change (i.e. non-designated or designated areas of local recognition or areas of little sense of place).
Negligible	Landscapes of very low importance and rarity able to accommodate change.

Table 8.2 Visual sensitivity (susceptibility and value) and typical description

Sensitivity (susceptibility and value)	Typical descriptions
Very high	1) Static views from and of major tourist attractions; 2) Views from and of very important national/international landscapes, cultural/historical sites (e.g. National Parks, UNESCO World Heritage sites); 3) Receptors engaged in specific activities for enjoyment of dark skies.
High	1) Views by users of nationally important PRoW / recreational trails (e.g. national trails, long distance footpaths); 2) Views by users of public open spaces for enjoyment of the countryside (e.g. country parks); 3) Static views from dense residential areas, longer transient views from designated public open space, recreational areas; 4) Views from and of rare designated landscapes of national importance.
Medium	1) Static views from less populated residential areas, schools and other institutional buildings and their outdoor areas; 2) Views by outdoor workers; 3) Transient views from local/regional areas such as public open space, Scenic roads, railways or waterways, users of local/regional designated tourist routes of moderate importance; 4) Views from and of landscapes of regional importance.
Low	1) Views by users of main roads or passengers in public transport on main arterial routes; 2) Views by indoor workers; 3) Views by users of recreational/formal sports facilities where the landscape is secondary to enjoyment of the sport; 4) Views by users of local public open spaces of limited importance with limited variety or distinctiveness.
Negligible	1) Quick transient views such as from fast moving vehicles; 1) Views from industrial area, land awaiting re-development; 2) Views from landscapes of no importance with no variety or distinctiveness.

8.4.17. In accordance with the guidance above, an assessment of the project characteristics, such as size and extent; location and alignment; type and massing; was used to determine the potential landscape impacts.

8.4.18. The magnitude of these effects to each of the landscape receptors was determined by the descriptors set out in Table 8.3.

- 8.4.19. The assessment of magnitude of identified impacts also records the degree of change in the composition of particular views: comparing the existing view (baseline) to that which would result as a consequence of the Scheme. In determining the magnitude of impact, the following were considered:
- Scales of change - large scale projects usually generate a greater magnitude of change, but not always;
 - Nature of change - the extent to which a given change is out of character with the existing view can influence the magnitude of the impact;
 - Distance - the magnitude of any change would generally decrease with distance, until a point is reached where there is no discernible change;
 - Screening - certain features may screen or partially screen particular views. Where the feature is vegetation (e.g. deciduous trees) the screening effect may be seasonal;
 - The direction and focus of the view - if the change occurs in the part of the landscape which is the principal area of existing visual interest, the effects are likely to be perceived to be greater than if the proposed change occurs away from the main area of visual interest. This is especially relevant in the context of views from within houses (which are effectively framed by their windows), or from gardens (where views are often restricted by vegetation), and from prominent or locally valued viewpoints;
 - Whether the receptor is static or moving – a greater emphasis was placed upon static receptors than moving receptors from a single viewpoint. However, the cumulative effect of several affected views on a moving receptor may have a high magnitude of impact;
 - Numbers and types of receptors potentially affected at a viewpoint - (e.g. a popular viewpoint, busy trunk road, little-used path or minor lane); and
 - Night-time impacts on receptors - street lighting and headlight glare can introduce additional adverse visual impacts after dark. Conversely, feature lighting can have beneficial visual impacts at night-time.
- 8.4.20. The magnitude of visual impact, or degree of change, is assessed using the criteria in Table 8.4.

Table 8.3 Magnitude and nature of effect on the landscape and typical descriptions.

Magnitude of effect (change)		Typical Descriptions
High	Adverse	Total loss or large-scale damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, conspicuous features or elements.
	Beneficial	Large scale improvement of landscape character to features and elements; and/or addition of new distinctive features or elements, or removal of conspicuous road infrastructure elements.
Medium	Adverse	Partial loss or noticeable damage to existing landscape character or distinctive features or elements; and/or addition of new uncharacteristic, noticeable features or elements (i.e. road infrastructure).
	Beneficial	Partial or noticeable improvement of landscape character by restoration of existing features or elements; or addition of new characteristic features or elements or removal of noticeable features or elements.
Slight	Adverse	Slight loss or damage to existing landscape character of one (maybe more) key features and elements; and/or addition of new uncharacteristic features and elements.
	Beneficial	Slight improvement of landscape character by the restoration of one (maybe more) key existing features and elements; and/or the addition of new characteristic features.
Negligible	Adverse	Very minor loss, damage or alteration to existing landscape character of one or more features and elements.
	Beneficial	Very minor noticeable improvement of character by the restoration of one or more existing features and elements.
No change		No noticeable alteration or improvement, temporary or permanent, of landscape character of existing features and elements.

Table 8.4 Magnitude (change) of visual effect and typical descriptions.

Magnitude (change) of visual effect	Typical descriptions
High	The project, or a part of it, would become a dominant feature or focal point of the view.
Medium	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Slight	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the project would be discernible, or it is at such a distance that it would form a barely noticeable feature or element of the view.
No change	No part of the project, or work or activity associated with it, is discernible.

Assessing the Significance of Landscape Impacts

- 8.4.21. The first assessment determined the significance of the landscape effects without mitigation measures.
- 8.4.22. In accordance with the guidance above, this has been assessed at Construction Phase, Year 1 and Year 15. The effects on night-time character has also been taken into consideration. The significance of the landscape effects of the Proposed Scheme was derived by assessing the value, or “*sensitivity*” of the receptor, against the degree of change, or “*magnitude of impact*” resulting from the development. These valuations are combined by referring to a matrix as shown in Table 8.5 below to identify the “*significance of effects*”.

Table 8.5 Significance Matrix.

		Receptor Value (or Sensitivity)				
		Very High	High	Medium	Low	Negligible
Magnitude of Impact	High	Very Major	Major to Very Major	Moderate to Major	Slight to Moderate	Slight
	Medium	Major to Very Major	Moderate to Major	Moderate	Slight	Neutral to Slight
	Slight	Moderate to Major	Moderate	Slight	Neutral to Slight	Neutral to Slight
	Negligible	Slight	Slight	Neutral to Slight	Neutral to Slight	Neutral
	No Change	Neutral	Neutral	Neutral	Neutral	Neutral

- 8.4.23. Table 8.6 provides typical descriptors of the significance of effects categories. Effects that are Moderate, Major, or Very Major are considered to be “significant”. Where there are two values in the significance matrix the higher value has been applied to the assessment.

Table 8.6 Significance categories and typical descriptions.

Significance Category	Typical description
Very Major	Effects at this level are material in the decision-making process.
Major	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Identifying mitigation measures

- 8.4.24. Design elements have been introduced to mitigate adverse effects of the Scheme. This was determined following the preliminary assessment phase during the mitigation workshop on 14th December 2020.
- 8.4.25. As a result of this workshop, mitigation was listed in the Mitigation Schedule (See Volume 3: Appendix 16.1), which can be cross referenced with the Mitigation Plans (Volume 2: Plan GC3144-RED-61-XX-DR-C-310 to 3013) to geographically locate each item, where applicable.

Informal Discussion

- 8.4.26. In addition to the formal workshops there were numerous informal meetings and discussions between designers and environmental assessors to consider options to improve the environmental design of the Proposed Scheme.

Assessing residual effects

- 8.4.27. Following the introduction of mitigation, receptors that were previously identified to have significant effects were assessed again. This residual impact assessment determined whether mitigation caused a change in the significance of effects. Again, the effects have been assessed at both Construction and operational Phases, Year 1 and Year 15. The assessment at years 1 and 15 allows for a comparison to show how adverse landscape and visual effects can be mitigated over time using planting design.

Identifying cumulative effects

- 8.4.28. The cumulative impacts of any proposed developments within the study area have been assessed for all committed or existing developments. Further details of these developments can be found in the Cumulative Effects section (Section 8.8).

Overall Impact Significance

- 8.4.29. An assessment of impact significance was made for each receptor. The results from these assessments informed the overall impact assessment on landscape character which is included in the summary (Section 8.9).

Limitations and Assumptions

- 8.4.30. Access to private property was not possible during field study. Field survey information was gathered from areas with public access only.

Construction Phase

- 8.4.31. Information and details of the construction phase have been assessed based on indicative construction information provided at the mitigation workshop in December 2020. This forms the 'worst case' scenario and sets the parameters for the Proposed Scheme.

8.5. Baseline Conditions

Landscape Character Areas: - National

- 8.5.1. The study area lies within the national landscape character area defined by Natural Resources Wales (NRW): namely the South Wales Valleys National Landscape Character Area (NLCA37)

The key characteristics of this area relevant the Proposed Scheme is defined in the NRW documents³¹ and are summarised below.

South Wales Valleys National Landscape Character Area (NLCA37)

- Extensive Upland plateaux – typically wild and windswept, often with unenclosed tracts, running roughly north-south as ‘fingers’ parallel between intervening deep valleys. (Forming setting for the area);
- Ribbon urban and industrial areas in valleys – in places extending up valley sides;
- Extensive remains of heavy industry – with a mix of derelict, preserved and largely redeveloped areas, notably for coal mining;
- Contrast of urban valley activity next to quiet uplands – e.g. busy roads, new developments, traffic noise, night lighting, versus the adjacent wilder, remoter, quieter uplands;
- Large blocks of coniferous plantation and deciduous woodland fringes – covering many steep hillsides and hilltops, most notably in the middle to western portion of the area, providing a softer contemporary landscape where there was once industry;
- Improved pastures on some lower valley sides - grazed by sheep and some dairy cattle;
- Field boundaries - dry stone walls mark the boundary of common land while fields on lower slopes are bounded by dense hawthorn hedges, interspersed with swathes of broadleaved woodland;
- Transport routes restricted to valleys – the intervening topography makes valley to valley travel difficult, except at heads and bottoms of valleys. Occasionally there are roads that climb steeply over passes with dramatic views and ‘hair pin’ bends; and
- Iconic cultural identify – many popular images of a tough, rugby-playing, religious, radically-minded society still remain associated with the South Wales Valleys, however today’s post-industrial, internet-connected reality is somewhat different.

Landscape Character Areas: – Local

- 8.5.2. For this assessment, the baseline has been established at a local level. LANDMAP a database maintained by NRW and desk-based research along with field survey information has been gathered to provide character areas at a local level. The character areas are based on the visual sensory classifications, but the sensitivity also takes into consideration landscape habitats, historic landscapes, geological landscape and cultural landscape services aspects.
- 8.5.3. At a local level the existing landscape comprises strongly defined undulating topography with a ridge and valley which create a multi-scaled landscape. The valley is narrow with steep sides rising from the valley floor.

Hillside and Scarp Slopes Mosaic Valley East

- 8.5.4. This character area lies in the LANDMAP Visual and Sensory area CYNONVS141 which is valued as moderate, the Landscape Habitats area CYNONLH072 and CYNONLH083 valued as high and moderate respectively and the Historic Landscape area CYNONHL870 and

³¹ <https://naturalresources.wales/evidence-and-data/maps/nlca/?lang=en>

CYNONHL687 valued as moderate and outstanding respectively. It also lies within the Geological Landscape CYNONGL016 valued as high and the Cultural Landscape Services CYNONCLS013.

Key Characteristics

8.5.5. The key characteristics of this local landscape are:

- This landscape is essentially both upland and enclosed in character;
- There is a moderate sense of place due to a mix of characteristics/elements from the upland (open) to slight urban (more enclosed valley side on the lower slopes) which detracts from the overall sense of place adding a slight confused feeling into the landscape;
- A landscape of rough grazing with conifer plantations, small woodland/broadleaf clumps and heathland;
- Bracken, grasses and areas of gorse cover large swathes of the character area;
- The topography is very steep in nature but levels off slightly on the upper slopes adjacent to the Wooded Upland Plateaux;
- The Old Smokey, a dominating landform is situated on the top of the valley sides on the edge of the character and consists of a large mound of existing spoil material partially covered with naturally regenerated grasses, scrub and trees. The embankments are varying in gradient and scars are visible due to recreational use and where vegetation has not become established. Informal footpaths run diagonally up the embankments allowing recreational users access to the summit;
- Blaenllechau Road which is narrow and steep in nature runs diagonally up the valley side towards the Old Smokey with the topography rising/dropping away steeply at its edges;
- There is a large area of slipped material creating very visible scar on the landscape which has changed its fabric, landcover, and use in this location;
- Boundary types include dry stone walls, post & wire fence cut drainage, earth/vegetated banks;
- Several natural watercourses run through the area mainly situated to the north and south and running down the valley sides;
- Detracting elements include electric poles and overhead wires; and
- The urban valley floor and light pollution at night add visual intrusions into the otherwise rural landscape.

Night-Time Character

8.5.6. The night-time character of the area feels rural (unlit). Street lighting columns and headlights from road traffic are present on the valley floor below.

Landscape Designations

8.5.7. The following designations are associated with this landscape:

- Sites of Important Nature Conservation (SINC).

Sensitivity

- 8.5.8. This landscape character area is of local importance and has a moderate sense of place therefore, the sensitivity of this landscape receptor has been classed as: **Medium**.

Urban Valley Floor

- 8.5.9. This character area lies in the LANDMAP Visual and Sensory area CYNONVS337 which is valued as low, the Landscape Habitats area CYNONLH090 and CYNONLH081 valued as low and high respectively and the Historic Landscape area CYNONHL378 valued as outstanding. It also lies within the Geological Landscape CYNONGL025 valued as moderate and the Cultural Landscape Services CYNONCLS041.

Key Characteristics

- 8.5.10. The key characteristics of this local landscape are:
- This character area comprises urbanised villages on the valley floor and immediate valley sides within the relatively narrow valley. The urban fabric is provided by tightly integrated industrial urban housing settlements;
 - The main urbanised area of Tylorstown rises from the valley floor on the western side although Stanleytown on the southern edge of the character area rises to the east;
 - The character area lies within the Historic Landscape area of Pontygwaith, Tylorstown and Stanleytown on the Register of Historic Landscapes (Cadw). These settlements evolved to serve the collieries of the Mid-Fach;
 - The urban area lacks a focus/central area and spreads along the valley floor following the river and transport corridors including the railway and the A4233;
 - Streets are long and feel enclosed with variants on the ubiquitous linear two-storey terrace of Pennant Sandstone (both single and double fronted and the less frequent single-storeyed properties). There are a few newer brick properties notably at the end of upper terrace in Stanleytown;
 - The streets are benched into steep topography at the start of the valley sides;
 - Interspersed woodland/broadleaf clumps and scrub vegetation break up the built form;
 - The landscape setting and historic landscape give some local identity and some sense of place linked to its rural surroundings;
 - There is a mix of outbuildings and garden styles some established with mature trees and shrubs adding a mosaic feel to the linear settlement nature; and
 - Boundary types include dry stone walls, brick and metal rail fencing.

Night-Time Character

- 8.5.11. The night-time character of the area is urban and suburban. Street lighting columns are present within the built-up area and provide permanent illumination. Road traffic introduces urbanising elements including headlights and noise from road users.

Landscape Designations

- 8.5.12. The following designations are associated with this landscape:

- This landscape character lies within the Historic Landscape area of Pontygwaith, Tylorstown and Stanleytown;
- Sites of Important Nature Conservation (SINC); and
- Green Wedge Land between Penrhys (including Penrhys Cemetery) and Tylorstown (not a designation but of local importance).

Sensitivity

- 8.5.13. Although the visual sensory classification is low this landscape has some sense of place, the landscape setting and historic landscape give some local identify although the urban/sub-urban character and existing busy roads detract from this. It is considered that it would be able to accommodate some change of the type proposed. Therefore, the sensitivity of this landscape receptor has been classed as: **Medium**.

Wooded Upland Plateaux

- 8.5.14. This character area lies in the LANDMAP Visual and Sensory area CYNONVS580 which is valued as low, the Landscape Habitats area CYNONLH090 and CYNONLH081 valued as low and high respectively and the Historic Landscape area CYNONHL378 valued as outstanding. It also lies within the Geological Landscape CYNONGL025 valued as moderate and the Cultural Landscape Services CYNONCLS041.

Key Characteristics

- 8.5.15. The key characteristics of this local landscape are:
- This upland landscape is dominated by coniferous forest plantations varying in age with small areas of rough grazing/open land interspersed amongst it;
 - Forest tracks create a linear yet mosaic pattern on the landscape dividing the plantations into sections;
 - The topography is undulating although less steep than the valley sides adjacent to it;
 - The landscape feels more remote and calm, with the urban areas on the valley floor screened partially from view;
 - The landscape feels large in nature although enclosed due to forest plantations and natural topography;
 - There is a moderate sense of place due to the feeling and overall perception of the landscape; and
 - Boundary types include, post & wire fence cut drainage and earth/vegetated banks.

Night-time Character

- 8.5.16. The night-time character of the area feels rural (unlit). There is slight light intrusion from any views out to the valley floor below and from road traffic along Blaenllechau Road although the effects are **negligible**.

Landscape Designations

- 8.5.17. The following designations are associated with this landscape:
- Sites of Important Nature Conservation (SINC).

Sensitivity

- 8.5.18. This landscape character area is a typical upland plantation with a moderate sense of place able to accommodate some change therefore the sensitivity of this landscape receptor has been classed as: **Medium**.

Hillside and Scarp Slopes Mosaic Valley West

- 8.5.19. This character area lies in the LANDMAP Visual and Sensory area CynonVS738 which is valued as moderate, the Landscape Habitats area CYNONLH071 and CYNONLH081 valued as high and high respectively and the Historic Landscape area CYNONHL997 and CYNONHL687 valued as high and high respectively. It also lies within the Geological Landscape CYNONGL025 valued as moderate and the Cultural Landscape Services CYNONCLS041.

Key Characteristics

- 8.5.20. The key characteristics of this local landscape are:
- A landscape of rough grassland with conifer plantations on the upper slopes, small woodland/broadleaf clumps and heathland including considerable areas of purple moor grass dominated grassland;
 - There is a moderate sense of place due to a mix of characteristics/elements from the upland (open) to slight urban (more enclosed valley side on the lower slopes) which detracts from the overall sense of place and adds a slight confused feeling into the landscape;
 - The landscape feels open with views out across the valley to the east;
 - The topography is very steep but levels off slightly on the upper slopes at the western boundary; and
 - Footpaths and forest tracks create a mosaic pattern on the landscape.

Night-time Character

- 8.5.21. The night-time character of the area feels rural (unlit). Street lighting columns are present on roads which bound the study area. Road traffic introduces urbanising elements including headlights and noise from road users.

Landscape Designations

- 8.5.22. The following designations are associated with this landscape:
- Sites of Important Nature Conservation (SINC).

Sensitivity

- 8.5.23. This landscape character area is of local/regional recognition therefore the sensitivity of this landscape receptor has been classed as: **Medium**.

Current visual baseline

- 8.5.24. The initial visual baseline assessment was carried out during the walk over surveys on 30th November and 1st December 2020.

8.5.25. A total number of seven viewpoints around the site were assessed in terms of their features and sensitivity. The baseline conditions within the study area and their defined sensitivity is shown in Table 8.7 below and are shown in Volume 2: Plan V2-S10-0001, 0002 and 0003.

Table 8.7 Summarising the Baseline Information and Sensitivity.

Viewpoint Number	Brief Baseline Description of the Existing View	Sensitivity
1	<p>Heol Tir Gwaidd, Penrhys (residential) - The baseline view from this receptor looks across to the eastern side of the valley and the prominent landform of the Old Smokey in the distance. Self-seeded conifer trees are in clusters on and around the base of Old Smokey. Larger conifer plantations are visible in the distance both to the far left and right of the view. To the right, the views are partially screened due to the topography and vegetation in the near view. Welsh poultry farm buildings in the mid view on the valley side and lighting columns in the near view intrude built form into a predominantly rural open setting.</p>	High
2	<p>PRoW TYL 2/1, Park Street- The baseline view from this receptor is across rooftops to the eastern side of the valley. In the centre the large landslip is a prominent scar on the landscape. The valley sides and top are partially characterised by an open landscape of rough grazing with conifer plantations and small woodland/broadleaf clumps creating a mosaic landscape pattern visible to the receptor. To the right the prominent landform of the Old Smokey, with its Natural regenerated conifer trees, is prominent in the view from this location.</p>	High
3	<p>Union Place at the junction with Arfryn Terrace (residential) – The baseline view from this receptor is across rooftops to the eastern side of the valley, with the topography rising steeply to meet the skyline. In the centre the large landslip is a prominent scar on the landscape. The valley sides and top are partially characterised by an open landscape of rough grazing with conifer plantations and small woodland/broadleaf clumps creating a mosaic landscape pattern visible to the receptor. The valley bottom is screened by the residential buildings in the near view. To the right, the prominent landform of the Old Smokey with its self-seeded conifer trees is prominent in the view from this location.</p>	High
4	<p>Heol Llechau Wattstown (residential) – The baseline view is from the end of Heol Llechau looking up towards the valley top; the top of Old Smokey is visible on the skyline. Vegetation in the near view screens much of the valley side. To the right, the view is screened by a garage and residential properties which contrast with the natural landscape beyond.</p>	High
5	<p>PRoW TYL 9/1 Blaenllechau Rd – The baseline view is from the passing place on Blaenllechau Rd at the start of PRoW TYL 9/1 and looks over an open landscape of rough grazing to the valley top with conifer trees dotted on the skyline. The road continues into the distance and out of view. To the right the prominent landform of the Old Smokey with its natural regenerated conifer trees is prominent in the view from this location. The view to the left contains no conifers just the outline on the valley top on the skyline. There are post and wire fences visible in the view although they are dilapidated in nature.</p>	High
6	<p>PRoW TYL 9/1 south east of Llanwonno Summit – The baseline view is located on PRoW TYL 9/1, looking slightly to the right of Old Smokey. In the centre of the view the rough topography and tracks rise slightly to meet the skyline. To the right, the landform of the Old Smokey with its self-seeded conifer trees is dominant in the view and screens any distant views. To the left, the topography rises to meet the conifer plantation. Views are quite short due to the makeup of the landscape.</p>	High

Viewpoint Number	Brief Baseline Description of the Existing View	Sensitivity
7	The junction of East Road and East Street leading to the Rhondda Fach Leisure Centre (both recreational and residential) – The baseline view from this receptor looks across to the eastern side of the valley the topography rising steeply to meet the skyline. In the centre the large landslip is a prominent scar on the landscape although vegetation in the near view screens the lower half of the slope. To the left and right, the valley side characterised by an open landscape of rough grazing which is readily apparent to the receptor. Again, vegetation partially screens the lower slopes here. The road, lighting columns, electric poles, fences and signs add urbanising elements in the near view with the rural more open landscape behind.	High

8.5.26. As stated in paragraph 8.4.8. all viewpoints are selected as being representative, to illustrate a larger number of viewpoints that cannot all be included individually. For example, one house is representative of the views of a number of houses in a settlement and certain points may be chosen to represent views from key pathways.

8.6. Preliminary Impact Assessment

Construction Phase

8.6.1. An assessment has been undertaken to assess the significance of effects of the Scheme without mitigation at Construction Phase, Operational Phase (Year 1) and Year 15 without proposed mitigation. The assessment of the effects at night-time has also been taken into consideration. The construction impact assessment on landscape character is set out in Table 8.8 below followed by an assessment of visual impacts at each viewpoint.

Table 8.8 Landscape Impact Assessment - Construction Phase.

Receptor and sensitivity	Impact	Effect	Magnitude	Significance
Hillside and Scarp Slopes Mosaic Valley East (Medium)	<p>The construction of the large spoil mound at the receptor site.</p> <p>The movement of material from Llanwonno Tip.</p> <p>The movement of construction vehicles through the character area taking material from Llanwonno Tip up to the receptor site.</p> <p>The potential introduction of lighting associated with construction in the winter months (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).</p> <p>Land used as a site compound adjacent to the receptor site.</p> <p>Loss of vegetation, including native broadleaved trees and non-native coniferous trees, during the construction phase of the works.</p>	<p>The earthworks create a prominent element in the landscape adjacent to the Old Smokey.</p> <p>The grading of material at Llanwonno Tip creates a beneficial change to the landscape.</p> <p>An increase in construction traffic through this character area will have an adverse effect on its rural qualities especially on the upper slopes. The urban feel will be increased on the lower slopes.</p> <p>Increased lighting will change the feeling at night.</p> <p>The site compound will become a prominent feature in this rural landscape and have an adverse effect on landscape quality.</p> <p>The site compound will create increased movement within the character area.</p> <p>Vegetation lost due to construction changing the fabric of the landscape.</p>	High Adverse	
Urban Valley Floor (Medium)	<p>The construction of the large spoil mound at the receptor site and the grading of material at the Llanwonno Upper Tip.</p> <p>The movement of material from Llanwonno Tip to the receptor site.</p> <p>The movement of construction vehicles.</p> <p>The potential introduction of lighting associated with construction in the winter months (although the majority</p>	<p>Construction activities will create noticeable features within the adjacent Hillside and Scarp Slopes Mosaic Valley East character area.</p> <p>Increased lighting will change the feeling and outlook from the character area at night.</p>	Slight Adverse	Slight Adverse

Receptor and sensitivity	Impact	Effect	Magnitude	Significance
	of construction works are expected to be completed in Spring, Summer and early Autumn).			
Wooded Upland Plateaux (Medium)	<p>The construction of the large spoil mound at the receptor site.</p> <p>The movement of construction vehicles at the receptor site.</p> <p>The potential introduction of lighting associated with construction in the winter months (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).</p>	<p>This character area is not directly affected; however, the earthworks are creating a prominent element in the landscape adjacent to the Old Smokey which is visible from the western edge of this character area.</p> <p>An increase in construction traffic will have an adverse effect on the setting of this character area and its rural qualities along its western boundary.</p> <p>Increased lighting from within the neighbouring character area will change the feeling at night.</p>	Slight Adverse	Slight Adverse
Hillside and Scarp Slopes Mosaic Valley West (Medium)	<p>The construction of the large spoil mound at the receptor site and the grading of material at the Llanwonno Upper Tip.</p> <p>The movement of material from Llanwonno Tip to the receptor site.</p> <p>The movement of construction vehicles.</p> <p>The potential introduction of lighting associated with construction in the winter months (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).</p>	<p>This character area is not directly affected; however, construction activities will create noticeable features across the valley.</p> <p>Increased lighting across the valley will change the feeling at night.</p>	Slight Adverse	Slight Adverse

8.6.2. The following is a list of aspects that were considered in the assessment of visual impacts arising from the construction phase:

- loss of vegetation (although scrub can develop on construction sites);
- earthworks and construction works;
- the siting of any temporary buildings;
- the siting of any compounds;
- the visibility of plant and materials; and
- floodlighting.

8.6.3. Detailed assessments for each viewpoint during the construction phase without mitigation are described below and should be read in conjunction with drawing V2-S8-0001 and 0002 in Volume 2: Plans for the viewpoint locations. These are also summarised in Table 8.9 below.

Viewpoint 1 - Heol Tir Gwaidd, Penrhys (residential)

8.6.4. Construction activities associated with the Proposed Scheme would be partially visible in far view across the valley. Vegetation and topography to the right screen views of construction activities associated with the Llanwonno Tip. Visible construction activities are associated with movement of vehicles transporting material up to the receptor site, the adjacent site compound and works associated with the western edge of the receptor site. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.5. Magnitude: **High**. Significance: **Major Adverse**.

Viewpoint 2 - PRow TYL 2/1, Park Street

8.6.6. Construction activities associated with the Proposed Scheme would be dominant in the view across the valley. Construction activities include the movement and grading of material from Llanwonno Tip and the movement of vehicles transporting material up to the receptor site. To the right, the main site compound and works associated with the western edge of the receptor site will be visible. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.7. Magnitude: **High**. Significance: **Very Major Adverse**.

Viewpoint 3 - Union Place at the junction with Arfryn Terrace (residential)

8.6.8. Construction activities associated with the Proposed Scheme would be dominant in the view across the valley although the toe of slope screened by residential properties in the foreground. Construction activities include the movement and grading of material from Llanwonno Tip and the movement of vehicles transporting material up to the receptor site. To the right, the main site compound and works associated with the western edge of the receptor site will be visible. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.9. Magnitude: **High**. Significance: **Very Major Adverse**.

Viewpoint 4 - Heol Llechau Wattstown (residential)

8.6.10. Construction activities associated with the Proposed Scheme would be seen looking up the valley. Construction activities are associated with the movement of material on the southern edge of the receptor site. Topography, including the Old Smokey, screen any views beyond. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.11. Magnitude: **Medium**. Significance: **Moderate Adverse**.

Viewpoint 5 - PRow TYL 9/1 Blaenllechau Rd

8.6.12. Construction activities associated with the Proposed Scheme would be dominant in the near view. The main site compound and construction activities associated with the receptor site will be directly visible. Movement of vehicles transporting material up to the receptor site will be visible although, to the right, the topography drops away gradually passing out of sight. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.13. Magnitude: **High**. Significance: **Very Major Adverse**.

Viewpoint 6 - PRow TYL 9/1 south east of the Old Smokey

8.6.14. Construction activities associated with the Proposed Scheme would be dominant in the near view. Activities are associated with the movement of material on the southern edge of the receptor site. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.15. Magnitude: **High**. Significance: **Very Major Adverse**.

Viewpoint 7 - The junction of East Road and East Street leading to the Rhondda Fach Leisure Centre (both recreational and residential)

8.6.16. Construction activities associated with the Proposed Scheme would be visually prominent in the view across the valley although the toe of the slope is screened by vegetation in the foreground. Construction activities include the movement and grading of material from Llanwonno Upper Tip and the movement of vehicles transporting material up to the receptor site. To the right, the main site compound and works associated with the western edge of the receptor site will be visible. During the winter months, any floodlighting associated with construction would be noticeable (although the majority of construction works are expected to be completed in Spring, Summer and early Autumn).

8.6.17. Magnitude: **High**. Significance: **Very Major Adverse**.

Table 8.9 Summary of Visual Impact Assessment - Construction Phase.

Receptor and sensitivity	Impact	Effect	Magnitude	Significance
1 - Heol Tir Gwaidd, Penrhys (residential) (High)	Removal of existing vegetation. Construction compound / works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Major Adverse
2 - PRoW TYL 2/1, Park Street (High)	Removal of existing vegetation. Construction compound / works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Very Major Adverse
3 - Union Place at the junction with Arfryn Terrace (residential) (High)	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Very Major Adverse
4 - Heol Llechau Wattstown (residential) (High)	Removal of existing vegetation. Construction compound / works, and lighting.	Loss of visual amenity for the receptor	Medium Adverse	Moderate Adverse
5 - PRoW TYL 9/1 Blaenllechau Rd (High)	Removal of existing vegetation. Construction compound / works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Very Major Adverse
6 - PRoW TYL 9/1 south east of the Old Smokey (High)	Removal of existing vegetation. Construction works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Very Major Adverse
7 - The junction of East Road and East Street leading to the Rhondda Fach Leisure Centre (both recreational and residential) (High)	Removal of existing vegetation. Construction compound / works, and lighting.	Loss of visual amenity for the receptor	High Adverse	Very Major Adverse

Operation Phase

8.6.18. Detailed assessments of the operation phase impacts (in Year 1 and Year 15 post-construction) for each character area without mitigation are described in Table 8.10 below.

Operational effects: Year 1 and Year 15

Table 8.10 Landscape Assessment (without mitigation) – Operation Phase Year 1 and Year 15.

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
Hillside and Scarp Slopes Mosaic Valley East (medium)	Change in topography Steep engineered embankments Loss of vegetation	<p>The newly graded valley slope will have a beneficial impact on the topography of the Llanwonno Upper Tip. The slopes tying into the surrounding topography at an unnaturally straight grade.</p> <p>The topography at the receptor site will change from being gently rolling to a large spoil mound with high embankments.</p> <p>The large spoil mound and associated embankments will have an adverse effect on the landscape character due to their scale and form adding to that of the Old Smokey.</p> <p>Loss of grass habitats and heathland that helps make up the fabric of the landscape will have an adverse effect on the landscape character.</p> <p>The receptor site will lack vegetation and be a brown eyesore within the landscape.</p> <p>The Llanwonno Tip will lack vegetation and be a brown scar on the landscape.</p> <p>By Year 15 the proposed seeding and naturally regenerated vegetation would become more established although the spoil mound at the receptor site would still have an adverse effect on the character due to its scale and form.</p>	Year 1 - Medium Adverse Year 15 – Medium Adverse	Moderate Adverse	Moderate Adverse
Urban Valley Floor (medium)	Change in topography Steep engineered embankments Loss of vegetation	<p>This character area is not directly affected, however, there will be a slight beneficial impact due to the newly graded topography of the Llanwonno Tip being visible on the valley side adjacent to this character area.</p>	Year 1 – Slight Adverse	Slight Adverse	Negligible Beneficial

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
		<p>The steep embankments at the western edge of the receptors site will be visible from this character area looking up the valley side, to the east.</p> <p>Loss of grass habitats and heathland on the adjacent valley side that help make up the fabric of the wider landscape will have an adverse effect on the setting of this landscape character.</p> <p>Areas of earth movement will have not re-vegetated, meaning there will still be an eyesore looking out from this character area.</p> <p>By Year 15 the naturally regenerated vegetation would become more established, having a beneficial impact.</p>	Year 15 – Negligible Beneficial		
Wooded Upland Plateaux (medium)	<p>Change in topography</p> <p>Steep engineered embankments</p> <p>Loss of vegetation</p>	<p>This character area is not directly affected, however, the topography at the receptor site will change from being gently rolling to a large spoil mound with high embankments, creating an adverse effect on the setting of this character area.</p> <p>Loss of grass habitats and heathland on the adjacent valley side that help make up the fabric of the wider landscape will have an adverse effect on the setting of this landscape character.</p> <p>By Year 15 the naturally regenerated vegetation would become more established, having a beneficial impact.</p>	<p>Year 1 - Slight Adverse</p> <p>Year 15 - Negligible Adverse</p>	Slight Adverse	Negligible Adverse
Hillside and Scarp Slopes Mosaic Valley West (medium)	<p>Change in topography</p> <p>Steep engineered embankments</p> <p>Loss of vegetation</p>	<p>This character area is not directly affected, however, there will be a noticeable change creating a beneficial impact from the newly graded Llanwonno Upper Tip on the other side of the valley.</p> <p>The topography at the receptor site will change from being gently rolling to a large spoil mound with high embankments.</p> <p>The large spoil mound and associated embankments will have an adverse effect on the character due to their scale and form, adding to that of the Old Smokey.</p>	<p>Year 1 – Slight Adverse</p> <p>Year 15 – Negligible Beneficial</p>	Slight Adverse	Negligible Beneficial

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
		<p>Loss of grass habitats and heathland that help make up the fabric of the landscape will have an adverse effect on the landscape character.</p> <p>The receptor site will lack vegetation and be a brown eyesore within the landscape.</p> <p>The Llanwonno Upper Tip will lack vegetation and be a brown scar on the landscape.</p> <p>By Year 15 the naturally regenerated vegetation would become more established, having a beneficial impact.</p>			

8.6.19. The following is a list of aspects that have been considered in the assessment of visual impacts as part of the operational phase impacts, without mitigation:

- height and appearance of embankments;
- position, height and appearance of new built structures;
- the visibility of the carriageway;
- changes to vegetation; and
- light spill from the proposed carriageway lighting.

8.6.20. Photowires have been produced (refer to Volume 3: Appendix 8.1) showing the original views and the proposed extents of the Proposed Scheme within the existing topography. The rendered images include the existing built form but deliberately do not include the proposed landscaping.

8.6.21. Detailed assessments of the operation phase impacts (in Year 1 and Year 15 post-construction) for each viewpoint without mitigation are described in the following sections. These are also summarised in Table 8.11 below.

Viewpoint 1 - Heol Tir Gwaidd, Penrhys (residential)

8.6.22. In Year 1 of operation, the western edge of the spoil mound at the receptor site will be partially visible. The brown engineered slopes would be a noticeable new landform in the view. By year 15, naturally regenerated vegetation will have partially covered the landform, helping to soften visual effects on the receptor from this location. There will be no additional light pollution during operation.

8.6.23. The magnitude of impact in Year 1 will be **Medium Adverse** reducing to **Slight Adverse** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Slight Adverse**.

Viewpoint 2 - PRow TYL 2/1, Park Street

8.6.24. In Year 1 of operation, the newly graded Llanwonno Tip will be visible. The straight grade will have a beneficial impact tying the slope into the surrounding landscape; however, the material will still create a readily visible brown scar. The western edge of the spoil mound at the receptor site will also be visible, with the brown engineered slopes creating a noticeable new landform in the view. By year 15, naturally regenerated vegetation will have partially covered the earthworks, helping to soften the visual effects on the receptor from this location. There will be no additional light pollution during operation.

8.6.25. The magnitude of impact in Year 1 will be **Medium Adverse** reducing to **Slight Beneficial** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Slight Beneficial**.

Viewpoint 3 - Union Place at the junction with Arfryn Terrace (residential)

8.6.26. In Year 1 of operation, the newly graded Llanwonno Upper Tip will be visible although the toe of slope screened by residential properties in the foreground. The straight grade will have a beneficial impact tying the slope into the surrounding landscape; however, the material will still create a brown scar readily visible to the receptor. The western edge of the spoil mound at the receptor site will also be visible, with the brown engineered slopes creating a noticeable new landform in the view. By year 15, naturally regenerated vegetation will have partially covered

the earthworks, helping to soften visual effects on the receptor from this location. There will be no additional light pollution during operation.

- 8.6.27. The magnitude of impact in Year 1 will be **Medium Adverse** reducing to **Slight Beneficial** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Slight Beneficial**.

Viewpoint 4 - Heol Llechau Wattstown (residential)

- 8.6.28. In Year 1 of operation, the southern edge of the receptor site would be seen looking up the valley. The natural topography and the Old Smokey screen any views beyond. By year 15, natural regenerated vegetation will have partially covered the earthworks, helping to soften effects on the receptor from this location. There will be no additional light pollution during operation.

- 8.6.29. The magnitude of impact in Year 1 will be **Medium Adverse** reducing to **Slight Adverse** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Slight Adverse**.

Viewpoint 5 - PRow TYL 9/1 Blaenllechau Rd

- 8.6.30. In Year 1 of operation, the spoil mound at the receptor site will be dominant in the near view, with the brown engineered slopes creating a dominant new landform. By year 15, naturally regenerated vegetation will have partially covered the earthworks, helping to soften visual effects on the receptor from this location, although the effects will still be significant. There will be no additional light pollution during operation.
- 8.6.31. The magnitude of impact in Year 1 will be **High Adverse** remaining **High** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Very Major Adverse** although this will reduce to **Major Adverse** in year 15.

Viewpoint 6 - PRow TYL 9/1 south east of the Old Smokey

- 8.6.32. In Year 1 of operation, the spoil mound at the receptor site will be dominant in the near view, with the brown engineered slopes creating a dominant new landform. By year 15 naturally regenerated vegetation will have partially covered the earthworks helping to soften visual effects on the receptor from this location although the effects will still be significant. There will be no additional light pollution during operation.
- 8.6.33. The magnitude of impact in Year 1 will be **High Adverse** remaining **High** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Very Major Adverse** although this will reduce to **Major Adverse** in year 15.

Viewpoint 7 - The junction of East Road and East Street leading to the Rhondda Fach Leisure Centre (both recreational and residential)

- 8.6.34. In Year 1 of operation, the newly graded Llanwonno Upper Tip will be would be visible in the view across the valley although the toe of slope will be screened by vegetation in the foreground. The straight grade will have a beneficial impact tying the slope into the surrounding landscape; however, the material will still create a brown scar readily visible to the receptor. By year 15 naturally regenerated vegetation will have partially covered the earthworks helping to soften visual effects on the receptor from this location. There will be no additional light pollution during operation.

8.6.35. The magnitude of impact in Year 1 will be **Medium Adverse** reducing to **Slight Beneficial** in Year 15 without mitigation, therefore the significance of the effect is assessed as **Slight Beneficial**.

Table 8.11 Summary of Operation Visual Impacts (without mitigation).

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
1 - Heol Tir Gwaidd, Penrhys (residential) (High)	Loss of vegetation. Partial intrusion of large embankments on the western edge of the receptor site	Loss of visual amenity for the receptor	Year 1 - Medium Adverse Year 15 – Slight Adverse	Moderate Adverse	Slight Adverse
2 - PRoW TYL 2/1, Park Street (High)	Loss of vegetation. The graded Llanwonno Tip remaining a brown scar. Partial intrusion of large embankments on the western edge of the receptor site	Loss of visual amenity for the receptor	Year 1 – Medium Adverse Year 15 – Slight Beneficial	Moderate Adverse	Slight Beneficial
3 - Union Place at the junction with Arfryn Terrace (residential) (High)	Loss of vegetation. The graded Llanwonno Tip remaining a brown scar. Partial intrusion of large embankments on the western edge of the receptor site	Loss of visual amenity for the receptor	Year 1 - Medium Adverse Year 15 - Slight Beneficial	Moderate Adverse	Slight Beneficial
4 - Heol Llechau Wattstown (residential) (High)	Loss of vegetation. Partial intrusion of large embankments on the southern edge of the receptor site	Loss of visual amenity for the receptor	Year 1 – Slight Adverse Year 15 – Slight Adverse	Slight Adverse	Slight Adverse
5 - PRoW TYL 9/1 Blaenllechau Rd (High)	Loss of vegetation. Direct intrusion of large embankments at the receptor site.	Loss of visual amenity for the receptor	Year 1 - High Adverse Year 15 – High Adverse	Very Major Adverse	Major Adverse
6 - PRoW TYL 9/1 south east of the Old Smokey (High)	Loss of vegetation. Direct intrusion of large embankments at the receptor site.	Loss of visual amenity for the receptor	Year 1 - High Adverse Year 15 - High Adverse	Very Major Adverse	Major Adverse
7 - The junction of East Road and East Street leading to the	Loss of vegetation. The graded Llanwonno Tip remains a brown scar.	Loss of visual	Year 1 - Medium Adverse	Medium Adverse	Slight Beneficial

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
Rhondda Fach Leisure Centre (both recreational and residential) (High)	Partial intrusion of large embankments on the western edge of the receptor site	amenity for the receptor	Year 15 – Slight Beneficial		

8.7. Mitigation, Enhancement and Monitoring

Short-term Impacts

- 8.7.1. Short term mitigation is generally associated with the temporary construction phase impacts.
- 8.7.2. The only significant landscape impacts are on the Hillside and Scarp Slopes Mosaic Valley East character area.
- 8.7.3. Significant visual impacts during the construction phase are predicted at Viewpoints 1, 2, 3, 4, 5, 6 & 7 (residential and recreational receptors). The proposed temporary mitigation measures are summarised in Table 8.12.

Table 8.12 Construction phase visual mitigation.

Ref	Location/Receptor	Nature of Impact	Mitigation
VI M1	1, 2, 3, 4, 5, 6 & 7	Site compounds, temporary buildings and the movement of construction vehicles will have a negative effect on the visual amenity. The height and design of the contractor's buildings may cause a visual barrier or a visual disturbance which would detract from the existing visual amenity.	Careful planning of the construction phasing and layout to ensure visually intrusive features are located away from sensitive receptors or screened appropriately. A CEMP will be produced and include detailed methodology.
LC M1 VI M2	Hillside and Scarp Slopes Mosaic Valley East 1, 2, 3, 4, 5, 6 & 7	There will be a loss of vegetation, including native broadleaved trees and non-native coniferous trees, during the construction phase of the works. The removal of this vegetation will result in change to the landscape fabric and increased levels of visual disturbance and the loss of visual amenity.	<p>The loss of herbaceous vegetation generally will be mitigated through the removal, storage and reinstatement of topsoil, allowing natural regeneration. The principle of only removing trees, shrubs and habitat where it is essential will be adopted, and the arboricultural impact assessment will be used to guide removal.</p> <p>The loss of native trees within the re-landscaped area of the tip will be mitigated through the planting of appropriate compensatory trees.</p> <p>No mitigation is proposed for the removal of non-native coniferous trees as these are of no ecological or landscape value.</p> <p>The contractor should confirm planning approval has been gained prior to the removal of any trees and must seek further planning approval before removing any additional trees or mature shrubs which are</p>

Ref	Location/Receptor	Nature of Impact	Mitigation
			not identified for removal on the contract drawings.
LC M5			Install tree protection fencing around tree groups (as recommended in the Arboricultural Impact Assessment) and move alignment of channel outwith the root protection area of the trees.
LC M2 VI M3	Hillside and Scarp Slopes Mosaic Valley East 1, 2, 3, 4, 5, 6 & 7	The light pollution created by the floodlighting of the site compound and vehicular movement etc. will cause a visual disturbance to any receptors, especially in the evening and early morning and will change the feeling within the landscape.	All lighting used will be directional and all efforts should be made to avoid unnecessary light pollution. A CEMP will be produced to include detailed method statement.
VI M4	1, 2, 3, 4, 5, 6 & 7	The storage of topsoil has the potential to cause a loss of visual amenity.	Stockpiles of topsoil should be no higher than 2m for general topsoil. The stockpiling should comply with BS 3882:2015. Areas for topsoil storage to be agreed with RCTCBC and managed by the contractor.
LC M3 VI M5	Hillside and Scarp Slopes Mosaic Valley East 1,2,3,6 & 7	Additional traffic will be visible within the construction area. This additional traffic will create a visual disturbance and have an adverse impact on its rural qualities especially on the upper slopes.	A CEMP will be produced to include further details of the construction traffic movements

Long-term Impacts

- 8.7.4. To avoid, reduce or compensate significant adverse landscape and visual operational effects, various mitigation measures have been proposed. Table 8.13 provides details of the operational phase landscape mitigation proposals, the receptors to which they apply and the particular impact or effect that it is mitigating. Table 8.14 provides details of the visual mitigation.
- 8.7.5. Within Table 8.13 and Table 8.14, a reference code is also shown against each item, which correlates with the Mitigation Plans in Volume 2: Plan V2-S16-0001 to 0003.) to illustrate the location of each item where applicable.
- 8.7.6. Significant landscape impacts have been identified at Hillside and Scarp Slopes Mosaic Valley East and Significant visual impacts have been identified at viewpoints 5 & 6.

Table 8.13 Operational phase landscape mitigation.

Ref	Receptor/s	Nature of Impact	Mitigation
LC M4	Hillside and Scarp Slopes Mosaic Valley East	Introduction of engineered slopes	Engineered slopes to be seeded with a low maintenance reclamation mix and slopes allowed to green over
LC M5	Hillside and Scarp Slopes Mosaic Valley East	Loss of Important habitats	Topsoil at the receptor site to be stripped and reused as a top dressing to promote natural regeneration. Habitats to be translocated.

Table 8.14 Operational phase visual mitigation.

Ref	Location/Receptor	Nature of Impact	Mitigation
VI M6	5 & 6	The steep embankments to introduce unnatural or engineered form into the view	Topsoil at the receptor site to be stripped and reused as a top dressing to promote natural regeneration. Habitats to be translocated.
VI M7	5 & 6	Introduction of unnatural or engineered slopes	Engineered slopes to be seeded with a low maintenance reclamation mix and slopes allowed to green over

Monitoring

- 8.7.7. Mitigation should be maintained and monitored continuously to ensure that it is serving the function that was intended through the proposed design. If any damage or failure occurs, this must be rectified as soon as possible. The responsibility will be with contractor for the duration of their contracted works. Responsibility then will be handed back to Rhondda Cynon Taf County Borough Council (RCTCBC).

8.8. Residual Impact Assessment

Construction Phase

- 8.8.1. Mitigation during construction will not be sufficient to fully mitigate for these impacts and therefore not be sufficient to reduce the magnitude of the impact as well as the resulting significance of effect in the long term, for all character areas and viewpoints.

Operational phase

Operational Phase: Year 1

- 8.8.2. An assessment of the residual impacts after mitigation has been carried out for the receptors where there were significant adverse effects (moderate, major or very major) in the preliminary assessment. Proposed mitigation has been considered to determine the change in significance of effects. The results of the assessment are provided in Table 8.15.

Operational Phase: Year 15

- 8.8.3. To highlight the effect of the maturing of vegetation over time, an assessment of the residual impacts after mitigation has established over 15 years has been carried out for the same receptors to further determine the change in significant effects.
- 8.8.4. All residual operational landscape impacts are summarised in Table 8.15 below.

Table 8.15 Residual operational landscape impacts (with mitigation).

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
Hillside and Scarp Slopes Mosaic Valley East (medium)	<i>As operational assessment before mitigation with the following changes:</i>	<i>As operational assessment before mitigation with the following changes:</i>	Year 1 - Medium Adverse	Moderate Adverse	Slight Adverse
	Species rich grassland	The low maintenance reclamation mix will have started to establish.	Year 15 –Slight Adverse		
	Topsoil	Topsoil to aid natural regeneration will have started to establish. Translocated habitats will have started to establish.			
	By Year 15 the proposed seeding, naturally regenerated vegetation and translocated habitat would become more established, having a beneficial impact.				

8.8.5. Operational landscape Impacts moderate adverse or above (opening, Year 1 and Year 15):

Viewpoint 5 - PRoW TYL 9/1 Blaenllechau Rd

8.8.6. In Year 1 of operation, the spoil mound at the receptor site will still be dominant in the near view, as the natural regeneration will have not matured enough to offer any screening. By year 15, proposed seeding and natural regenerated vegetation will have covered the earthworks. The topsoil re-used as a top dressing and translocated habitats will help to soften visual effects on the receptor from this location, although the effects will still be significant. There will be no additional light pollution during operation.

8.8.7. The magnitude of impact in Year 1 will be **High Adverse** remaining **High** in Year 15, with mitigation. Therefore, the significance of the effect is assessed as **Very Major Adverse**; although this will reduce to **Major Adverse** in year 15.

Viewpoint 6 - PRoW TYL 9/1 south east of the Old Smokey

8.8.8. In Year 1 of operation, the spoil mound at the receptor site will be dominant in the near view, with the brown unnatural and engineered slopes creating a dominant new landform. By year 15, proposed seeding and naturally regenerated vegetation will have partially covered the earthworks, helping to soften the visual, although the effects will still be significant. There will be no additional light pollution during operation.

8.8.9. The magnitude of impact in Year 1 will be **Medium Adverse** remaining Medium in Year 15 with mitigation, therefore the significance of the effect is assessed as **Major Adverse**; although this will reduce to **Moderate Adverse** in year 15.

8.8.10. These residual operational visual impacts are summarised in Table 8.16 below.

Table 8.16 Summary of residual operational visual impacts (with mitigation).

Receptor and sensitivity	Impact	Effect	Magnitude	Significance	
				Year 1	Year 15
5 - PRoW TYL 9/1 Blaenllechau Rd (High)	Loss of vegetation. Direct intrusion of large embankments at the receptor site.	Loss of visual amenity for the receptor	Year 1 - Medium Adverse Year 15 – Medium Adverse	Major Adverse	Moderate Adverse
6 - PRoW TYL 9/1 south east of the Old Smokey (High)	Loss of vegetation. Direct intrusion of large embankments at the receptor site.	Loss of visual amenity for the receptor	Year 1 - Medium Adverse Year 15 - Medium Adverse	Major Adverse	Moderate Adverse

8.9. Cumulative Effects

8.9.1. The cumulative effects of proposed development adjacent to and in conjunction with the assessed effects of the Proposed Scheme are considered within this section of the report. The following assessment of cumulative effects considers planning applications within the study area which have been consented for development by the local planning authority plus the effects of the emergency works in the immediate vicinity of the landslip debris in the valley bottom. This includes developments within the Local Development Plan.

Cumulative effects on landscape character

- 8.9.2. **Emergency Works to Clear Landslip Debris:** This work consisted of removing material from the Afon rhondda Fach valley and depositing it on the riverbank. These were part of the emergency works at Tylorstown to move the slipped material. This application overlaps the southern part of the proposed site and lies within the Hillside and Scarp Slopes Mosaic Valley East and adjacent to the Urban Valley Floor. The development will create a minor adverse cumulative impact during construction. This is due to increased construction traffic within this character area and the neighbouring Urban Valley Floor. There will be a **Slight Adverse** impact during operation year 1 although this will reduce to negligible in operation Year 15 as the natural regeneration becomes more established.
- 8.9.3. **Application 20/1312/08:** Temporary deposit and storage of approximately 8,000m³ of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works, as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective). This application is at Station Road, Ferndale, to the southwest of the Proposed Scheme and lies within both the Hillside and Scarp Slopes Mosaic Valley East and Urban Valley Floor character areas. The development will create a minor adverse cumulative impact during construction. This is due to increased construction traffic within this character area. There will be a **Slight Adverse** impact during operation year 1 although this will reduce to negligible in operation Year 15 as the natural regeneration becomes more established.
- 8.9.4. **Application 20/1313/08:** Temporary deposit and storage of approximately 22,000m³ of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works, as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective). This application is on land across valley from Oaklands business park, Ferndale, to the southwest of the Proposed Scheme and lies within the Hillside and Scarp Slopes Mosaic Valley East character area and adjacent to the Urban Valley Floor. The development will create a minor adverse cumulative impact during construction. This is due to increased construction traffic within this character area and the neighbouring Urban Valley Floor. There will be a **Slight Adverse** impact during operation year 1 although this will reduce to negligible in operation Year 15 as the natural regeneration becomes more established.

Cumulative effects on visual receptors

- 8.9.5. **Emergency Works to Clear Landslip Debris:** There are no viewpoints effected by this development therefore no cumulative impacts are envisaged.
- 8.9.6. **Application 20/1312/08:** There are no viewpoints effected by this development therefore no cumulative impacts are envisaged.
- 8.9.7. **Application 20/1313/08:** The only viewpoints impacted are viewpoints 2,3 & 7. The development will create a minor adverse cumulative impact during construction and Year 1 operation. This will reduce to negligible by Year 15 as the natural regeneration becomes more established.

Local Development plan Policies

- 8.9.8. **LDP Policy NSA 27.2:** This policy identifies areas of land to be included in a land reclamation scheme for Llanwonno and Tylorstown Landslips. The Proposed Scheme directly interacts with the land identified under this policy. The removal of material from RH01 supports this policy;

however, further consultation will be undertaken with the LPA to ensure the use of the Receptor Site within the policy area does not conflict with the policy.

- 8.9.9. **LDP Policy NSA 20.2:** This is the Upper Rhondda Relief Road along the dismantled tramway alongside the Afon Rhondda Fach. While this is in the LDP, the initial stage of the road (from Porth to Pontygwaith) was completed many years ago with no sign of extension, so there are no envisaged cumulative impacts on either landscape or visual receptors.
- 8.9.10. **LDP Policy NSA 23.4:** This policy sets out the railway cutting for Cycle Network Improvements from Pontygwaith to Maerdy. If this development occurs it is not envisaged to create any cumulative impacts on either landscape or visual receptors.
- 8.9.11. **LDP Policy AW8.65:** This policy deals with any SINC or Regionally Important Geological Sites (RIG) within the County Borough and sets out measures for the protection and enhancement of the natural environment. The development will create a minor adverse cumulative impact on the land designated under the policy during construction within the Hillside and Scarp Slopes Mosaic Valley East character area. This is due to increased construction traffic. There will be a **Slight Adverse** impact during operation year 1 although this will reduce to negligible in operation Year 15 as the natural regeneration becomes more established.
- 8.9.12. There will also be a **Slight Adverse** impact on all viewpoints looking onto the SINC or from within it. The impacts will have reduced to negligible by operation year 15.

8.10. Summary

- 8.10.1. This assessment has considered both the construction and operation phase impacts of the Proposed Scheme on four agreed landscape character areas and seven agreed viewpoints, the significance of impacts at each location and how these will be mitigated.
- 8.10.2. During Year 15 of the Proposed Scheme there will still be a **Slight Adverse** effect on the following landscape receptor:
- Hillside and Scarp Slopes Mosaic Valley East
- 8.10.3. In summary, the residual landscape effects of the Proposed Scheme during Year 15 are **Slight Adverse** or better therefore there are no significant effects. Table 8.17 below demonstrates the reduction in adverse effects through effective landscape mitigation.
- 8.10.4. During Year 15 of the Scheme there will still be a **Moderate Adverse** effect on the following visual receptors:
- PRoW TYL 9/1 Blaenllechau Rd
 - PRoW TYL 9/1 south east of the Old Smokey
- 8.10.5. In summary, the residual effects of the Proposed Scheme during Year 15 remain significant at PRoW TYL 9/1 Blaenllechau Rd and PRoW TYL 9/1 south east of the Old Smokey.
- 8.10.6. The residual visual effects of the Proposed Scheme during Year 15 have been reduced. Table 8.18 below demonstrates the reduction in adverse effects through effective landscape mitigation.

Table 8.17 Summary of Landscape Impact Assessment.

Receptor	Sensitivity	Impact Assessment			Residual Impact Assessment		
		Construction Phase	Operation Year 1	Operation Year 15	Construction Phase	Operation Year 1	Operation Year 15
Hillside and Scarp Slopes Mosaic Valley East	Medium	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Moderate Adverse	Slight Adverse
Urban Valley Floor	Medium	Slight Adverse	Slight Adverse	Negligible Beneficial	Slight Adverse	* Not assessed	* Not assessed
Wooded Upland Plateaux	Medium	Slight Adverse	Slight Adverse	Negligible Adverse	Slight Adverse	* Not assessed	* Not assessed
Hillside and Scarp Slopes Mosaic Valley West	Medium	Slight Adverse	Slight Adverse	Negligible Beneficial	Slight Adverse	* Not assessed	* Not assessed
* Not assessed	Character areas without significant effects (moderate/ large/ very large) at Summer Year 15 of the Impact Assessment were not assessed for residual effects after mitigation.						

Table 8.18 Summary of Visual Impact Assessment.

Receptor	Sensitivity	Impact Assessment			Residual Impact Assessment		
		Construction Phase	Operation Year 1	Operation Year 15	Construction Phase	Operation Year 1	Operation Year 15
1 - Heol Tir Gwaidd, Penrhys (residential)	High	Major Adverse	Moderate Adverse	Slight Adverse	Major Adverse	Moderate Adverse	Slight Adverse
2 - PRoW TYL 2/1, Park Street	High	Very Major Adverse	Moderate Adverse	Slight Beneficial	Very Major Adverse	* Not assessed	* Not assessed
3 - Union Place at the junction with Arfryn Terrace (residential)	High	Very Major Adverse	Moderate Adverse	Slight Beneficial	Very Major Adverse	* Not assessed	* Not assessed
4 - Heol Llechau Wattstown (residential)	High	Moderate Adverse	Slight Adverse	Slight Adverse	Moderate Adverse	* Not assessed	* Not assessed
5 - PRoW TYL 9/1 Blaenllechau Rd	High	Very Major Adverse	Very Major Adverse	Major Adverse	Very Major Adverse	Major Adverse	Moderate Adverse
6 - PRoW TYL 9/1 south east of the Old Smokey	High	Very Major Adverse	Very Major Adverse	Major Adverse	Very Major Adverse	Major Adverse	Moderate Adverse
7 - The junction of East Road and East Street leading to the Rhondda Fach Leisure Centre (both recreational and residential)	High	Very Major Adverse	Moderate Adverse	Slight Beneficial	Very Major Adverse	* Not assessed	* Not assessed
* Not assessed	Character areas without significant effects (moderate/ large/ very large) at Summer Year 15 of the Impact Assessment were not assessed for residual effects after mitigation.						

9. Biodiversity and Nature Conservation

9.1. Introduction

- 9.1.1. This chapter describes how the Proposed Scheme would impact upon important ecological resources, designated sites, habitats and species.
- 9.1.2. This chapter reflects the assessment of likely significant effects as required under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.
- 9.1.3. The assessment is conducted within the framework of best practice guidelines, wildlife legislation and planning policy, to ensure that all potential adverse effects on ecology and nature conservation are identified and mitigated appropriately.
- 9.1.4. Impacts upon biodiversity resources from infrastructure projects including highway schemes can arise from direct and indirect sources, can be temporary or permanent and reversible or irreversible. Indirect impacts can be caused through disturbance from noise and vibration or increased human access, alteration of hydrological regimes and pollution of air, land or water.
- 9.1.5. This chapter is supported by information from the following chapters of the Environmental Statement (ES):
- 'Air Quality' (Chapter 6);
 - 'Landscape and Visual Effects' (Chapter 8);
 - Geology, Soils and Waste (Chapter 10);
 - 'Water Environment and Flood Risk' (Chapter 11); and
 - 'Noise' (Chapter 12).
- 9.1.6. The aim of this chapter is therefore to describe and detail the:
- legal and policy context in respect of biodiversity as relevant to the Proposed Scheme;
 - methodology in respect of data gathering and assessment;
 - current ecological baseline within the zone of influence of the Proposed Scheme;
 - evaluation of the ecological resources within the zone of influence of the Proposed Scheme;
 - assessment of the likely significant impacts of the Proposed Scheme on important biodiversity resources in the absence of additional mitigation;
 - mitigation measures identified as part of the Proposed Scheme;
 - residual effects predicted as a result of the Proposed Scheme with additional mitigation and conclusions of the assessment; and
 - enhancements for biodiversity.

Study Area

- 9.1.7. The Proposed Scheme is located to the east of Tylorstown, within the Rhondda Fach valley, which is a steep sided narrow valley in South Wales in the County Borough of Rhondda Cynon Taf. The study area is shown in Volume 2: Plan V2-S09-001.
- 9.1.8. The Proposed Scheme is located within two Sites of Importance for Nature Conservation (SINCs), mainly within Old Smokey Slopes SINC and Blaenllechau Woodland SINC encompasses the western boundary of the Proposed Scheme. Old Smokey Slopes SINC is designated for extensive area of mosaic ffridd habitat based partly on the natural ground and partly on coal spoil, including unimproved acid grassland, dry heath, lichen heath; and Blaenllechau Woodland SINC is designated for upland ancient oak woodland.
- 9.1.9. Surrounding habitats and land use mainly include ffridd habitat covering the steep hills, conifer plantation, grassland located on the higher elevation and agricultural land with scattered farmhouses covering lower ground. The site is located within historic collieries, where natural and deposited colliery material landforms are present (namely Tylorstown Tip, also known as Old Smokey).
- 9.1.10. The valley sides are covered with a combination of habitats with small parcels of broadleaved semi-natural woodland, scrub, dry heath and acid grassland on the steeper lower slopes and marshy grassland at higher elevations. Narrow continuous parcels of broadleaved semi-natural woodland follow the river on both banks of Rhondda Fach.

9.2. Legislation and Policy

- 9.2.1. Please note that, following the United Kingdom leaving the European Union (EU) any legislation referring to the EU and its members, and/or European Protected Species, has been transposed to UK legislation and legal obligations remain the same.

Legislation

- 9.2.2. Key legislation that has determined the way in which this assessment was carried out includes but is not limited to the following.

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

- 9.2.3. These regulations identify, designate and protect sites of international/European importance and form a national ecological network of SPAs and SACs across the UK. In addition, numerous habitats and species are strictly protected under the legislation.
- 9.2.4. Protection afforded to faunal species listed in Schedule 2 of the Regulations makes it an offence to:
- deliberately capture or kill any wild animal of a European protected species;
 - deliberately disturb any such animal (defined as reducing their ability to survive or reproduce); and
 - damage or destroy a breeding site or resting place of such a wild animal.
- 9.2.5. If development is likely to disturb, destroy or damage a European Protected Species or their place of shelter then an appropriate licence issued by the relevant governing body i.e. Natural Resources Wales (NRW) is required.

- 9.2.6. There is an aim to retain listed habitats and species at Favourable Conservation Status and this is taken into account in the evaluation of receptor sensitivity as part of the assessment.

Birds Directive 1979

- 9.2.7. Annex 1 of the Birds Directive lists species and sub-species which are:
- in danger of extinction;
 - vulnerable to specific changes in their habitat;
 - considered rare because of small populations or restricted local distribution; and
 - requiring particular attention for reasons of the specific nature of their habitat.
- 9.2.8. For these species, Member States must conserve their most suitable territories in number and size as Special Protection Areas (SPAs). Species listed on Annex 1 of the Birds Directive include kingfisher and red kite.

Wildlife and Countryside Act 1981 (as amended)

- 9.2.9. This Act allows for the designation of SSSIs due to features of conservation interest related to flora, fauna, physiography or geology. The Act makes it an offence to kill, injure, take, possess, or trade in many wild animal species and to pick, uproot, possess or trade in a number of wild plant species. Measures are outlined to prevent the establishment of non-native species that could adversely affect native wildlife. The act also implements certain provisions of Council Directive 2009/147/EC (the 'Wild Birds Directive').

Countryside and Rights of Way Act 2000

- 9.2.10. This Act provides for public access on foot to certain areas of land and strengthens measures for the management and protection of SSSIs.

Environment (Wales) Act 2016

- 9.2.11. Section 7 of the Environment (Wales) Act has replaced Section 42 of the NERC Act 2006 in Wales. Section 7 lists the living organisms and types of habitat in Wales which are considered to be of key significance to sustain and improve biodiversity in relation to Wales.
- 9.2.12. The Act states that Welsh Ministers must take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section and encourage others to take such steps.
- 9.2.13. Habitats and species of principal importance for the conservation of biodiversity in Wales are taken into account as part of this assessment and are referred to as S.7 habitats or species throughout the chapter.
- 9.2.14. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. These Regulations transpose Council Directive 2000/60/EC (the 'Water Framework Directive'), Council Directive 2008/105/EC (the 'Environmental Quality Standards (EQSs) Directive') and Priority Substances (Amendment) Directive 2013 (Directive 2013/39/EU) into UK law. It sets out a series of objectives for fluvial, lacustrine, groundwater, and coastal water bodies. These include improving the water environment to achieve good/high status, maintaining existing good/high status, and implementing mitigation to support the water environment at a catchment and water body scale.

- 9.2.15. Consideration of the aquatic and water environment is considered under Chapter 11 'Water Environment and Flood Risk'.

Policies

- 9.2.16. Key national and local planning policy relevant to this assessment includes the following.

Planning Policy Wales 11th Edition (PPW) 2021

- 9.2.17. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development. The Policy contains the Welsh Government's measures to conserve landscape and biodiversity and describes objectives for the environmental protection of natural resources, and minimising and managing risks posed by climate change. Chapter 6 of the PPW sets out measures in respect of biodiversity and ecological networks and expands upon implementing the Section 6 duty under the Environment (Wales) Act 2016.

Technical Advice Note 5 – Nature Conservation and Planning (Welsh Government, 2009c)

- 9.2.18. This advice note provides guidance on how the planning system should contribute to the protection and enhancement of biodiversity and geological features.

Rhondda Cynon Taf Local Development Plan 2006 - 2021 (Adopted March 2011)

- 9.2.19. The Rhondda Cynon Taf Local Development Plan (LDP)³² sets out the land use planning policy framework for the period 2006 - 2021.
- 9.2.20. Policy AW 8: Protection and Enhancement of the Natural Environment details preservation of RCTCB's natural heritage. The policy aims to protect RCT's distinctive natural heritage from inappropriate development, only permitting development where it would not cause harm to the features of a Site of Importance for Nature Conservation (SINC) unless it could be demonstrated that: the proposal is necessary for the positive management of the site; the proposal would not unacceptably impact the designated features or; the development could not be reasonably located elsewhere and its benefits outweigh the nature conservation value.

9.3. Assessment Methodology

- 9.3.1. A desk study and field surveys undertaken in 2020 has provided extensive knowledge of the biodiversity resource at the site. The assessment covers sites of nature conservation importance, habitats, floral and faunal species. As part of this study reference was made to the previous desk study and surveys undertaken in 2000 by Hyder Consulting, consultations and extensive fieldwork including ecological assessment and supervision undertaken by Redstart in 2020 for Phases 2 and 3 of the Tylorstown Landslip remedial schemes (not subject to this EIA). This knowledge was instrumental in determining the final footprint of the Receptor Site, Construction Phase of the Proposed Scheme, details of the proposed ground investigation works for 2021 and mitigation measures.

³² RCTCBC LDP, etc., available at: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/RelateddocumentsLDP20062021/AdoptedLocalDevelopmentPlan.pdf>

- 9.3.2. Meetings with the County Ecologist and other stakeholders took place through 2020-2021 to inform the extent of the footprint of the works, further mitigation, and potential long-term Management Plans for the site. As a result of these meetings, the footprint of the proposed Receptor Site was adjusted to minimise impacts on the most sensitive habitats and an agreement was made that the re-use of topsoil and allowing vegetation to naturally regenerate on the Receptor Site was the best approach to revegetating the area.

Guidance

- 9.3.3. This assessment is based on guidance detailed within the Design Manual for Roads and Bridges (DMRB), LA108 Biodiversity.
- 9.3.4. Where applicable other guidance such as the Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal³³ and specific species guidance to assess impacts on protected species These are detailed in the relevant sections of the chapter Methodology.
- 9.3.5. Study areas for the ecological assessment were determined through CIEEM guidance and consultation with the Rhondda Cynon Taf (RCT) County Ecologist. Study areas vary according to habitat and species, and a sufficient zone of influence was agreed for each applicable survey.
- 9.3.6. The following resources were consulted for ecological information about the site and surrounding areas:
- Ecological Survey Report Tylorstown & Llanwonno Road Tips land Reclamation Scheme (Hyder Consulting, 2000)³⁴;
 - Tylorstown Tips Emergency Works Ecological Rationale (Redstart, 2020)³⁵;
 - Tylorstown Tips Remedial Works Phase 2 and 3. Phase 1 Habitat Survey. (Redstart, 2020)³⁶
 - Tylorstown Tips Remedial Works Phase 2 and 3 Site Investigation Report under Ecological Method Statement. (Redstart, 2020)³⁷.
 - Otter and Badger Survey Technical Note Redstart (2020)³⁸
 - South East Wales Biodiversity Records Centre (SEWBReC). Biodiversity Information Search – Tylorstown Tip [Ref: 0201-442] (SEWBReC, October 2020)³⁹
 - Ancient Woodland Inventory (AWI)⁴⁰

33CIEEM (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal

34 Hyder Consulting (2000), Ecological Survey Report Tylorstown & Llanwonno Road Tips land Reclamation Scheme

35 Redstart (2020), Tylorstown Tips Emergency Works Ecological Rationale.

36 Redstart (2020), Tylorstown Tips Remedial Works Phase 2 and 3. Phase 1 Habitat Survey.

37 Redstart (2020), Tylorstown Tips Remedial Works Phase 2 and 3 Site Investigation Report under Ecological Method Statement.

38 Redstart (2020) Tylorstown Tips Remedial Works Phase 2 and 3 Otter and Badger Survey Technical Note

39 SEWBReC (2020) South East Wales Biodiversity Records Centre (SEWBReC). Biodiversity Information Search – Tylorstown Tip [Ref: 0201-442]

40 NRW (2011) Ancient Woodland Inventory

- Multi-Agency Geographic Information System⁴¹
- Natural Resources Wales – Designated Sites Search⁴²
- Rhondda Cynon Taf County Borough Council – Planning Department (RCTCBC, 2019)⁴³;
- Rhondda Cynon Taf Local Development Plan 2006-2021⁴⁴, and
- Rhondda Cynon Taf Local Development Plan 2006-2021. Appendix Three - Sites of Important Nature Conservation in Rhondda Cynon Taf: Site Descriptions⁴⁵
- Rhondda Cynon Taf County Ecologist;
- Buglife and Colliery Spoil Biodiversity Initiative⁴⁶.

⁴¹ MAGIC (2019) Multi-Agency Geographic Information System; <https://magic.defra.gov.uk/>

⁴² NRW (2020) Natural Resources Wales – Designated Sites Search

⁴³ RCTCBC (2019) Rhondda Cynon Taf County Borough Council – Planning Department

⁴⁴ Rhondda Cynon Taf County Borough Council (RCTBC) (2008). Rhondda Cynon Taf Local Development Plan 2006-2021;

⁴⁵ Rhondda Cynon Taf County Borough Council (RCTBC) (2008). Rhondda Cynon Taf Local Development Plan 2006-2021. Appendix Three - Sites of Important Nature Conservation in Rhondda Cynon Taf: Site Descriptions.

⁴⁶ Colliery Spoil Biodiversity Initiative <https://www.collieryspoil.com/>

Table 9.1: Ecological Receptor Study Areas.

Task /Survey	Study Area	Notes
Habitat Survey		
Phase 1 Habitat Survey	Mainly within the redline boundary and up to 500m buffer where accessible.	This area was considered appropriate to allow for the identification of mitigation for the potential partial loss of habitat from the Old Smokey Slopes SINC. Habitats within the SINC were surveyed to investigate the hydrological connection, zonation, distribution and magnitude of potential impacts on these habitats and to identify potential mitigation measures within the SINC.
Lower Plants Survey (Lichen and Bryophytes)	Mainly within the redline boundary	
Species Surveys		
Badger	1km buffer around the centre of the Proposed Scheme, where accessible	
Great crested newt	Approximately 500m radius from the centre of the proposed development as required by the standard methodology outlined in Harris et al. (1989) ⁴⁷ .	Two ponds 500m to the south of the closest end of redline boundary. HSI and eDNA were carried out.
Reptiles	Within the redline boundary	Reptiles are known to be present on site.
Birds	1km wide buffer around the centre of the Proposed Scheme	
Other mammals	Phase 1 Habitat Survey	Habitat suitable to support the Priority mammal species hare and hedgehog was identified on site during the extended Phase 1 habitat survey.

Establishing the Baseline

- 9.3.7. Ecological baseline information has been collected through the undertaking of a desk study and onsite surveys. Table 9.2 below provides the sources used to collate the baseline for the assessment, as well as the methodologies used.
- 9.3.8. Surveys have been undertaken with reference to DMRB LD118 and current best practice guidelines.

47 Harris, S., Cresswell, P. and Jefferies, D. (1989) Surveying Badgers. Mammal Society: London

Table 9.2: Baseline Survey Methodologies and Sources.

Task /Survey	Dates	Methods/Sources
Desk Study		
Statutory Sites Non-Statutory Sites Species	October 2020	<p>Information was requested from SEWBRc in October 2020 in respect of statutory and non-statutory sites and protected and notable species within a 4km corridor based on the centre of the Proposed Scheme (10km for bats).</p> <p>Further information was gleaned from:</p> <p>Ecology Survey Reports consulted:</p> <ul style="list-style-type: none"> • Ecological Survey Report Tylorstown & Llanwonno Road Tips land Reclamation Scheme (Hyder Consulting, 2000); • Tylorstown Tips Emergency Works Ecological Rationale (Redstart, 2020) • Tylorstown Tips Remedial Works Phase 2 and 3. Phase 1 Habitat Survey. (Redstart, 2020); • Tylorstown Tips Remedial Works Phase 2 and 3 Site Investigation Report under Ecological Method Statement. (Redstart, 2020); • Otter and Badger Survey Technical Note (Redstart, 2020) • Ancient Woodland Inventory; • Multi-Agency Geographic Information System); • Natural Resources Wales – Designated Sites Search; • Rhondda Cynon Taf County Borough Council – Planning Department; and • Rhondda Cynon Taf Local Development Plan (2006-2021).
Habitat		
Phase 1 Habitat Survey	October 2020	Undertaken in accordance with Handbook for Phase 1 habitat survey (Joint Nature Conservation Committee 2010 ⁴⁸). The survey was conducted mainly within the redline boundary of the Proposed Scheme and up to 500m buffer where accessible.
Lower Plants Survey (Lichen and Bryophytes)	8 th October 2020	Survey within all appropriate habitats. Some collection of samples for later identification in the laboratory. The survey was mainly conducted within the redline boundary of the Proposed Scheme.
Species Surveys		
Bats		

⁴⁸ JNCC (2010). Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey. *A technique for environmental audit.*

Preliminary Ground Level Tree Assessment (GLTA)	Initial ground level assessment	GLTA's were undertaken within a 200m area of the Proposed Scheme based on the criteria as set out in; Bat Surveys for Professional Ecologists, Good Practice Guidelines
Potential Roost Feature Assessment of trees	29 th April 2021	Trees that had been identified as having potential bat roost sites during the GLTA were inspected using an endoscope and assigned a level of potential to support roosting bats (See bat roost inspection in Appendix 9.8).
Emergence and Return to Roost survey of Tree P4T1	27 th May 2021 / 15 th June 2021	Two activity surveys were carried out to assess bat activity at the roost features. A dusk emergence visit was carried out on the 27 th May 2021 followed by a dawn return to roost survey on the 15 th June 2021.
Badger	November 2019	The survey followed standard methodology used in the two most recent national badger surveys (Cresswell <i>et al</i> , 1990, Wilson <i>et al</i> , 1997). 1km wide corridor centred on Proposed Scheme.
Great crested newt	H S I: 24 th June 2020 eDNA: 24 th June 2020	Habitat Suitability Index (HSI) assessment undertaken in accordance with methodology described in Oldham <i>et al</i> (2000) ⁴⁹ and ARG (2010) ⁵⁰ Environmental DNA (eDNA) samples were taken in accordance with the published technical advice note Defra Science and Research Project WC1067 ⁵¹ . 1km wide corridor centred on Proposed Scheme.
Reptiles		There are habitats on site that are suitable to support reptiles. Common lizard (<i>Zootoca vivipara</i>), slow-worm (<i>Anguis fragilis</i>) and grass snake (<i>Natrix natrix helvetica</i>) were recorded on lower slopes of Tylorstown Tips during Phase 2 and 3 works. Following discussion with the county ecologist it was agreed that clearance of reptiles and amphibians prior to works commencing would be an appropriate approach.
Birds		

49 Oldham, R.S.; Keeble, K.; Swan, M.J.S.; and Jeffcote, M (2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

50 ARG (2010) ARG UK: Advice Note 5 Great crested newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom

51 Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). Analytical and methodological development for improved surveillance of the Great crested newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

Wintering Birds	November 2019 – February 2020	<p>Survey methodology was broadly based on the British Trust for Ornithology (BTO) Winter Farmland Bird Survey⁵² and generic wintering bird monitoring methods detailed in Gilbert <i>et al.</i>⁵³.</p> <p>Four survey visits were undertaken over two transect routes within a 1km corridor centred on the Proposed Scheme.</p>
Breeding Birds	22 nd June; 1 st July; and 7 th July 2020	<p>A breeding bird survey was undertaken using methodology broadly based on the British Trust for Ornithology's (BTO) Common Bird Census (CBC)⁵⁴</p> <p>Three appropriately spaced survey visits were undertaken over a transect route within a 1km corridor of the redline boundary of the Proposed Scheme. The transect route was devised and mapped prior to the surveys being undertaken to ensure a representative sample of habitats across the site were incorporated.</p>

Determining Biodiversity Resource Importance

- 9.3.9. The valuation of biodiversity resource is generally based on a geographical context.
- 9.3.10. The assessment will be undertaken in accordance with the Institution of Civil Engineering (ICE) Environmental Impact Assessment Handbook (2019) and the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidance for Ecological Impact Assessment (2018).
- 9.3.11. The habitats, species and their key functions within the study area are known as 'ecological features'. To determine the likelihood of a significant effect, it is first necessary to identify whether an ecological feature is suitably valuable for a significant effect upon it to be material in decision making. Guidance for Ecological Impact Assessment (EcIA) developed by CIEEM assesses the value in terms of biodiversity, social, community or economic value. These values are described in Table 9.3.
- 9.3.12. The 'Very High' value identified by CIEEM can be disregarded in this instance as there are no internationally important ecological features and it is therefore not applicable. Additionally, two tiers in the CIEEM guidance (Medium and Medium Low) have been combined and classified as Medium for the purpose of this assessment.
- 9.3.13. Legal protection is considered separately from value. The protection of a particular ecological feature through national or international legislation may not necessarily be taken into account when assessing ecological value. For example, whilst badgers are protected under national legislation, the presence of a single badger sett would not be properly assessed as a constraint of 'national' importance. Legislation is, however, considered in terms of mitigation.

52 Gillings *et al.* (2008): British Trust for Ornithology (BTO) Winter Farmland Bird Survey

53 Gilbert, G., Gibbons, D.W., Evans, J. (1998) Bird monitoring methods. RSPB, Sandy, Bedfordshire.

54 Bibby, C.J., Burgess, N.D. and Hill, D.A and Mustoe, S. (2000) Bird Census Techniques-Second Edition Academic Press, London

Table 9.3 Value (or sensitivity) of ecological features.

Value	Descriptor
<p>Very High <i>(International)</i></p>	<ul style="list-style-type: none"> • A site designated or identified for designation at the international level (e.g. Special Protection Area (SPA), SAC, and/or Ramsar site). Proposed or candidate sites are given the same consideration as designated sites. • A sustainable area of any habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat that is essential to maintain the viability of a larger whole. • Any regularly occurring population of an internationally important species (e.g. Red Data Book species), which are listed as occurring in 15 or fewer 10 km squares in the UK, and that is identified as having an unfavourable conservation status in Europe or global conservation concern in the UK Biodiversity Action Plan (BAP). • A regularly occurring, nationally significant population of any internationally important species.
<p>High <i>(National)</i></p>	<ul style="list-style-type: none"> • A site protected by national designations (e.g. SSSI, National Nature Reserve (NNR), or Marine Protected Area or a site considered worthy of this designation). • A sustainable area of any priority habitat identified in the UK BAP, or smaller areas of such habitat that is essential to maintain the viability of a larger whole. • A feature identified as being of critical importance in the UK BAP. • A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. • Any regularly occurring population of a nationally important species that is threatened or rare in that region of the County.
<p>Medium <i>(Regional and County)</i> <i>(County)</i></p>	<ul style="list-style-type: none"> • Sustainable areas of key habitat identified in the Regional BAP or smaller areas of such habitat that is essential to maintain the viability of a larger area. • Sites which exceed the county-level designations but fall short of the SSSI selection criteria. • Some non-statutory designated sites (Ancient Woodland, TPOs). • Any regularly occurring, locally important population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or listed in the LBAP on account of its regional rarity or localization. • A regularly occurring, locally significant population/number of a regionally important species. • Some designated sites (e.g. Local Nature Reserves). • Some non-statutory designated sites (including SLNCI/CWS). • A viable area of a habitat that is uncommon in the county/district or a degraded example of a habitat identified in the local BAP. • Sustainable population of a species that is rare or scarce within a county or listed in the local BAP on account of its regional rarity or localisation. • Sites or populations that appreciably enrich the county/district.
<p>Low <i>(Local > 5km)</i></p>	<ul style="list-style-type: none"> • Area of internationally or nationally important habitats, which are degraded and have little potential for restoration.

Value	Descriptor
	<ul style="list-style-type: none"> • Areas within the site or locally, or populations, that appreciably enrich the habitat resource within the locality, (e.g. species-rich hedgerow). • Species or populations within the site or locally, that appreciably enrich the ecological resource within the locality.
Negligible <i>(Scheme footprint)</i>	<ul style="list-style-type: none"> • Areas of heavily managed or modified vegetation of low intrinsic interest and low value to species of nature conservation interest that do not appreciably enrich the site or locality (i.e. improved grassland and arable crops). • Common and widespread species.

Determining magnitude of Impact

9.3.14. The magnitude of impact has been assigned quantitatively where possible. The assessment has taken into account the following factors:

- whether the effect is positive or negative – i.e. is the impact likely to be **beneficial** or **adverse**;
- the spatial, or geographical area over which the impact may occur The duration of the impact, either short term (for example only during construction), or long term (throughout the lifetime of the development),
- the timing and frequency – consideration of the point at which the impact occurs in relation to critical life stages or seasons; and
- the reversibility of the impact – i.e. is the impact temporary or permanent. A reversible (temporary) impact is one from which recovery is possible.

9.3.15. Professional judgement has been used to assign magnitude based on the descriptors provided in Table 9.4. Cumulative effects will be identified and assessed.

Table 9.4 Magnitude of impact (or change) descriptors.

Magnitude of Impact (change)		Typical Description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Slight	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition to one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of Impact

9.3.16. The significance of an impact is a product of the biodiversity resource importance and the magnitude of impact. impact significance is determined through the matrix provided in Table 9.5.

Table 9.5: Significance of Impact Matrix.

Magnitude of impact	Receptor Value (or sensitivity)			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Slight to moderate	Negligible
Slight	Moderate	Slight to moderate	Slight	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- 9.3.17. For impacts associated with low probability or low frequency, the above methodology could suggest an artificially high significance of the effect on the receptor. The assessment has therefore used professional judgement, and where considered appropriate, the assessed magnitude has been reduced to reflect the low probability of occurrence.
- 9.3.18. The significance of potential impacts on the biodiversity resources has been identified both with and without any proposed mitigation. When assessing the Proposed Scheme without mitigation, embedded mitigation measures were included in the assessment of impact. Additional mitigation was only included in the assessment of impact in the with-mitigation state.

Identification of Cumulative Effects

- 9.3.19. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important in EclA as many ecological features are already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline. Effects can also make habitats and species more vulnerable or sensitive to change. An assessment of potential cumulative effects between the Proposed Scheme and other committed developments in the area has been undertaken as part of this chapter to determine any combined effects on ecological receptors. See Chapter 15 for more detail on Cumulative Effects.

Identification of Mitigation and Enhancement Measures

- 9.3.20. The identification of mitigation and enhancement measures has been undertaken through a combination of professional judgement, extensive consultation with the County Ecologist and collaboration with other disciplines (such as engineering, other EIA topics and landscape design) through a series of Mitigation Workshops.
- 9.3.21. The following best practice guidelines were also referred to:
- DMRB Volume 11 Section 3 LA 118 Biodiversity Guidance;
 - the Herpetofauna Workers Manual (Gent and Gibson, 2003); and
 - the Great Crested Newt Conservation Handbook (Froglife, 2001).
- 9.3.22. For the identification and design of mitigation measures the following hierarchy was used:
- **avoidance of impact:** design and mitigation measures to avoid the effect (e.g. alternative design options or avoidance of environmentally sensitive sites);
 - **reduction:** where avoidance is not possible, then mitigation is used to reduce the magnitude or significance of effects; and
 - **remediation/compensation:** where it is not possible to avoid or reduce a significant adverse effect, measures are proposed to offset the effect.

Identification of Residual Effects

- 9.3.23. Residual effects are identified where a significant effect on a receptor remains after the implementation of mitigation measures.

Limitations and Assumptions

- 9.3.24. Any ecological survey can only identify what was present on site at the time it was conducted and habitat usage by species can change over time. The length of time survey data remains valid will depend on a case-by-case basis, but it is generally considered that if development does not commence within two years of the date of this report an update may be required.
- 9.3.25. Due to time constraints reptile surveys were not carried out on the site, however, based on knowledge of reptile populations recorded during Phase 2 and 3 of the remedial works and following discussion with the county ecologist it was agreed that clearance of reptiles and amphibians prior to works commencing would be an appropriate approach. Specific limitations relevant to each survey are detailed in the appropriate survey reports (Volume 3: Appendices).
- 9.3.26. Biodiversity mitigation will require that a Construction Environmental Management Plan (CEMP) is in place for the duration of the construction period. The CEMP will control construction activities in respect of construction timings, dust, silt and surface water run-off, water pollution, materials storage, site traffic etc. It is expected that current good practice will be followed in the production and implementation of the CEMP. In the meantime, an outline CEMP is being produced to support the planning application for the Scheme and will then form the basis for the detailed CEMP.
- 9.3.27. It is not considered that any of the limitations represent a significant gap in data or that the baseline information collected is insufficient or inadequate.

Consultations

- 9.3.28. There has been extensive consultation with the RCTCBC County Ecologist throughout the survey period and during the design of mitigation measures. Table 9.6 summarises those consultations.

Table 9.6: Summary of consultations.

Date	Meeting	Brief Summary of discussion
15/12/2020	Design team, EIA, Heritage, Landscape and Ecology	Receptor Site C design meeting to discuss to refine and decrease the entire footprint to avoid valuable habitats for biodiversity (dry heath, acid flush and raised bog) as far as possible without impacting on other EIA aspects (e.g. Landscape and Visual Impact and Heritage Site).
06/01/2021	RCT County Ecologist, Landscape and Ecology	<p>Discussion of mitigation strategy for the SINCC habitats and further possible management. The following was noted:</p> <ul style="list-style-type: none"> • Geo-shape of the Receptor site C – microrelief tied with drainage design consideration. • Soil/turf re-use and natural regeneration (low key) approach; • Low maintenance recreational grass mix (e.g. red fescue and common bent) to be used on the receptor site flanks for erosion prevention; • Long-term management and after-care. e.g. - conservation grazing similar to Healthy Hillside project; • Aspects of site management such as wildfires control, removal of conifer regeneration, bracken and scrub control. • Statutory process of the management plan implementation. • To investigate the involvement of the local charities/ NGO/ possibly for after-care, management.
13/01/2021	Design team, EIA, Landscape and Ecology	Updates on the shape and landform - two options explored; discussions were continued on 18/01/2021
14/01/2021	RCT & RCT County Ecologist, Landscape	<p>Agreed on the turf translocation as far as possible and topsoil re-use for habitats onsite and leave the site with low key maintenance for natural regeneration).</p> <p>To ensure the post monitoring and site management - Buglife and Colliery Spoil Biodiversity Initiative was decided to be contacted to get involved in the project.</p>
18/01/2021	Design team, EIA, Landscape and Ecology	The Receptor Site C design was chosen to balance between all sensitive aspects (landscape and visual, heritage and ecology).
27/01/2021	RCT County Ecologist	<p>Discussion on the construction aspects and Redline boundary - to explore the possibilities of red boundary refining to exclude habitats with high biodiversity, but not to delay the programme;</p> <p>Use less valuable areas for biodiversity to accommodate compound and topsoil storage, e.g. bracken;</p> <p>To avoid the impact on the sensitive habitats, as working within the SINCC, all alternative options are to be explored to justify the areas for topsoil storage and compounds.</p>

Date	Meeting	Brief Summary of discussion
12/02/2021	RCT; RCT County Ecologist, Landscape, Buglife/ and Colliery Spoil Biodiversity Initiative	Finalising on mitigation strategy plan and discussing management plans and possible funding with Buglife/ and Colliery Spoil Biodiversity Initiative.

9.4. Baseline Conditions

9.4.1. This section presents the baseline ecological conditions and resources on site and within the study area. Full results for all ecological resources are presented in Volume 3: Appendices.

Designated Sites

Statutory Designated Sites

9.4.2. There are no statutory sites identified within a 2km search of the Proposed Scheme. No statutory designated sites for bat species were identified within 5km of the Scheme.

Non-Statutory Designated Sites

9.4.3. Ten Sites of Importance for Nature Conservation (SINC) are present within 2km of the RH01 and the Phase 4 receptor site. The four most relevant of these, due to their close proximity to the proposed works are detailed below. Greater detail about the of sites are provided in the Preliminary Ecological Appraisal (PEA) report in Volume 3: Appendix 9.1.

- Old Smokey Slopes SINC - RH01 and the Phase 4 receptor site are located within the SINC;
- St. Gwynno Forest SINC is directly adjacent to the north east sector of receptor site;
- Taff and Rhondda Rivers SINC is adjacent to the landslide area (RH01); and
- Blaenllechau Woodland SINC lies directly adjacent to north-west of the site and partly falls within the western boundary of the site area.

Ancient Semi-Natural Woodland (ASNW)

9.4.4. There are sites listed on the Ancient Woodland Inventory (AWI) in close proximity to the Proposed Scheme, including a parcel of ancient woodland adjacent to RH01, to the north and west alongside the Afon Rhondda Fach.

9.4.5. The locations are shown in Volume 2: Plan V2-S08-0002.

Habitats

9.4.6. A summary of the terrestrial habitats identified during the Phase 1 Habitat Survey is provided in Table 9.7 and also in Volume 2: Plan V2-S08-0003. The full results can be found in Volume 3: Appendix 9.1.

Table 9.7 Summary of Phase 1 Habitats.

Habitat	Approximate Area / Length of habitat within Study Area	Features of Interest
Woodland and Scrub		
Semi-natural broadleaved woodland	4.46 ha	<p>Two small parcels of Upland oak woodland were recorded within the redline boundary, which were also adjacent to the landslide. Mature Sessile oak (<i>Quercus petraea</i>) and Pedunculate oak (<i>Quercus robur</i>) species were commonly present. Ground flora comprised mainly dense bracken and bramble (<i>Rubus fruticosus</i> agg.).</p> <p>Wet woodland (including willow carr) was present along the banks of the Rhondda Fach and ditches outside of the redline boundary. These linear woodland parcels are situated in the bottom of the river valley with abundant alder (<i>Alnus glutinosa</i>) and willow species (<i>Salix</i> spp.), with occasional oak species and downy birch (<i>Betula pubescens</i>) in the canopy.</p> <p>In places the woodland habitat had been modified with Himalayan balsam.</p>
Coniferous plantation woodland	11.80 ha	<p>A large parcel of a coniferous plantation, dominated by Sitka spruce (<i>Picea sitchensis</i>), was present directly to the east of the site.</p>

Habitat	Approximate Area / Length of habitat within Study Area	Features of Interest
Scrub dense and scattered scrub	2.15 ha	<p>Several parcels of various categories of dense scrub were present across the site:</p> <p>Gorse scrub</p> <p>Gorse (<i>Ulex europaeus</i>) and dwarf gorse (<i>Ulex minor</i>) had colonised the coal tips driving new habitat succession further from dry heath to dense scrub habitat.</p> <p>Willow scrub</p> <p>Willow species scrub was noted along small watercourses/ditches on the site.</p> <p>Bramble scrub</p> <p>Mosaics of dense and scattered bramble scrub formed the margins of different habitats on site and along the road verges.</p> <p>Extensive mosaic of bramble and bracken (<i>Pteridium aquilinum</i>) cover was within the woodland parcels and the ffridd habitat on the slope throughout the site. This habitat comprised mainly bramble, however, other species were occasionally present such as hawthorn (<i>Crataegus monogyna</i>), dog-rose (<i>Rosa canina</i>), gorse (<i>Ulex europaeus</i>), dwarf gorse (<i>Ulex minor</i>), willow (<i>Salix</i> spp.) species saplings of ash (<i>Fraxinus excelsior</i>), oak (<i>Quercus</i> spp.), willow (<i>Salix</i> spp.) and hazel (<i>Corylus avellana</i>).</p> <p>Scattered scrub consisting of bramble, willow, hawthorn, saplings and immature tree species of ash, birch, alder, willow was present throughout the site.</p> <p>Bramble scrub was ubiquitous across the site, whereas willow and gorse scrub were mainly associated with the areas of colliery spoil.</p>
Scattered broadleaved and coniferous trees	67 broadleaved; 1091 conifers	<p>Scattered mixed trees were recorded throughout the site. Broadleaved species included ash, alder, rowan, oak and birch species ranging from immature to mature and notable/veteran trees were present within ffridd and dry heath/acid grassland mosaic.</p> <p>Coniferous species were limited to the self-seeded Sitka spruce, Scots pine (<i>Pinus sylvestris</i>) and Larch species (<i>Larix</i> sp.) and mainly located within 'Old Smokey' tip, or in close proximity, reflecting the species assemblage of the near-by coniferous plantation.</p>
Grassland and marsh		
Semi-improved neutral grassland	0.035 ha	Semi-improved neutral grassland had very limited presence on the site, with only small parcels present along the road verges and around building ruins to the north of the site.

Habitat	Approximate Area / Length of habitat within Study Area	Features of Interest
		<p>These parcels covered steep slopes and overall comprised a mosaic of damp, species-poor grassland and areas of higher species richness.</p> <p>The poor semi-improved damp grassland comprised mainly grass species such as Yorkshire-fog, false oatgrass (<i>Arrhenatherum elatius</i>) and creeping bent (<i>Agrostis stolonifera</i>) with the limited number of herbs - creeping buttercup (<i>Ranunculus repens</i>) and yarrow (<i>Achillea millefolium</i>).</p> <p>The more diverse semi-improved grassland habitat included a higher diversity of forbs species such as common knapweed (<i>Centaurea nigra</i>), common bird's-foot-trefoil (<i>Lotus corniculatus</i>), greater bird's-foot trefoil (<i>Lotus pendunculatus</i>), selfheal (<i>Prunella vulgaris</i>), tormentil (<i>Potentilla erecta</i>) and common ragwort (<i>Senecio jacobaea</i>).</p>
Marsh/marshy grassland	9.87 ha	<p>Two categories of marshy grassland habitat were present on site:</p> <p>Soft-rush dominated habitat - mainly localised in small patches damp depressions on higher ground. Generally, this habitat was species poor with limited additional species such as foxglove (<i>Digitalis purpurea</i>), tufted hairgrass, Yorkshire-fog (<i>Holcus lanatus</i>) and located within extensive carpets of bryophyte cover.</p> <p>Purple moor-grass dominated habitat. Dominated by purple moor-grass (<i>Molinia caerulea</i>), this habitat occupied areas of gently sloping ground and was often present within a mosaic with dry heath. It has a limited assemblage of other plant species including heath bedstraw (<i>Galium saxatile</i>), tufted hair-grass, mat-grass (<i>Nardus stricta</i>), foxglove (<i>Digitalis purpurea</i>), tormentil (<i>Potentilla erecta</i>), soft-rush (<i>Juncus effusus</i>), sweet vernal grass (<i>Anthoxanthum odoratum</i>), green-ribbed sedge (<i>Carex binervis</i>) and heath-rush (<i>Juncus_squarrosus</i>).</p> <p>The purple moor-grass dominated habitat is occupying gentle sloping ground and often present as a mosaic with dry heath and unimproved acid grassland habitats.</p>
Tall Herb and Fern		
Continuous bracken	15.09 ha	Dense and scattered bracken (<i>Pteridium aquilinum</i>) habitat, as a part of Ffridd habitat is locally valuable habitat, listed as one of the SINC qualifying habitats in RCT. Ffridd is a mosaic of dense and scattered bracken, acid grassland and heath habitats at different stage of succession.
Scattered bracken	0.39 ha	
Tall ruderal	Too sparse to calculate	Tall ruderal habitat was present as a component of mosaic with bramble scrub; and within bracken and semi-improved neutral

Habitat	Approximate Area / Length of habitat within Study Area	Features of Interest
		grassland along the margins of the road verges, live railways, fences, walls, and occasionally along the watercourses on site. Species present were varied and included stands of rosebay willowherb (<i>Chamaenerion angustifolium</i>), great willowherb (<i>Epilobium hirsutum</i>), common nettle (<i>Urtica dioica</i>), broad-leaved dock (<i>Rumex obtusifolius</i>) and cleavers (<i>Galium aparine</i>).
Heathland		
Unimproved acid grassland; acid Grassland and heath mosaic and dry Heath	30.17 ha	This mosaic of habitats is widespread across the site, it is a variable habitat and at different stages of succession in different locations. It could be divided into two distinct habitat types, dependent on the soil substrate. The habitat occupying the colliery spoil tips was generally in the primary stage of habitat succession and less species rich, with lower numbers of vascular plant species within the bryophyte's lawns. Species present included common bent (<i>Agrostis capillaris</i>); bilberry (<i>Vaccinium myrtillus</i>), heather (<i>Calluna vulgaris</i>), mat-grass (<i>Nardus stricta</i>); wood-rush species (<i>Luzula</i> spp.) and heath-grass (<i>Danthonia decumbens</i>).
Mire		
Raised bog	0.021 ha	One area of raised bog was present on site. At least four bog-moss species were recorded including papillose bog-moss (<i>Sphagnum papillosum</i>), a peat forming bog-moss indicating that the habitat was well established. The species assemblage included: soft-rush, velvet bent (<i>Agrostis canina</i>), Yorkshire-fog and bulbous rush (<i>Juncus bulbosus</i>) were commonly present and green-ribbed sedge (<i>Carex binervis</i>), cross-leaved heath (<i>Erica tetralix</i>), common yellow-sedge (<i>Carex viridula</i> subsp. <i>oedocarpa</i>), red fescue (<i>Festuca rubra</i>), heath rush (<i>Juncus squarrosus</i>), sedge species (<i>Carex</i> spp.) and lesser spearwort (<i>Ranunculus flammula</i>) were occasionally present within the habitat. Bog-moss species that were locally abundant within the habitat included flat-topped bog-moss (<i>Sphagnum fallax</i>), fringed bog-moss (<i>Sphagnum fibriatum</i>) and red bog-moss (<i>Sphagnum capillifolium</i>).
Acid flush	0.26 ha	Four areas of acid flush habitat were present on the site, typically comprising a carpet of bryophyte with dominant bog-moss species (<i>Sphagnum</i> spp.) cover overlaid by abundant soft-rush, star sedge (<i>Carex echinata</i>) and frequent common yellow edge (<i>Carex demissa</i>), sharp-flowered rush, lesser spearwort (<i>Ranunculus flammula</i>) and bulbous rush (<i>Juncus</i>

Habitat	Approximate Area / Length of habitat within Study Area	Features of Interest
		<i>bulbosus</i>). It was supporting an extensive population of nationally and regionally rare Ivy-leaved bellflower (<i>Wahlenbergia hederacea</i>).
Open water		
Standing water	0.015 ha	Two open ponds were recorded approximately 500m to the south of the redline boundary at Cefn Llechau Uchaf Farm, Stanleytown, within marshy grassland habitat grazed by horses.
Running water	5169.37m (drainage ditches)	A number of small drainage ditches dissected the site. The ditches contained fast running water or were dry, depending on weather conditions. No marginal vegetation was recorded within the habitat. Rhondda Fach flows along the north-western boundary of the site. It is a highly modified watercourse with fast flow, running in south-easterly direction.
Rock exposure and waste		
Natural inland cliff	0.05 ha	There are several rock outcrops, mainly sandstone, throughout the site. These often supported a diversity of lichens, bryophytes. One of the large outcrops, located on the eastern batter of the River Rhondda Fach supporting a population of ivy-leaved bellflower (<i>Wahlenbergia hederacea</i>), which is red listed as Near Threatened for Wales and Nationally.
Rock exposure artificial – Spoil	21.70 ha	Tylorstown Tip (Old Smokey) is a historical colliery tip, which is vegetated over by a mosaic of habitats with areas of exposed spoil. The steep slope and shallow nutrient-poor soils support habitats in early succession.
Miscellaneous		
Wall	283.43 m	Four lengths of drystone wall with diverse lichen and bryophyte cover were present within the redline boundary.
Buildings structures and hardstanding	0.7 ha	The ruins of two buildings, associated with the old colliery site, were present to the northwest of the proposed receptor site. Hardstanding is present on the roads to the north of the site.
Bare ground	9.70 ha	Areas of bare ground are present across the site, along tracks and in areas where the colliery spoil is exposed.

Lower Plants and Fungi

- 9.4.7. A range of semi-natural habitats which support a diversity of lichens and bryophytes were recorded during the survey.
- 9.4.8. The nationally rare lichen species *Lecidea promixta* was recorded on a stone within grassland to the north of the lands.
- 9.4.9. The nationally scarce *Scapania lingulata* (a small liverwort) was recorded on site, possibly the first record for the species in Glamorgan.
- 9.4.10. Lichen species associated with disturbed habitats were recorded on stones on tracks at the location of the receptor site RS-C.
- 9.4.11. A low diversity and sparse distribution of lichens and bryophytes was recorded on the route of the proposed haul road and the receptor site RS-C.
- 9.4.12. Full results are shown in Volume 3: Appendix 9.2 Lower Plants Survey Report.

Great Crested Newt

Desk Study

- 9.4.13. No records were returned for great crested newt within the 2km search area.
- 9.4.14. The two ponds located at Cefn Llechau Uchaf Farm, over 500m to the south of the redline boundary were identified.

Habitat Suitability Index (HSI)

- 9.4.15. The HSI results indicated that both Pond 1 and 2 had 'average' habitat suitability to support great crested newt.

eDNA Survey

- 9.4.16. The DNA analysis report received by Fera stated that eDNA for great crested newt was detected in the sample taken from Pond 1 but not detected in the sample taken from Pond 2.

Field Survey

- 9.4.17. Marshy grassland habitat on site is suitable terrestrial habitat for great crested newt, however, but at over 500m the likelihood of the species being present on site is low.
- 9.4.18. The Great Crested Newt eDNA Survey Technical Note is included as Volume 3: Appendix 9.3.

Wintering Birds

- 9.4.19. The full report for the wintering bird survey is provided in Volume 3: Appendix 9.4.

Desk Study

- 9.4.20. Four Sites of Importance for Nature Conservation (SINC) with relevance to birds lie within 1km of the site.

- The site lies within Old Smokey Slopes SINC and the grassland habitats in the SINC support a distinctive bird assemblage, which include stonechat (*Saxicola rubicola*) and whinchat (*Saxicola rubetra*).
- Blaenllechau Woodland SINC has no specific designation for birds but is likely to support common woodland species and grassland species such as meadow pipit, stonechat and skylark in winter.
- St. Gwynno Forest SINC supports has habitat suitable for wintering goshawk (*Accipiter gentilis*), crossbill (*Loxia*), siskin (*Spinus spinus*) and redpoll (*Carduelis* spp.).
- The Rhondda Fach is part of the Taff and Rhondda Rivers SINC and supports dipper (*Cinclus cinclus*) grey wagtail (*Motacilla cinerea*), and kingfisher (*Alcedo atthis*) all year around. In the winter goosander (*Mergus merganser*) is a frequent visitor, and grey heron (*Ardea cinerea*) feed along the river throughout the year.

9.4.21. A total 19 records of bird species of high conservation concern (Priority/ Protected/ Red listed Species) within 2km of site were returned for between August and March inclusive for the last 10 years.

9.4.22. There were 10 amber listed species of medium conservation concern returned from the data search. Tawny owl (*Strix aluco*) and kestrel (*Falco tinnunculus*).

9.4.23. Dipper, also listed as a Local Biodiversity Action Plan (LBAP) species for Rhondda Cynon Taf, was recorded 34 m from the south west margin of the landslip area.

Field Survey

9.4.24. A total of 38 species were recorded during the wintering bird survey, including three Schedule 1 species and ten species classified as Species of Principal Importance in Wales (SPI). Full results are provided in Volume 3: Appendix 9.5.

Raptors

9.4.25. Five species of raptor were recorded, including sparrowhawk (*Accipiter nisus*), red kite (*Milvus milvus*) and common buzzard (*Buteo buteo*).

Species of low conservation concern

9.4.26. Twenty-four bird of the species recorded were of low conservation concern, being widespread and common in East Glamorgan, but some of these species are listed as LBAP species in Rhondda Cynon Taf and include buzzard (*Buteo buteo*) and stonechat (*Saxicola rubicola*).

Wildfowl (Swans, geese and ducks) and waders

9.4.27. No wildfowl or waders were recorded using the site to rest or feed.

Winter thrushes

9.4.28. Wintering thrushes were present in very low numbers, including migrant Schedule 1 species redwing and fieldfare.

Breeding Birds

Desk Study

- 9.4.29. A total of 114 records of birds of 26 species within 2km of site were returned for the last 10 years. Records included eight Schedule 1 species.
- 9.4.30. There were 83 records of amber listed species of medium conservation concern, relating to 15 species.
- 9.4.31. There were 57 records of amber listed species of medium conservation concern, relating to 18 species.
- 9.4.32. Dipper, house martin (*Delichon urbicum*) and swift (*Apus apus*) are also listed as Local Biodiversity Action Plan (LBAP) species for Rhondda Cynon Taf.
- 9.4.33. Stonechat was recorded within the footprint of the haul road and dipper was recorded 34m from the south-west margin of the landslide area.

Field Survey

- 9.4.34. A total of 54 species of bird were recorded during the surveys and 13 of these were confirmed as breeding, 10 as probably breeding and four as possibly breeding.
- 9.4.35. Fifteen species were assessed as non-breeding or flying over the survey area. Species in this category include species of principal importance in Wales (SPI); herring gull and kestrel.
- 9.4.36. Some breeding birds of low conservation concern are listed as LBAP species in Rhondda Cynon Taf and include buzzard (*Buteo buteo*) and stonechat, these have been classified as having a local importance for nature conservation value.
- 9.4.37. The breeding bird survey report is included as Volume 3: Appendix 9.4.

Reptiles

- 9.4.38. Habitats with potential to support reptiles are present on the site and common lizard (*Zootoca vivipara*), slow-worm (*Anguis fragilis*) and grass snake (*Natrix natrix helvetica*) were recorded on the lower slopes of Tylorstown Tips during Phase 2 and 3 works. Due to time constraints a reptile survey of the Phase 4 site was not carried out but, following discussion with the county ecologist, it was agreed that the precautionary principle be followed and reptile presence assumed.

Future baseline

Climate Change

- 9.4.39. In the UK, the effects of climate change are likely to comprise more extreme weather events, a general increase in summer temperatures and warmer, milder winters. Changes in rainfall distribution and a rise in sea levels are also expected. The Climate Change Risk Assessment for Wales⁵⁵, suggest that the most significant threats for Wales include:
- changes in soil conditions, biodiversity and landscape as a result of warmer, drier summers;

⁵⁵ Welsh Government, Department of Environment, DEFRA (2012) The Climate Change Risk Assessment for Wales

- reductions in river flows and water availability during the summer;
- increases in flooding; and
- changes in species including a decline in native species, changes in migration patterns and an increase in invasive species.

Habitats

Grasslands mire and raised bog

- 9.4.40. Whilst some grasslands within the study area are unlikely to be significantly affected by a rise in temperatures, other important grassland areas such as the marshy grassland are likely to be very sensitive to the changes in rainfall patterns, with drier summers leading to a decline in this habitat type. Increased rainfall through the winter, however, could lead to a change in catchment characteristics, providing new waterlogged areas and consequent marshy/wet grassland habitats.

Woodland

- 9.4.41. Drier summers have the potential to affect the species composition of the wet woodland areas identified on site, leading to an overall loss of this habitat through drying out of the ground.

Species

Evaluation of Biodiversity Resources

- 9.4.42. The biodiversity resources identified within the study area are evaluated as summaries in Table 9.8 below.

Table 9.8: Evaluation of Biodiversity Resources.

Biodiversity Resource	Value	Justification
Sites		
Old Smokey Slopes SINC - RH01 and the Phase 4 receptor site are located within the SINC	Medium (County)	<p>The SINC comprises an extensive area of mosaic fridd habitat which supports diverse acid grassland and dry heath habitats based partly on natural ground and partly on coal spoil.</p> <p>Colliery spoil sites support high levels of diversity by providing a combination of varied topography, aspect, substrate composition, hydrology and pH. which results in complex habitat mosaics in close proximity.</p> <p>County level SINC quality habitats assessed by RCT with importance Priority Habitats were also identified in relation to Wales (Section 7, Environmental (Wales) Act 2016).</p>
St. Gwynno Forest SINC is directly adjacent to the north east sector of receptor site	Medium (County)	<p>The SINC comprises a diverse range of habitats including dry heath and acid grassland, marshy grassland and small areas of relic ancient woodland (Coed Aberaman) with an extensive area of Forestry Commission plantation that is known to support rare bird species (crossbill, redpoll, goshawk, great grey shrike and breeding nightjar).</p>
Taff and Rhondda Rivers SINC	Medium (County)	<p>The banks of the Rhondda (and Rhondda Fach) are flanked with wet woodland and other associated river habitat supporting a diverse assemblage of flora and fauna, including ancient woodland. The clean waters support fish (brown trout and potentially salmon) and invertebrates, and there is a high diversity of bird species associated with the habitats.</p> <p>County level SINC quality habitats assessed by RCT.</p> <p>Regional level importance Priority Habitats were also identified in relation to Wales (Section 7, Environmental (Wales) Act 2016).</p>
Blaenllechau Woodland SINC	Medium (County)	<p>Upland ancient oak woodland, wet woodland dry heath (heather and bilberry) and bracken/acid grassland and purple moor-grass support very large grayling butterfly and mottled grasshopper colonies; violet rich banks likely to support breeding dark green fritillary and high brown colonies, which occurs in the vicinity.</p>
Habitats		
Semi-natural broadleaved	Medium	Upland oak woodland; Lowland mixed deciduous woodland and wet woodland are present on site and

Biodiversity Resource	Value	Justification
woodland	(County)	are S.7 Habitats under the Environment (Wales) Act 2016 and also listed on the RCT LBAP.
Coniferous plantation	Low (Local > 5km)	Heavily managed habitat of low intrinsic interest and low biodiversity value. However, crossbills Schedule 1 of WCA species of birds possibly bred in the forestry plantation 100 m east of the RS-C. Additionally the plantations is situated on the mosaic of dry-heath, acid and marshy grassland with the extensive lower plants cover.
Dense and scattered scrub	Low (Local > 5km)	Gorse scrub. Two species on site including Gorse (<i>Ulex europaeus</i>) and dwarf gorse (<i>Ulex minor</i>) is the component of dry heath shrub layer and fridd habitat. Dwarf gorse is a relatively uncommon component. Important habitat for birds, invertebrates. However, without management encroaching on habitats of greater conservation value.
Scattered broadleaved trees	Low (Local > 5km)	Some of the trees on the site are mature or notable/veteran trees that enrich biodiversity on the site with potential to support nesting birds, roosting bats and a high diversity of invertebrates, but they are common and widespread in the county,
Scattered coniferous trees	Negligible (Scheme footprint)	These trees have self-seeded from the nearby coniferous plantation and have no biodiversity or conservation value. The trees are encroaching on habitats of greater conservation value.
Poor semi-improved neutral grassland	Negligible (Scheme footprint)	This habitat comprises common and widespread species and does not significantly enrich the biodiversity of the site.
Marshy grassland	Medium (Regional/County)	Purple moor grass and rush pasture is a Priority habitat under S.7 Habitats under the Environment (Wales) Act 2016. In the context of the site, this habitat forms a mosaic with dry heath and unimproved acid grassland habitats. Although the marshy grassland on site has a limited diversity of species, as a component of a mosaic habitat the ecological value is significantly increased.
Continuous and scattered bracken	Low (Local > 5km)	This is a common and widespread habitat in the county but enriches the ecological resources within the locality, providing suitable nesting sites for bird species such as meadow pipit and suitable habitat for common reptiles.
Tall ruderal herb	Negligible (Scheme footprint)	Sparsely distributed over the site with contribution to ecological value.

Biodiversity Resource	Value	Justification
	footprint)	
Acid flush and raised bog	Medium (Regional/County)	These habitats are S.7 Priority Habitats under the Environment (Wales) Act 2016. They are valuable habitats within the Old Smokey Slopes SINC due to the diversity of higher plants, bryophytes and invertebrates it can support. The ear threatened' ivy-leaved bellflower (<i>Wahlenbergia hederacea</i>) was recorded in the area of acid flush. The habitats are also listed on the RCT LBAP.
Unimproved acid grassland	Medium (County)	These habitats are S.7 Priority Habitats under the Environment (Wales) Act 2016. They are valuable habitats within the Old Smokey Slopes SINC due to the diversity of higher plants, bryophytes and invertebrates it can support. The habitats are also listed on the RCT LBAP.
Dry heath and acid grassland and dry heath mosaic	Medium (Regional)	These habitats are S.7 Priority Habitats under the Environment (Wales) Act 2016. They are valuable habitats within the Old Smokey Slopes SINC due to the diversity of higher plants, bryophytes and invertebrates it can support. The habitats are also listed on the RCT LBAP.
Standing water	Medium (County)	Ponds are a S.7 Priority Habitats under the Environment (Wales) Act 2016. The two ponds located at over 500m from the site will enrich biodiversity locally through providing breeding sites for common amphibians, habitat for waterfowl aquatic invertebrates. There are low numbers of ponds in the locality, but it is not an uncommon habitat in the county.
Running water	Medium (Regional/County)	Rhondda Fach River located directly west of the red line boundary. Highly modified river however, important for fish (including salmonids), otter, birds and aquatic invertebrate species population.
Natural inland cliff	Medium (County)	Sandstone outcrop located within the eastern batter of River Rhondda Fach is on the redline boundary of the landslide area.
Rock exposure artificial – Mine and Spoil (Historic open cast mine)	Medium (County)	This is listed as a UKBAP Priority habitat as it creates an open mosaic of habitats on previously developed land.
Bare ground	Negligible (Scheme footprint)	Widespread across the site and negligible biodiversity value, although some lichens are present on this habitat on site.

Biodiversity Resource	Value	Justification
Species		
Bats	Medium (County)	<p>No statutory designated sites for bats were identified within 5km of the Proposed scheme.</p> <p>One tree has been identified as having Moderate potential for bat roosts and two trees were identified as having low potential, all are located within the red line boundary to the west of the landslip and donor site (See Volume 3 Appendix 9.8).</p> <p>The site is located mainly within the open area of uplands. Low number of commuting and foraging bats are present on site and no evidence was found that the trees on site are currently being used by roosting bats (See Volume 3 Appendix 9.9).</p>
Great Crested Newt	Medium (County)	<p>An e-DNA sample from a pond just over 500 m from the site returned a positive result and the marshy grassland on site provides suitable habitat for this species. Whilst the likelihood of the presence of great crested newt on site is deemed negligible, if a population was identified, it would be of a minimum of county value.</p>
Wintering Birds	Low (Local > 5km)	<p>No large flocks of species or migratory movement of raptors, gulls or geese were recorded. There were only low number of wintering thrushes on the site. Wintering bird populations on the site enrich the ecological resources within the locality, but are not significant at a higher geographic level, as there are widespread areas of suitable habitat across the county.</p>
Breeding Birds	Low (Local > 5km)	<p>The diversity of bird species was relatively low and mainly widespread, common species, no species of significant regional or county importance were recorded on site. Suitable habitat for the species recorded on site in abundant in the locality.</p>
Reptiles	Medium (County)	<p>The assessment of the value of reptiles on the site is based on the precautionary principle, in the absence of a survey due to time constraints. The assessment has been based on knowledge of the site, the presence of a diversity of suitable habitats, records of reptiles during Phase 2 and 3 of the remedial works, and through discussion with the county ecologist.</p>
Fish	Medium (County)	<p>No records were returned for priority and protected fish species however, the Rhondda Fach (SINC) is cited as supporting brown trout (<i>Salmo trutta</i>) with potential for salmon (<i>Salmo salar</i>).</p>

Biodiversity Resource	Value	Justification
		Brown trout were observed in the river during the ecological surveys and work supervision for Phases 2 and 3 of the remedial works (Redstart, 2020b; 2020c). Both species are Priority species under Section 7 of the Environment (Wales) Act 2016.

9.4.43. Where habitats form part of a designated site such as SINC then they will be considered within the context of the designated site and the higher value will be used in the assessment.

9.5. Preliminary Impact Assessment

Construction Phase

- 9.5.1. Construction activities have the potential to cause impacts upon biodiversity through disturbance, direct mortality, insensitive timing of works coinciding with specific life cycle phases such as hibernation or breeding, pollution of air, water or land leading to habitat modification or reduction in prey species etc.
- 9.5.2. The footprint of the Proposed Scheme has been assumed as per the Red Line Boundary. The most likely locations for construction compounds and haul routes have also been included within the assessment.
- 9.5.3. It is considered therefore that the assessment presents a reasonable worse-case scenario (see Table 9.9).

Table 9.9: Construction Impacts Assessment.

Receptor	Impact	Effect	Magnitude	Significance
Sites				
Old Smokey Slopes SINC	Habitat loss	<p>The entire footprint of the works is located within the Old Smokey SINC, including designated features and habitats such as unimproved acid grassland, dry-heath, lichen/ bryophyte heath and mosaic of dry-heath, acid grassland and bracken.</p> <p>Some habitats will be permanently lost due to the creation of the landform on the receptor site.</p> <p>Whilst every effort will be made to use areas of existing bare ground for access/egress routes and compound locations, there will be some temporary damage and/or loss of habitat where these features need to encroach on habitat.</p> <p>Impacts on specific habitats are detailed in the 'Habitats' section of this table.</p>	High Adverse	Major Adverse
	Habitat degradation	<p>The condition of habitats within the SINC may be degraded through potential hydrological changes caused by the excavation works, deposition of material on the receptor site and creation of a drainage system. Dust from these works may also cause a temporary degradation of habitat value, although it is anticipated that this will be a temporary impact due to the short duration of the works.</p>	Medium Adverse	Moderate Adverse
		<p>Marshy grassland, acid flush and raised bog habitats are groundwater dependant terrestrial ecosystems (GWDTE). Excavation, disturbance and deposition of materials, along with the creation of a drainage system around the receptor site location may alter the groundwater regime in the area. The receptor landform and the proposed drainage system have been designed to avoid, or minimise, impact on these habitats and it is anticipated that groundwater levels will not be significantly affected during construction.</p> <p>The habitats directly adjacent to the receptor site and any haulage or access/egress routes is at risk of degradation from chemical and dust pollution. This will be a temporary effect and the baseline condition</p>	Medium Adverse	Moderate Adverse

Receptor	Impact	Effect	Magnitude	Significance
		should recover following completion of the works.		
St. Gwynno Forest SINC	Short term degradation of habitat.	There is potential for the habitats in this SINC to be affected indirectly by dust accumulation resulting from the material deposition on to the RS-C. The short duration of the works will result in a temporary impact only.	Slight Adverse	Slight Adverse
Taff and Rhondda Rivers SINC	Degradation of the habitat	As the Rhondda Fach runs along the southern boundary of the landslip area (the donor site) there is potential for contaminated surface water run-off and chemical pollution from machinery to enter the water channel. Particulate matter from the landslip material may be disturbed and contaminate the river.	High Adverse	Major Adverse
Blaenllechau Woodland SINC	Degradation of habitat	There will be no loss of this habitat as works do not encroach on the site. There is potential for the habitats in this SINC to be affected indirectly by dust accumulation resulting from the material deposition on to the RS-C. The short duration of the works will result in a temporary impact only.	Slight Adverse	Slight Adverse
Habitats				
Semi-natural broadleaved woodland	Potential loss or degradation of this habitat.	There is a direct impact on trees within/adjacent to the donor site. Habitat loss will occur through the removal of trees to facilitate the work. Roots of adjacent trees may be damaged, and therefore degrade the habitat value, if machinery and excavations are in close proximity of the trees.	Medium Adverse	Moderate Adverse
Coniferous plantation	No impact	No effect	No Change	Neutral
Dense and scattered scrub	Potential loss or degradation of this habitat	Direct impact through the permanent habitat loss; indirect impacts through habitat degradation, hydrological changes, potential pollution from construction; disturbance	Medium Adverse	Slight Adverse

Receptor	Impact	Effect	Magnitude	Significance
Scattered broadleaved trees	Habitat loss	There will be minimal removal of scattered broadleaved trees but they are common and widespread in the county and the impact on biodiversity will be low,	Slight Adverse	Slight Adverse
Scattered coniferous trees	Habitat loss	Some self-seeded coniferous trees will be removed to facilitate the proposed works but they have no biodiversity or conservation value and are encroaching on habitats of greater conservation value.	Slight Beneficial	Slight Beneficial
Poor semi-improved neutral grassland	Habitat loss or degradation	Semi-improved neutral grassland habitat was limited to road verges and around building ruins to the north of the site. There should be no damage to these habitats as site machinery should not be tracking over these areas, there is a potential for minor degradation of the habitat through dust from the construction phase, but as a habitat of low biodiversity this will be insignificant.	Slight Adverse	Slight Adverse
Marshy grassland	Habitat loss	The permanent loss of 3.05 ha of marshy grassland (approximately 30% of the total area of this habitat on the site) will be caused by the proposed Scheme.	High Adverse	Major Adverse
	Habitat degradation	Hydrological changes caused by the deposition of material on the receptor site and installation of a drainage system may alter ground water levels and therefore the characteristic of the marshy grassland habitat that is being retained. This would be a permanent impact. The habitat adjacent to the boundaries of the receptor site and haulage and access/egress routes may be temporarily damaged by site traffic.	Medium Adverse	Moderate Adverse
Continuous and scattered bracken	Habitat loss	Areas of continuous or scattered bracken habitat will be used as storage areas for turves and topsoil before re-instatement, any habitat loss will be short-term.	Slight Adverse	Slight Adverse
Tall ruderal herb	Habitat loss	There may be a minor loss of some of the sparse tall ruderal habitat on site.	Negligible Adverse	Negligible Adverse

Receptor	Impact	Effect	Magnitude	Significance
Acid flush and raised bog	Habitat loss	<p>0.05 ha (18% Of the total area of these habitats on the site) will be lost due to the deposition of material at the receptor site.</p> <p>Any change in the hydrological regime on the site, caused by excavation, disturbance or deposition of materials could lead to the permanent loss of these habitats.</p>	Medium Adverse	Moderate Adverse
	Habitat degradation	<p>There is potential for these habitats to be degraded by pollution from chemicals and spills from site machinery and through machinery and site personnel straying off designated haul and access routes causing damage to the habitats.</p>	Medium Adverse	Moderate Adverse
Unimproved acid grassland	Habitat loss	<p>A permanent loss of 0.05 ha of unimproved grassland (approximately 0.5% of the total area of this habitat within the SINC) of these habitats will be caused by the creation of the receptor site landform.</p>	Slight Adverse	Slight Adverse
	Habitat degradation	<p>Hydrological changes caused by the creation of the receptor site landform and the installation of the drainage system have potential to cause degradation of these habitats.</p> <p>There is a risk of temporary degradation of these habitats through pollution of ground water and soils caused by fuel spillages from machinery.</p>	Slight Adverse	Slight Adverse
Dry heath and acid grassland and dry heath mosaic	Habitat loss	<p>An area of 1.54 ha of dry heath (approximately will be permanently lost through construction of the landform at the receptor site and the creation of the site compound.</p>	Medium Adverse	Moderate Adverse
	Habitat degradation	<p>There is potential for dry heath habitat outside of the Proposed Scheme footprint but within the red line boundary to be degraded by pollution from chemicals and spills from site machinery and through machinery and site personnel straying off designated haul and access routes causing damage to the habitats.</p> <p>There is potential for these habitats in to be temporarily impacted on through the accumulation of dust accumulation resulting from the material deposition on to the RS-C.</p>	Slight Adverse	Slight Adverse
	No impact	No effect.	No change	Neutral

Receptor	Impact	Effect	Magnitude	Significance
Standing water				
Running water (see Taff and Rhondda Rivers SINC)	Habitat degradation	No works will be carried out within the river channel and the proposed works are not directly adjacent to the Rhondda Fach, however, there is some potential for indirect impact through pollution, silt debris and sediment entering the watercourse from the drainage system on the tips which may impact on the fish population in Rhonda Fach. This would be short term as the volume and flow of the water in this main river will effectively dilute any small amounts of pollutants entering the watercourse.	Medium Adverse	Moderate Adverse
Natural Inland Cliff	No impact	No effect.	No Change	Neutral
Rock exposure artificial – Mine and Spoil (Historic open cast mine)	No impact	No effect.	No Change	Neutral
Bare ground	No impact	No effect.	No Change	Neutral
Species				
Bats	Direct mortality	<p>Three trees located in close proximity to the north-west of the landslip site have potential to support bat roosts, but no bat roosts were identified.</p> <p>The trees are adjacent to the proposed drainage works on the site and may need to be removed. There is a low potential risk of harming or killing bats if the trees are felled.</p> <p>If the final drainage design does not necessitate the removal of the trees, there is still a potential risk of disturbance from noise and dust from the excavation works in the unlikely event that a bat roost was present in the trees.</p> <p>The impact on the bat population will not be significant as the risk of death/injury is low and applies to individual bats only.</p> <p>No works during the night is anticipated and therefore there will be no disturbance to potential roosts from additional lighting.</p>	Slight Adverse	Slight Adverse
	Foraging habitat loss, habitat modification;	Potential indirect impacts may be disturbance from noise and vibration from excavation works and some loss and degradation of foraging habitat within the donor site (RH01) and the	Minor Adverse	Slight Adverse

Receptor	Impact	Effect	Magnitude	Significance
	disturbance of flight line	footprint of the proposed RS-C and construction of the landform of the proposed RS-C. These effects would be temporary and have no long-term negative effect on the local bat population.		
Great crested newt	Direct mortality/injury	<p>Site preparation and clearance have a potential to cause direct mortality and injury to GCN.</p> <p>The Proposed Scheme site is over 500m of the potential breeding pond for GCN, therefore the likelihood of encounter this species and therefore the direct mortality is negligible.</p>	Negligible Adverse	Negligible Adverse
	Degradation and loss of potential terrestrial habitat (foraging, resting and commuting)	<p>No suitable waterbodies were identified in, or within 500 m of, the redline boundary. eDNA sampling of a pond just over 500 m from the south western extent of the red line boundary returned a positive result for great crested newt and NRW requested that the species is considered in the EIA.</p> <p>The proposed scheme could result in permanent loss of potential terrestrial habitat suitable to support GCN in the footprint of the receptor site landform, however no terrestrial habitat will be lost within the 500 m radius of the pond for which the positive eDNA result was returned.</p>	Negligible Adverse	Negligible Adverse
Wintering birds	Direct mortality	Short term displacement of small numbers of wintering bird species using the site, including species of high conservation concern such as reed bunting, starling and kestrel, is likely to occur due to habitat loss.	Moderate Adverse	Slight Adverse
Breeding birds	Direct mortality	The pre-construction phase such as vegetation clearance, topsoil and turves stripping can cause direct mortality to eggs and chicks of the ground nesting birds	Slight Adverse	Slight Adverse

Receptor	Impact	Effect	Magnitude	Significance
	Roosting and/or nesting habitat loss	The breeding birds survey identified the site as having habitat with potential for breeding skylark. Approximately 4.4ha will be permanently lost to the proposed RS-C footprint. Additional breeding grounds will be temporarily lost to the compound site and potentially for areas of topsoil storage.	Medium Adverse	Slight Adverse
Reptiles	Direct mortality/injury	Pre-construction works such as vegetation clearance and earth-moving works can cause direct mortality to the reptile population on site. In the absence of a survey, but based on knowledge of the site, presence of suitable habitats to support reptiles, and the confirmed presence of reptiles on the lower slopes of Tylorstown Tips, the precautionary principle will be followed and reptiles will be assumed present.	Medium Adverse	Moderate Adverse
	Terrestrial habitat loss and degradation	As stated above the RS-C footprint will cause approximately 4.4ha of permanent foraging habitat loss. Site compound and topsoil storage area will cause further temporarily habitat loss. There is a wide area of suitable habitat that will remain undisturbed outside of the red line boundary and therefore it is not considered that the impacts will be majorly significant to reptile populations in the area	Medium Adverse	Moderate Adverse
Fish	Direct mortality and Habitat loss	Works within the main watercourse of Rhondda Fach are not anticipated, however indirect impact through pollution, silt debris and sediment entering the watercourse from the drainage system on the tips may impact on the fish population in Rhonda Fach.	Minor Adverse	Moderate Adverse

Operational Phase

- 9.5.4. Due to the nature of the Proposed Scheme and the after use no adverse effects from operational phase of this scheme are anticipated.
- 9.5.5. Dependent on long term management beneficial effects on biodiversity may be realised.

9.6. Mitigation, Enhancement and Monitoring

Mitigation

- 9.6.1. There are a number of construction and operational phase effects that are reduced or eliminated through embedded mitigation.

Construction Stage

9.6.2. The following is assumed:

- The design for the landform at the receptor site will be adhered to, ensuring that the habitats of higher biodiversity value are either avoided, or the area lost is minimised;
- A CEMP will be prepared and implemented which will detail measures to minimise construction dust/air quality impacts, noise and vibration and pollution controls to water and soils as well as controls for site traffic;
- Site clearance will be undertaken at appropriate times of year; or under ecological supervision, if appropriate;
- There will be a commitment to follow best practice in respect of environmental protection during construction. A detailed Ecological Method Statement and Mitigation Strategy will be in place to ensure working practices adhere to this commitment (Volume 3: Appendices 9.6 and 9.7).

Operational Stage

9.6.3. The measures have been recommended to mitigate operational impacts on biodiversity receptors:

- The Mitigation Strategy incorporates aftercare work to be following mitigation measures such as the translocation of turves and re-use topsoil; and
- The re-establishment of translocated turves and re-used topsoil will be monitored.
- Impacts which are controlled or reduced to a significance of **Slight Adverse** or below through the above embedded mitigation are not included in Tables 9.10 and 9.11.

Table 9.10: Construction phase mitigation.

Ref	Receptor(s)	Impact and resulting Effect	Significance (pre-mitigation)	Mitigation
Sites				
B M1	Old Smokey Slopes SINC	Habitat loss	Major Adverse	<p>Habitats have been mapped and assigned a value of high, medium or low. Details are provided within the Ecological Method Statement (Volume 3; Appendix 9.6) and Biodiversity Mitigation Strategy (Volume 3; Appendix 9.7).</p> <p>High value habitat (RED) - Where possible there will be no works or removal of the highest value habitats, where removal of the habitat is necessary due to excavation works or prior to deposition of materials at the receptor site turf removal will be carried out. Turves will be stored in a pre-determined location on a low value habitat and re-instated following the completion of the earthworks to replace the areas of habitat removed.</p> <p>Medium value habitats (AMBER) - Where habitat clearance is required topsoil will be stripped and stored in pre-designated locations of low biodiversity value. The topsoil will be re-instated on site following the completion of earthworks to promote natural regeneration of habitat.</p> <p>The turf translocation and topsoil re-instatement is detailed in the Ecological Method Statement and Mitigation Strategy Plan for the Proposed Scheme Volume 3: Appendices 9.7 and 9.8). Acid flush turves and marshy grassland topsoil will be translocated or re-instated within the newly created swales and attenuation areas within the drainage design, where conditions are most suitable.</p> <p>The process will be overseen by the ECoW and controlled by the incorporating the certification procedure.</p>
B M2		Degradation of habitats outside of the footprint of the Proposed Scheme (but within the red line boundary) may be caused by damage from site traffic and	Moderate Adverse	Designated haul routes, access points and compound locations will be used. The routes and locations have been identified to ensure that degradation of habitat through vehicular access and damage from site personnel is avoided.

Ref	Receptor(s)	Impact and resulting Effect	Significance (pre-mitigation)	Mitigation
		personnel, dust and potential hydrological changes.		<p>Where habitats with higher biodiversity (RED and AMBER) are present within the redline boundary, but outside of the footprint of the development, they will be fenced off to protect from accidental damage.</p> <p>A phased construction programme will be implemented to protect and minimise the direct impact of the works on the RED and AMBER habitats within the redline boundary. A phased construction method will also enable reduce the area for topsoil/turf storage required as storage can be achieved on a rotational basis.</p>
B M3	Taff and Rhondda Rivers SINC (and running water habitat)	Degradation of the riverine habitat may occur due to potential input of dust and sediment from the remedial works at the site of the landslip and pollution events from machinery and through the new drainage system.	Moderate Adverse	<p>Standard best practice and pollution control measures will be implemented in accordance with relevant, including:</p> <ol style="list-style-type: none"> No refuelling of plant and machinery will be permitted adjacent to any watercourses. All fuel and chemicals will be stored away from any watercourse. Bio-oils will be used in plant to ensure the risk of pollution is minimised. Silt prevention measures will be installed to prevent debris and sediment entering watercourses. Additional silt fencing will be utilised where and when necessary and the contractor should monitor weather to ensure conditions are suitable to continue work. <p>These measures will be detailed in the contractor's Construction Environmental Management Plan (CEMP).</p> <p>Silt prevention measures will be installed to prevent debris and sediment entering the watercourse and negatively impacting upon the habitat.</p>
Habitats				

Ref	Receptor(s)	Impact and resulting Effect	Significance (pre-mitigation)	Mitigation
B M4	Priority habitats: Marshy grassland Acid flush and raised bog Unimproved grassland, acid grassland and dry heath mosaic Dry heath	Habitat loss and degradation	Moderate Adverse	The Priority habitats are present within Old Smokey Slopes SINC and the details of mitigation measures are described in the 'Sites' section of this table.
B M8	Priority habitats: Semi-natural broad-leaved woodland	Habitat loss and degradation	Moderate Adverse	Where loss of mature trees is required to facilitate reprofiling works at Llanwonno Tip, compensatory planting of native trees will be required in the area, either within the existing footprint of the habitat or to the west, along the drainage channel.
Species				
B M5	Reptiles	Direct mortality through vegetation clearance and excavation works and loss of terrestrial habitat – both temporary and permanent due to excavations, creation of the haul road and compound site and	Moderate Adverse	Vegetation and soil/turf removal will follow a Reptile and Amphibian Site Clearance Method Statement, which includes the erection of reptile fencing around the perimeter of the footprint of the works prior to any works commencing. Vegetation clearance will be carried out under a 2-stage cut and any potential refugia will be carefully dismantled by hand. All vegetation clearance and earthworks will be supervised by an ECoW.

Ref	Receptor(s)	Impact and resulting Effect	Significance (pre-mitigation)	Mitigation
		deposition of material at the receptor site.		<p>The programme will ensure that once cleared, the receptor areas do not recolonise with vegetation to become reptile 'suitable' and appropriate on-going management will be employed until the remediation works commence.</p> <p>More detailed information is specified in the separate Reptiles and Amphibians Site Clearance Method Statement.</p>
B M6	Fish (see also Taff and Rhondda Rivers SINC)	<p>Indirect impact through pollution, silt debris and sediment entering the watercourse from the drainage system on the tips may impact on the fish population in Rhonda Fach.</p> <p>Disturbance of breeding and damage to eggs to through in-channel works within the Rhondda Fach.</p> <p>These effects may lead to reduced food resources and loss of spawning sites for salmonid fish.</p>	Moderate Adverse	<p>It is not anticipated that any works will be required within the river channel, however, if in-channel works the timings of works will be restricted so as not to disrupt the potential spawning periods of protected fish species such as brown trout and other fish species using the river. In channel works are not allowed between 15th October and 15th May without written consent from NRW.</p> <p>Works will be designed to limit the potential disturbance within the river/stream.</p>

Table 9.11: Operational phase mitigation.

Ref	Receptor(s)	Impact and resulting Effect	Significance (pre- mitigation)	Mitigation
B M7	Old Smokey Slopes SINC and Priority habitats	Loss or degradation of habitat biodiversity value	Major adverse	<p>A five-year Aftercare Plan will be in place to monitor and ensure the establishment of the reinstated habitats and the progress of the natural regeneration.</p> <p>This will include weeding, watering and invasive species control and monitoring the success of habitat re-establishment and natural regeneration through habitat and vegetation sampling surveys.</p>

Enhancement

- 9.6.4. The consideration of enhancement is required under the Environment (Wales) Act 2016.
- 9.6.5. A number of enhancements are considered achievable and appropriate within the site area, they are detailed in Table 9.12.

Table 9.12 Enhancement Opportunities.

Ref	Description of location	Description of enhancement measures
N/A	Site wide	In the long term a comprehensive Habitat Management Plan focussed on low intensity cattle or horse grazing, scrub and invasive plant control and access management would be beneficial for habitat management for biodiversity on the site. The site management could be integrated with other conservation grazing and management arrangements managed by RCTCBC and local wildlife groups to develop the management strategies needed to maximise ecological value. This would be a measure that could be adopted by the client in the future but does not fall within the remit of this scheme.
B E1	The location(s) will be agreed by the supervising ecologist.	At least one 'below ground' reptile hibernaculum will be created on site. Tree cuttings from felled conifer trees and brash on site will be re-purposed for this creation.
B E2	Along the woodland edge / fence line of the coniferous plantation at the north-east of the receptor site, or along the boundary of the woodland closest to the donor site.	Installation of at least one kestrel nesting box.
B E3	Boxes should be sited in mature trees on the site (in the absence of buildings on site) with entrance holes facing away from the prevailing wind.	Starling boxes should also be erected as this rapidly declining species was recorded using the site to feed and the species is likely to be present in the breeding season.
B E4	In suitable woodland habitat across the site, particularly along the river corridor or in adjacent woodland areas.	At least 10 closed and open fronted boxes for a range of common breeding bird species that take readily to boxes such as blue tit, great tit and wren, should be erected in suitable woodland habitat across the site or in adjacent woodland areas. These boxes will provide roosting sites in winter.

Monitoring

- 9.6.6. A five-year Aftercare Plan will be in place to monitor and ensure the establishment of the reinstated habitats and natural regeneration, as detailed in the Mitigation Strategy Plan.
- 9.6.7. Local nature conservation groups and organisations will be involved with the long-term monitoring of the habitats on site.

9.7. Residual Impact Assessment

Construction phase

- 9.7.1. It is expected that all construction operations will be controlled by the CEMP and that significant long-term residual impacts due to the timing of operations, pollution of air, water or soil will be avoided. It is therefore considered that no significant long-term adverse effects will occur during the construction of the Scheme. These have been attributed a significance of **Slight**.

Operational phase

- 9.7.2. A number of impacts have been identified as **Moderate Beneficial** for the operational stage. As design and mitigation measures will result in increased diversity of habitat and species on the site.
- 9.7.3. Residual operational impacts are described in Table 9.13.

Table 9.13 Residual impacts – operational stage.

Receptor	Mitigation	Residual magnitude	Residual significance
Old Smokey SINC and Priority Habitats	<p>Restoration of Priority habitats through turf translocation and soil stripping and re-instatement.</p> <p>Inclusion of micro-topography on the landform at the receptor site, resulting in the creation of a diversity of micro- habitats.</p> <p>This will have a long-term beneficial effect on biodiversity, particularly local populations of invertebrates.</p>	Medium Beneficial	Moderate Beneficial
Reptiles	<p>The micro topography on the newly created landform at the receptor site, restoration of existing habitats and natural regeneration of habitat on the landform will create additional opportunities for reptiles – both basking sites and foraging opportunities. If a below-ground hibernaculum is created as an enhancement this will provide extra opportunities for shelter and over wintering.</p>	Medium Beneficial	Moderate Beneficial

9.8. Cumulative effects

9.8.1. The developments detailed in Table 9.14. Are those that were considered in the assessment of the cumulative effects on biodiversity and nature conservation.

Table 9.14: Developments considered in cumulative assessment for Proposed Scheme.

Planning Application Reference	Location	Description
20/0993/35	Overlapping with the southern part of the site of the Proposed Scheme.	Phase 2 and 3 of the Tylorstown Landslip project, consisting in removing material from the Afon Rhondda Fach valley and depositing them on the riverbank. These are part of the emergency works at Tylorstown to move the slipped material.
20/1312/08	Station Road, Ferndale, to the southwest of the Proposed Scheme.	Temporary deposit and storage of approximately 8,000m ³ of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works, as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective).
20/1313/08	Land across from Oaklands business park, Ferndale, to the southwest of the Proposed Scheme.	Temporary deposit and storage of approximately 22,000m ³ of material from Tylorstown landslip consisting of the formation of stockpiles, material consolidation, drainage, habitat/ecological mitigation and associated works, as part of Phase 2 and 3 of the Tylorstown Landslip project (part retrospective).

9.8.2. These developments are works associated with the emergency remedial works at Tylorstown, following the landslip caused by storm Dennis (Phases 2 and 3), located to the south-west of the Proposed Scheme.

9.8.3. The works were carried out under a detailed Ecological Method Statement agreed in consultation with Natural Resources Wales and the county ecologist. The mitigation and enhancement measures for the Proposed Scheme have been designed to tie in with the measures taken for the Phase 2 and 3 developments. The cumulative impacts are considered **Slight Adverse** in the short term, however, in the long term, as translocated and newly created habitats establish and mature, on both the Phase 2 and 3 developments and the site of the Proposed Scheme, there should be an increase in the biodiversity value across the whole area and the impact will be **Moderate Beneficial**.

9.9. Summary

9.9.1. Desk studies and field surveys have shown the site to be located within a highly valued nature conservation area in terms of designations, SINC designation and Priority habitats. The Proposed development encompasses the Tylorstown Slopes SINC designated for its extensive mosaic ffridd habitat.

9.9.2. The Proposed Scheme design has some embedded mitigation measures which have reduced impacts on the species and habitats, particularly Priority habitats, within the Old Smokey Slopes SINC.

9.9.3. A site clearance method statement has been prepared for the protection of reptiles and amphibians.

9.9.4. Measures taken under the CEMP will eliminate any significant long-term residual impacts due to the timing of operations, pollution of air, water or soil during the construction phase.

- 9.9.5. Turf translocation and topsoil re-instatement for habitats of higher biodiversity value will mitigate against the long-term loss of habitat on the site.
- 9.9.6. All developments considered in the assessment of cumulative impacts are works for the emergency remedial works at Tylorstown (Phases 2 and 3) and no cumulative ecological impacts are expected. A number of measures to further enhance the site for biodiversity are recommended including a Habitat Management Plan, creation of at least one below ground hibernaculum for reptiles and installation of kestrel and passerine nest boxes.
- 9.9.7. A five-year Aftercare Plan will be in place to monitor the establishment of the reinstated habitats and natural regeneration.
- 9.9.8. The design of the newly created landform at the receptor site will result in a high diversity of micro-climates and subsequently a diversity of habitats will regenerate on the landform. This will be beneficial to the ecological value of the site.
- 9.9.9. The proposed scheme will result in some **Slight** short-term adverse effects on the existing ecological features of the site. However, the design process has considered ecological impacts at every stage. With the implementation of the mitigation and enhancement measures the long-term result will be an increase in the diversity of habitats and species present on the site (**Moderate** Beneficial).

10. Geology, Soils and Waste

10.1. Introduction

- 10.1.1. This chapter provides a review of the baseline conditions in relation to geology and soils and assesses how these conditions may be affected by the construction and operation of the Proposed Scheme.
- 10.1.2. In addition, this chapter also provides an assessment of potential impacts from material use and the generation and management of waste during the construction and operational phases of the Proposed Scheme. These assessments follow the methodology laid out in the following documents:
- The Environmental Impact Assessment Handbook produced by ICE;
 - Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal LA 109: Geology and Soils; and
 - Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal LA 110: Material assets and Waste.
- 10.1.3. Contaminated land has been “scoped out” of this assessment due to the near inert status of the virgin quarried rock and shale fill which form the constituents of the landslip mass and remnant Llanwonno colliery tip, there is no source to provide a plausible contamination linkage. An assessment of agricultural soils has also been scoped out as there is no agricultural value to the land and the covering of topsoil at the site is sparse to non-existent.
- 10.1.4. The assessment of the potential impacts from material use focuses on the consumption of materials and products, the use of materials offering sustainability benefits, the use of excavated and other arisings that fall within the scope of waste exemption criteria, and the production and disposal of waste.
- 10.1.5. Materials extracted and processed off site are outside the scope of this assessment, including the associated impacts on quarries, landfill sites, and waste management facilities. Experience in extracting the lower parts of the slide material, under a separate phase of works, has only encountered very small quantities of tree sections and branches which have been taken to the local RCT recycling centre at Llantrisant and works in the upper parts of the tip are likely to encounter even fewer wood pieces.

Study Area

- 10.1.6. The Primary Study Area is defined as the construction footprint including all compounds and temporary land take as outlined in Chapter 3 – ‘Proposed Scheme description’.
- 10.1.7. A Secondary Study Area extends to the availability of construction material resources and waste management facilities within the vicinity of the Proposed Scheme which may be impacted. This study area will also include, where applicable, the location of sensitive off-site receptors that can be affected by the Proposed Scheme.

10.2. Legislation and Policy

Geology

- 10.2.1. Protection of existing geological features is covered through national designation i.e. Sites of Special Scientific Interest (SSSI) and on a regional basis via Local Geological Sites (formerly RIGS).

Material Assets and Waste

The Waste (England and Wales) Regulations 2011 (plus amendments)

- 10.2.2. The Waste (England and Wales) Regulations details the waste hierarchy, including methods to reduce waste generation and the amount of waste sent to landfill. The methods of waste management in order of preference are:

- prevent;
- prepare for re-use;
- recycle;
- recover; and
- dispose.

The Hazardous Waste (England and Wales) Regulations 2005

- 10.2.3. The Hazardous Waste Regulations set out the regime for the control and tracking of hazardous waste in England and Wales. The regulations introduced a process of registration of hazardous waste producers and a new system for recording the movement of waste.

The Environmental Permitting (England and Wales) Regulations 2010

- 10.2.4. The Regulations aim to ensure that activities are authorised and that their discharges do not harm human health or the environment. For the Proposed Scheme environmental permits must be granted by Natural Resources Wales (NRW). The Regulations combine the requirements for an integrated waste management approach and for hazardous waste management. This provides a framework for regulation that enables NRW to assess permitting and compliance.

Planning Policy Wales (2021)

- 10.2.5. Planning Policy Wales 2021 sets out the Welsh Government's policy on land use and should act as a guiding document when preparing development plans. The policy sets objectives in relation to waste management, encouraging the use of renewable and sustainably produced resources from local sources and maximising the recycling and reuse of demolition and construction materials, with a focus on waste minimisation. The policy is supplemented by Technical Advice Note 21: Waste⁵⁶ which provides guidance on how the land use planning system can contribute towards sustainable waste management and resource efficiency.

⁵⁶ Welsh Government (2014), Technical Advice Note 21: Waste, <https://gov.wales/sites/default/files/publications/2018-09/tan21-waste.pdf>

10.2.6. Sections 5.12-5.14 of Planning Policy Wales describe the short- and long-term goals for planning policy relating to waste and minerals in Wales, including the safeguarding of mineral deposits. The policy states the aim of sustainably managing minerals and includes the following:

- *“provide positively for the safeguarding and working of mineral resources to meet society’s needs now and in the future, encouraging the efficient and appropriate use of high-quality materials;*
- *protect environmental and cultural characteristic of places, including those highly cherished for their intrinsic qualities, such as wildlife, landscapes, ancient woodlands and historic features, and to protect human health and safety and general well-being;*
- *reduce the impact of mineral extraction and related operations during the period of working by ensuring that impacts on relevant environmental qualities caused by mineral extraction and transportation, for example air quality and soundscape, are within acceptable limits; and*
- *achieving, without compromise, a high standard of restoration and aftercare so as to avoid dereliction and to bring discernible benefits to communities, heritage and/or wildlife, including beneficial after uses or opportunities for enhancement of biodiversity and the historic environment”.*

10.2.7. Sections relevant to the known Coal reserves present at the site are presented in Section 5.10.13-5.10.17. Current Welsh policy is that future coal extraction proposals should not be permitted and that the safeguarding of the resource is not required.

Technical Advice Note 21: Waste (February 2014)

10.2.8. This guidance note provides advice on how the land use planning system should contribute towards sustainable waste management and resource efficiency, reflecting the new waste management drivers at a European Union and Welsh level. It describes the Welsh Government’s strategy, and in terms of waste management looks to specifically:

- drive the management of waste up the waste hierarchy and facilitate the provision of an adequate network of appropriate facilities;
- minimise the impact of waste management on the environment (natural and manmade) and human health through the appropriate location and type of facilities; and
- recognise and support the economic and social benefits that can be realised from the management of waste as a resource within Wales.

Minerals Technical Advice Note (Wales) 1 – Aggregates (March 2004)

10.2.9. The Minerals Technical Advice Note (Wales) sets out detailed advice on the mechanisms for delivering the policy for aggregates extraction by mineral planning authorities and the aggregates industry. The note appoints a Regional Aggregate Working Party (RAWP) to monitor the current production and permitted reserves of aggregates. Each working party is tasked with creating the Regional Technical Study for their region. The relevant RAWP for the Proposed Scheme is South Wales. The Regional Technical Study for South Wales sets out the strategy for the provision of aggregates in South Wales for the period up until 2021 and the contribution each local authority should make towards meeting the regional need.

10.2.10. The overarching objective in planning for aggregates provision therefore is to ensure supply is managed in a sustainable way. It ensures the best balance between environmental, economic and social considerations is struck, while making sure that the environmental and amenity impacts of any necessary extraction are kept to a level that avoids causing demonstrable harm to interests of acknowledged importance.

Towards Zero Waste, One Wales: One Planet and Waste

10.2.11. Towards Zero Waste⁵⁷ is the overarching waste strategy document for Wales and sets out a long-term framework covering the period up to 2050. The document contains aims for the construction and demolition sector within Wales and sets a target of 90% of waste by weight to be reused, recycled, or recovered by 2020. The last progress report from 2015 showed Wales to be well on track to achieving this, with 87% reuse, recycling, or recovery.

Rhondda Cynon Taf Local Development Plan 2006-2021

10.2.12. The following policies in the Rhondda Cynon Taf Local Development Plan relate to waste and material resource:

- Policy CS 9 – Waste Management affirms the council’s commitment to “seek to promote the reduction, re-use and recycling of materials in order to reduce land take-up for waste facilities.”
- Policy CS 10 – Minerals contains a set of goals to protect resources, including the following which may impact the Proposed Scheme:
 - maintaining a minimum 10-year landbank of permitted rock aggregate reserves throughout the plan period (to 2021), together with an extended landbank in the form of a Preferred Area of Known Mineral Resource;
 - defining safeguarding areas for mineral resources, including coal, high quality hard rock, limestone and sand and gravel, taking into account the range, quality and extent of resources and environmental, planning and transportation considerations;
 - where proven resources are under threat from sterilisation by necessary development, the pre-working of the mineral resource will be encouraged;
 - ensuring that appropriate restoration and aftercare measures are incorporated; and
 - promoting efficient usage, minimising production of waste, and promoting alternatives to primary won aggregates.

10.3. Guidance

10.3.1. The Environmental Impact Assessment Handbook produced by the ICE is the principal guiding document used for this EIA. Other guidance, such as the Design Manual for Roads and Bridges, will be used for those subjects where a methodology is not provided.

10.3.2. RCTBC and the Coal Authority have provided feedback on the topics proposed in the Scoping Report. As a result of this feedback information on legacy impacts from coal mining

⁵⁷ Welsh Government (2010), Towards Zero Waste, One Wales: One Planet,
<https://gov.wales/sites/default/files/publications/2019-05/towards-zero-waste-our-waste-strategy.pdf>

has been included. Other issues identified such as the transport of material and impacts to surface water quality are covered by other chapters.

10.4. Assessment Methodology

Assessment of Short-term Impacts – Construction Phase

Geology

- 10.4.1. Effects to geological receptors from the Proposed Scheme will be mainly felt during the operational phase and are therefore discussed in the next section.

Material Assets and Waste

- 10.4.2. The category descriptions are defined in Table 10.1 (from Table 3.13 of DMRB guidance LA110).

Table 10.1 Significance category descriptions.

Significance category	Description – material assets	Description – waste
Very Major	No criteria: use criteria for large categories.	1) >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or 2) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
Major	1) project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; and 2) aggregates required to be imported to site comprise <1% re-used /recycled content.	1) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and 2) >50% of project waste for disposal outside of the region.
Moderate	1) project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target.	1) >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 2) 1-50% of project waste for disposal outside of the region.
Slight	1) project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.	1) ≤1% reduction or alteration in the regional capacity of landfill; and 2) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Negligible	1) project achieves >99% overall material recovery / recycling (by weight) of non-hazardous Construction Demolition Waste (CDW) to substitute use of primary materials; and 2) aggregates required to be imported to site comprise >99% re-used /recycled content.	No reduction or alteration in the capacity of waste infrastructure within the region.

10.4.3. The quantity of material is assessed by interrogating the 3D design models for the Proposed Scheme where possible, and by using professional judgement. An interpretation is then made as to whether it is likely to be hazardous.

Assessment of Long-term Impacts – Operational Phase

Geology

- 10.4.4. The principal effects to geological receptors will be felt in the operational phase of the project and relate to the destruction or removal of geological features. An assessment of the significance of impact shall be determined with reference to the sensitivity of the receptor and the magnitude of the impact as detailed in Table 10.2 and Table 10.3.
- 10.4.5. An assessment will be undertaken of the sensitivity of geological receptors using the descriptors outlined in Table 10.2.

Table 10.2 Determination of the Receptor Value (Sensitivity).

Receptor value (Sensitivity)	Description
High	Mineral resources, rare receptors and those of national or international importance with little potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, geological SSSI, ASSI, National Nature Reserves (NNR)). Geology meeting national or international designation citation criteria which is not designated as such.
Medium	Mineral resources and receptors of regional importance with limited potential for replacement (e.g. RIGS). Geology meeting regional designation citation criteria which is not designated as such.
Low	Uneconomical mineral resources of poor quality and limited local importance. Geology of local importance/interest with potential for replacement (e.g. non designated geological exposures, former quarry's/mining sites).
Negligible	Uneconomical mineral resources. No geological exposures, little/no local interest.

- 10.4.6. The magnitude refers to the 'size' or 'amount' of an impact. In terms of the identified receptors, magnitude has been determined using the descriptors outlined in Table 10.3.

Table 10.3 Determination of the Magnitude of Impacts.

Magnitude	General Impact
High Adverse	Sterilisation of significant economic mineral resource or loss of geological feature/designation and/or quality and integrity, severe damage to key characteristics, features or elements.
Medium Adverse	Sterilisation of significant economic mineral resource or loss of geological feature/designation and/or quality and integrity, severe damage to key characteristics, features or elements.
Slight Adverse	Sterilisation of low value mineral resource or minor measurable change in geological feature/ designation attributes, quality or vulnerability; minor loss of, or Alteration to, one (maybe more) key characteristics, features or elements.
Negligible Adverse	No appreciable or reversible impacts to mineral resource or geological receptor. Overall integrity of resource not affected.

10.4.7. The matrix presented in Table 10.4 will then be used to assess the significance of the effect.

Table 10.4 Significance Matrix.

		Sensitivity			
		High	Medium	Low	Negligible
Magnitude of impact	High	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Slight to Moderate	Negligible
	Slight	Moderate	Slight to Moderate	Slight	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Materials Assets and Waste

10.4.8. The effects of the Proposed Scheme during its operational phase are expected to be negligible to those of the construction phase with regard to materials and waste. Once construction is complete the Proposed Scheme will not require large quantities of materials to be imported or exported from site.

Significance Criteria

10.4.9. The significance of an effect will be evaluated using the following criteria as set out in Table 10.5 (using the criteria defined in Table 3.14 of DMRB guidance LA110).

Table 10.5 Significance criteria.

Significance	Description – waste
Significant (one or more criteria met)	Category description met for moderate, major or very major effect.
Not significant	Category description met for negligible or slight effect.

10.4.10. Potential impacts from the Proposed Scheme may also be beneficial and have a positive influence on receptors or provide opportunities for improvement. Therefore, final residual significance ratings may include both beneficial and adverse impacts. The rating of the impact significance may indicate whether mitigation measures are required.

10.4.11. The rating assigned to the significance of the impact provides an indication as to whether mitigation measures are required.

Limitations and Assumptions

10.4.12. The impacts associated with the extraction of raw materials and the manufacture of products outside of the study area are excluded. These stages of a product’s or a material’s life cycle are likely to have already been subjected to environmental assessment and are therefore outside the scope of this assessment.

10.5. Baseline Conditions

Geology

- 10.5.1. The baseline conditions related to the geology and soils of the study area has been assessed using the information gathered as part of the Preliminary Sources Study Report (PSSR⁵⁸; see Appendix 10.1), including walkover findings and the contents of a site-specific Groundsure Insight Report⁵⁹.

Statutory and Non-Statutory Designations

- 10.5.2. The site does not fall within any geological Sites of Special Scientific Interest (SSSI) or any Local Geological Sites.

Made Ground

- 10.5.3. Large quantities of colliery spoil are known to be onsite in the Llanwonno Upper Tip, tramway corridor and in the surrounding areas. Additionally, exposed ground at the Receptor Site includes some areas of colliery spoil type material.

Superficial (Drift) Geology

- 10.5.4. Geological mapping (see Volume 2: Plan V2-S10-0002) shows the middle and upper parts of the site to be largely devoid of superficial deposits. A band of Glaciofluvial Deposits is predicted in the very south of the site at the base of the valley, described by the BGS as sand and gravel, locally with lenses of silt, clay or organic material. Lying just to the north of this band, and only predicted to encroach on a very small area of the site, is an area of Till which extends westwards. This typically consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape. In addition, previous site investigations in the area of Tylorstown Landslip have recorded Head deposits.

Solid (Bedrock) Geology

- 10.5.5. The Receptor Site and Tramway is underlain fully by the Brithdir Member of the Pennant Sandstone Formation (see Volume 2: Plan V2-S10-0001). This is described by the BGS as having green-grey, lithic arenites with conglomerate lenses at bases of units; thin mudstone/siltstone and seatearth interbeds and mainly thin coals.
- 10.5.6. The Llanwonno Upper Tip is shown to be underlain by juxtaposed bands of Brithdir Member and Rhondda Member both belonging to the Pennant Sandstone Formation. The Rhondda Member is described as green-grey, lithic arenites with thin mudstone/siltstone and seatearth interbeds and also with mainly thin coals. The Rhondda Member then extends down into the valley bottom.
- 10.5.7. The Coal Authority reports⁶⁰ which coal seams outcrop at the site. These are presented in Table 10.6. A number of further seams are also present beneath the site which do not outcrop, including the Brithdir and the No.1 Rhondda Rider.

⁵⁸ Capita 2020, *Tylorstown Phase 4 Emergency Landslide Debris Removal*, Ref: CS100303/GT/001

⁵⁹ Groundsure 2020, *Enviro+Geo Insight Report*, Ref: GS-7076729

⁶⁰ The Coal Authority (2020), *Consultants Coal Mining Report*, Ref: 71006970622001

Table 10.6 Coal Outcrops from Consultants Coal Mining Report.

Seam Name	Distance to Outcrop	Bearing of Outcrop
Brithdir Rider	20.8m	158
Brithdir Rider	Onsite	166
No. 1 Rhondda	Onsite	142
No. 1 Rhondda	Onsite	324
Tillery Brithdir	Onsite	140
Tillery Brithdir	Onsite	318
Tillery Rider No.1	Onsite	329
Tillery Rider No.2	Onsite	158
Tillery Rider No.2	Onsite	337

- 10.5.8. Halcrow UK undertook a stability assessment for Llanwonno Tip in 2000⁶¹ which touched on the possibility of underground worked seams affecting the stability of the Tip. They concluded that, while some settlement had been observed on roadways in Tylorstown during the 1960s, future settlement was unlikely due to the length of time since mining concluded in the region. During their investigation of the site they did not encounter worked seams in any of their exploratory holes, which were advanced to a depth of up to 27m. A ground investigation at the Receptor Site similarly did not identify any coal seams (worked or unworked) down to 24m depths.

Hydrogeology

- 10.5.9. The Pennant Sandstone Formation forms the largest aquifer within Rhondda Cynon Taf, and is classified by NRW as a Secondary A aquifer, which means that these rocks are capable of supporting water supplies at a local rather than strategic scale. The Hydrogeological Map of South Wales⁶² shows the site is located on the formerly named Upper Coal Measures and specifically the Brithdir Beds (now the Brithdir and Rhondda Members of the Pennant Sandstone Formation).
- 10.5.10. The Pennant Sandstone Formation is recognised as having large quantities of groundwater within a multi-layered aquifer system, with the sandstone units forming distinct and separate aquifer units between the lower permeability argillaceous layers of coal and mudstone which form aquitards. However, where mining has occurred then hydraulic continuity between these sandstone layers has been created in many places. Near the surface, groundwater within these sandstone units will be unconfined, but with increasing depth groundwater bodies in each sandstone unit will tend to become confined beneath argillaceous layers.

⁶¹ Halcrow UK (2000), *Llanwonno Tips Reclamation Scheme Option Assessment Report*, Ref: KJ/LWTR/R1

⁶² British Geological Survey (1986), *Hydrogeological map of South Wales including hydrometric area 58 and parts of 54, 55, 56, 57, 59, 60 and 61*

- 10.5.11. The sandstones are very well cemented, extremely hard and dense and as a result possess very little intergranular permeability and porosity. The sandstone permeability is directly related to the distribution and size of fractures present in the sandstone horizons. Mining has induced tension and compression fractures within these sandstones increasing the hydraulic conductivity of the sandstones. Fractures can be up to several centimetres in aperture near the surface.
- 10.5.12. Infiltration of rainwater is diverted from further vertical migration by the argillaceous bands which then emerges as streams (labelled as issues on mapping) or provides baseflow to rivers. It is noted in Robins and Davies (2016⁶³) that adits were frequently used as mine drainage to a valley side.
- 10.5.13. Site-specific data was available for the Llanwonno Upper Tip area of the Phase 4 works and the Receptor Site but drilling data was not available for the three drainage channels serving the reconfigured Llanwonno Upper Tip which lie on lower and middle hillslope areas. Therefore, hydrogeological conditions in these sectors have been inferred.
- 10.5.14. Data from the Halcrow (2004) stability report⁶⁴ cross sections support the regional view that in places there are separate aquifer units within the sandstone layers. Sections LWT R2 2 and LWT R2 3 with LWT1 and LWT6, provided as part of the report, indicate two separate aquifers in an upper and lower sandstone unit, with very different groundwater levels obtained within the spoil/superficial deposits and the sandstone layers.
- 10.5.15. The relevant argillaceous layers at Llanwonno Upper Tip from the surface downwards are the Brithdir Rider, Brithdir, 1st Rhondda Rider and 1st Rhondda. Were the argillaceous material and sandstones not covered by superficial deposits and colliery spoil, then very distinct, separate unconfined aquifers would be present near the surface in each sandstone layer, with streams emerging where the groundwater met the surface, near the boundary with the coal/mudstones. The presence of the superficial deposits and colliery spoil makes this simplistic model less likely, however there are distinct spring line across the slacks which appear to generally coincide with argillaceous layers. The sandstones layers above and immediately below the Brithdir are also unconfined and appear to be separate. Vertical groundwater gradients appear to be downwards in all locations where two strikes or groundwater levels have been monitored. Vertical groundwater gradients may reverse to be upwards near the base of the valley where the river may receive groundwater as part of its base flow.
- 10.5.16. The presence of the adits at the boundary of the Brithdir coal seam is likely to be linked to draining the sandstone immediately above it in order to gain access to this coal seam from the surface (Robins and Davies). These adits are known to issue water during times of high rainfall, supporting this hypothesis of a drainage mechanism.

Mineral Reserves

- 10.5.17. The Mineral Resource Map for South East Wales⁶⁵ suggests the following resources to be present within the site footprint:

- Sub-alluvial Sand and Gravel;

⁶³ Robins and Davies (2016), Hydrogeology of Wales

⁶⁴ Halcrow Group Ltd. (2004), *Llanwonno Tips Reclamation Scheme Stability Report*

⁶⁵ Humpage et al. (2010), *The National Mineral Resource Map of Wales*

- Sandstone with potential for high specification aggregate; and
- Tertiary Shallow Coal Resource.

10.5.18. Further to the available mapping there is known to be deep coal resource which has been worked historically. Collieries were present along the valley floor, with the nearest being Pendyrus Colliery and Ferndale Colliery located 50m south and 300m north respectively. Pendyrus Colliery, which later became Ferndale Pits No.6 and No.7, was sunk to over 400m.

Past Coal Mining

10.5.19. The Groundsure report indicates that the site is “in an area which may be affected by coal mining activity”. Therefore, a site-specific Consultants Coal Mining Report⁶⁶ has been obtained and is enclosed in Appendix 10.2. A summary of the findings of the report is presented in the table below.

Table 10.7 Natural Ground Subsidence.

Coal Mining Aspect	Comment
Past Underground Coal Mining	Approx. 15 seams were historically worked beneath the site at depths between 278m and 752m bgl.
Probable unrecorded shallow workings	None.
Mine Entries	Two shafts are reported adjacent south of the site, both have been filled and plugged with clay by the local authority. 12 disused adits are reported, 11 of which lie to the north of the site and one below the former tramway. These are depicted in the PSSR (see Appendix 10.2)
Open Cast Coal Mining	None recorded within 500m of the site boundary.
Coal Mining Subsidence	The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50m since 31 st October 1994.
Mine Gas	None recorded within 500m of the site boundary.

10.5.20. In general, the Coal Authority report does not indicate the presence of any known issues relating to coal mining associated with the site on the logic that mining is deep lying and historical (circa 1915) so that any extracted seam voids will have closed some time ago and associated ground movement ceased. There are several adits lying uphill of Llanwonno Upper Tip that are known to have mine water discharge which is currently managed using a network of pipes installed as Phase 1 emergency works.

⁶⁶The Coal Authority (2020), Consultants Coal Mining Report, Ref: 71006970622001

10.5.21. Of the seams listed in Table 10.6, the Coal Authority reports they are all workable. However, this does not take account of large quantities of overlying unstable surface deposits such as Tylorstown Landslip which would preclude their extraction. All outcropping seams are masked by a veneer of glacial deposits or by the onsite colliery spoil tips which limits the possibility of combustion.

Coal Mining Risk Assessment

10.5.22. A Coal Mining Risk Assessment (CMRA) was undertaken for the Phase 4 area in March 2021 (see Appendix 10.2). It made the following conclusions:

- the Receptor Site lies outside the development high risk area;
- Llanwonno Upper Tip (donor site) lies within the development high risk area;
- two mineshafts from Pendyrys Colliery lie in the valley bottom;
- deep mining is recorded but is of an age (<1950) and at a depth which suggests that any subsidence will have occurred and if not, is unlikely to affect the Proposed Scheme;
- several mine adits occur uphill of the site, which are thought to discharge water;
- two mine adits occur in the hillside beneath the site. The first adit is thought to have worked a seam, which indicates the potential presence of shallow mine workings beneath the haul road, and another which is a moderate depth seam as a result the topography rising in the area of RS-C and increasing the separation between ground surface and top of seam;
- there are no recorded ground stability or subsidence risks; and
- there are no recorded or indicated mine gas risks.

10.5.23. No seams deemed economical to extract are expected beneath the site.

Recent Investigations

10.5.24. As described in paragraph 10.1.2 above, Contaminated land was “scoped out” of this ES. However, the results of recent ground investigations have been included, to confirm previous assumptions made at the scoping stage and provide relevant information to other chapter (such as Chapter 11 ‘Water Environment & Flood Risk’ and Chapter 13 ‘Major Accidents and Disasters’).

Llanwonno Tip

10.5.25. A Ground Investigation was undertaken at Llanwonno Tip in January 2021 and comprised an initial phase of ten hand pits (0.5m deep), taken as a traverse across the width of the slip and at a chainage which reflects where material is to be taken off the slip feature. Testing involved:

- 10 total contaminated land suites;
- 10 leachate suites (on same samples totals were taken on);
- 10 compactions (2.5kg rammer method);
- 10 moisture contents and wet sieve tests; and

- to view and take pictures of where there are 'issues' at the downhill end of the slip mass to check for signs of any internal erosion and to repeat the exercise a few months apart to monitor the situation.



Figure 10.1 Locations of Trial Pits at Llanwonno Tip.

- 10.5.26. The compaction tests provide an average optimum moisture content (OMC) of 11.1% which almost matches the average natural moisture content of the material (11.3%). The natural moisture content range is plus 1.4% above OMC and 2.7 % below OMC. These results suggest that the in-situ moisture condition of material in Llanwonno Tip will provide suitable fill material without the need for drying. The grading curves provided by wet sieve analyses are all very consistent and meet requirements of DMRB Class 1A fill material. The average fines content of the material is 9.4%. This number when combined with the overall grading suggests that the fill will be free draining when compacted in the final landform.
- 10.5.27. Testing for a suite of contaminants in the soils revealed all parameters to be below relevant screening levels⁶⁷ for a Public Open Space (parks) land use. A summary of selected contaminants is provided in Table 10.8.

⁶⁷ The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015

Table 10.8 Summary of contaminant information for the material at Llanwonno Tip.

Determinant	Screening value	Min	Max
General			
pH - Automated	6-8	5.8	7.4
Total Sulphate as SO ₄	-	330	6000
Total Organic Carbon (TOC)	-	0.7	3.5
PAHs			
Naphthalene	1200	0.28	0.89
Acenaphthylene	29000	< 0.05	< 0.05
Acenaphthene	29000	< 0.05	< 0.05
Fluorene	20000	< 0.05	0.2
Phenanthrene	6200	0.31	1.5
Anthracene	150000	< 0.05	0.23
Fluoranthene	6300	< 0.05	0.94
Pyrene	15000	< 0.05	0.78
Benzo(a)anthracene	49	< 0.05	0.51
Chrysene	93	< 0.05	0.55
Benzo(b)fluoranthene	13	< 0.05	0.38
Benzo(k)fluoranthene	370	< 0.05	0.21
Benzo(a)pyrene	11	< 0.05	0.23
Indeno(1,2,3-cd)pyrene	150	< 0.05	< 0.05
Dibenz(a,h)anthracene	1.1	< 0.05	< 0.05
Benzo(ghi)perylene	1400	< 0.05	< 0.05
Speciated Total EPA-16 PAHs	-	< 0.08	6.28
Metals			
Arsenic (aqua regia extractable)	170	5.6	38
Lead (aqua regia extractable)	1300	18	68

Determinant	Screening value	Min	Max
Manganese (aqua regia extractable)	-	120	460

- 10.5.28. Chrysotile asbestos fibres were detected in one location but were below limits of quantification (<0.001% of sample).
- 10.5.29. Leachate testing also showed the samples to be free from contaminants. No PAHs, monoaromatics or TPH species were present above detection limits. For metals, all except lead were below relevant screening criteria (Water Framework Directive 2015 Environmental Quality Standards (EQS)). The concentrations of Copper, Zinc, Manganese and Nickel were assessed using the UK Technical Advisory Group Metal Bioavailability Assessment Tool (m-BAT) to determine their bioavailable concentrations. The bioavailable fraction of each contaminant was found to be below levels of concern. The EQS is also for its bioavailable concentration, however this cannot be reliably calculated at present. While lead was shown to fail in 9 of 10 locations, the average concentration was 2.8µg/l with a maximum of 7µg/l against an EQS of 1.2µg/l (bioavailable).

Receptor Site

- 10.5.30. An investigation at the site of the proposed landform was undertaken in March 2021. Seven boreholes were advanced to check the depth to competent strata and to confirm the location of any shallow coal seams with depths ranging from 8.0m and 24.0m bgl. In order to optimise progress, and as an agreed alternate to rotary dynamic sampling, window sampling (using a Geoprobe drilling system) was adopted to undertake in situ Standard Penetration Tests, and obtain samples in superficial materials in BHC01, BHC03 to BHC07. Progression through rock in these holes was by rotary open hole drilling techniques. One borehole (BHC02) was dynamically sampled to rock head then rotary cored to target depth. A further seven trial pits were also advanced to facilitate contaminant testing. An exploratory hole layout drawing is provided in Volume 2: Plans V2-S10-0003 and V2-S10-0004 along with exploratory hole logs and a summary of soil and water chemical test results provided in Appendix 10.4.
- 10.5.31. Geotechnical testing showed favourable conditions for the creation of the landform, with approx. 90% of fill site comprising a stiff platform of residual soils over rock. There is however a layer of buried topsoil 0.10m thick identified in the north-western corner of the site which has a 0.5m to 0.6m thick covering of made ground. Locally in the same area (WSO1) made ground was found as a pocket to 2.35m depth. It is assessed that the topsoil layer is too thin to lead to any appreciable settlement as it has already been compressed by historic overfilling. There is also a thin partial covering of predominantly loose clayey sandy gravel till. Locally the till grades to a soft (sometimes firm) very gravelly clay. The greatest extent was found in BHC01 at 2.60m thick to a depth of 3.30m bgl. Where identified in other locations at the site the thickness was below 1m, and typically below 0.5m. This will consolidate under loading from the new mound, but the appreciable gravel content will restrict the magnitude of settlement of the upper surface of the mound. It is anticipated that half of the settlement will be accommodated as the mound is filled. In terms of shear strength then the gravel content will add strength to the material in the short-term undrained scenario.

10.5.32. Testing for a suite of contaminants in the soils revealed all parameters to be below relevant screening levels⁶⁸ for a Public Open Space (parks) land use. A summary of selected contaminants is provided in Table 10.9.

Table 10.9 Summary of contaminant information for soils at the Receptor Site.

Determinant	Screening value	Min	Max
General			
pH - Automated	6-8	4.8	8.9
Calorific value	-	2.1	8.1
PAHs			
Naphthalene	1200	< 0.10	0.88
Acenaphthylene	29000	< 0.10	0.33
Acenaphthene	29000	< 0.10	0.47
Fluorene	20000	< 0.10	0.55
Phenanthrene	6200	< 0.10	2.8
Anthracene	150000	< 0.10	0.51
Fluoranthene	6300	< 0.10	2.7
Pyrene	15000	< 0.10	2.5
Benzo(a)anthracene	49	< 0.10	1.1
Chrysene	93	< 0.10	1.8
Benzo(b)fluoranthene	13	< 0.10	0.81
Benzo(k)fluoranthene	370	< 0.10	1.5
Benzo(a)pyrene	11	< 0.10	0.69
Indeno(1,2,3-cd)pyrene	150	< 0.10	0.39
Dibenz(a,h)anthracene	1.1	< 0.10	0.54
Benzo(ghi)perylene	1400	< 0.10	0.58
Speciated Total EPA-16 PAHs	-	< 2.0	18
Metals			

⁶⁸ The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015

Arsenic (aqua regia extractable)	170	6.4	19
Lead (aqua regia extractable)	1300	6.1	190
Manganese (aqua regia extractable)	-	59	1400

- 10.5.33. Soils were shown to be free from contamination, though several samples reported low pH. 8 of 14 samples recorded a pH of lower than 6, and two of those eight reported a pH lower than 5. The calorific value in TP2 at 0.5m was quite high (8.0 MJ/kg) reflecting the significant coal content of the sample. This material will be covered by the transported soils so possible combustion from a dropped match/barbecues will not occur. Topsoil samples were included in the testing programme with the purpose of classifying the chemical quality so that re-use of any stripped topsoil can be accommodated within the scheme (for example spread back on top to facilitate plant growth).
- 10.5.34. Leachate testing also showed the samples to be broadly free from contamination. Two samples failed against relevant screening criteria (Water Framework Directive 2015 Environmental Quality Standards (EQS)) for iron, with a maximum value of 1200 ug/l against a limit of 1000 ug/l. The concentrations of copper, zinc, manganese, and nickel were assessed using the UK Technical Advisory Group Metal Bioavailability Assessment Tool (m-BAT) to determine their bioavailable concentrations. Calcium concentrations, a key parameter of these equations, was below detection limits so the limit has been used in its place. One sample of zinc from TP3 was shown to fail, with a bioavailable concentration of 12.78 ug/l against a limit of 10.9 ug/l.
- 10.5.35. BH07, which recorded the most perched groundwater immediately after drilling, and two surface water monitoring points were tested for a comprehensive suite of water quality parameters. Surface water monitoring points were located in drainage features between 20m and 40m off site but close to the Receptor Site. Water samples were again shown to be largely free from contamination, though the use of the m-BAT tool showed two failures for bioavailable manganese of 240 and 153 ug/l against a limit of 123 ug/l in BH07 and SW02 respectively.
- 10.5.36. Six of the recent boreholes (BH01 to BH07) and three existing wells (BH01A to BH03A) from previous GI have been monitored for groundwater and gas, with two rounds of testing completed. The results are presented in Table 10.10. It is interpreted from these results that the equilibrium water table lies more than 70m bgl. Consequently, the new landform will not affect groundwater levels beneath the site (note rainwater infiltration levels are thought to be the same before and after construction as the fill material is porous).

Table 10.10 Groundwater conditions (note BH01A, 02A and 03A are pre-existing wells and the naming used in this table is unlikely to reflect the wells' original names).

	Location								
	BH01	BH02	BH03	BH05	BH06	BH07	BH01A	BH02A	BH03A
Response zone/ Hole depth (m)	17-20	21-24	5-8	17-20	17-20	5-8	65	70	69
GWL (m) 19.03.2021	DRY	23.20	DRY	19.85	DRY	6.43	DRY	DRY	DRY
GWL (m) 06.04.2021	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY

10.5.37. Gas monitoring was also undertaken in all of the locations in Table 10.10. No gas flows were recorded on either visit and no appreciable concentrations of carbon dioxide or methane were observed.

Material Assets

10.5.38. As an ex-coal extraction site, the hillside within the development area presents a number of colliery material heaps, most notably Llanwonno Tip and Old Smokey. In the case of Llanwonno Tip, this material is unstable and at risk of slipping down the valley, into the Afon Rhondda Fach, as occurred in February 2020.

Waste

10.5.39. A review of waste management facilities located in Caerphilly, Merthyr Tydfil and Rhondda Cynon Taf using the Natural Resources Wales Waste Permit Returns Data Interrogator 201769 was carried out. The sites presented in Table 10.11 accept Construction & Demolition wastes at quantities of over 1,000 tonnes in that year.

⁶⁹ Natural Resources Wales, Waste Permit Returns Data Interrogator,
<https://lle.gov.wales/catalogue/item/WastePermitReturnsDataInterrogator/?lang=en>

Table 10.11 Facilities which accepted over 1,000 tonnes of Construction and Demolition Waste in 2017.

Facility Name	Facility Type	Location	Tonnes Managed
Bryn Pica Landfill	Non-Hazardous Landfill	Rhondda Cynon Taf	6,337
Bryn Pica Waste Operations	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	9,441
Greens Recycling Centre	Inert Waste Transfer	Rhondda Cynon Taf	1,499
Hendy Quarry Landfill	Inert Landfill	Rhondda Cynon Taf	143,050
Hendy Recycling	Material Recycling Facility (MRF)	Rhondda Cynon Taf	7,578
Llantrisant Recycling	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	21,513
Project Red Recycling	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	50,721
Project Yellow Recycling	Inert & excavation Waste TS + treatment	Rhondda Cynon Taf	171,672
The Recycling Centre	Haz Waste Transfer	Rhondda Cynon Taf	2,389
Abba Scrap	Car Breaker	Merthyr Tydfil	3,023
Dowlais C/a Site	CA Site	Merthyr Tydfil	1,236
Merthyr Borough Recycling Centre Ltd-transfer Station	Material Recycling Facility (MRF)	Merthyr Tydfil	3,712
Step Up Skips	Non-Hazardous Waste Transfer	Merthyr Tydfil	2,121
Trecatti Landfill	Non-Hazardous (SNRHW) Landfill	Merthyr Tydfil	80,376
Gellia'r-gwellt Uchaf Transfer & Composting Station	Material Recycling Facility (MRF)	Caerphilly	83,876
Machen Quarry	Physical Treatment	Caerphilly	1,058
Olivers Sales & Rentals	Inert Waste Transfer	Caerphilly	4,949
Pen Y Fan Processing and Recycling Ltd	Non-Hazardous Waste Transfer	Caerphilly	25,336
Penallta Civic Amenity Site	Civic Amenity Site	Caerphilly	1,159
S L Recycling Ltd	Car Breaker	Caerphilly	4,390

10.5.40. An assessment of sites accepting over 1,000 tonnes of Mixed Residual Waste in the boroughs of Caerphilly, Merthyr Tydfil and Rhondda Cynon Taf was also carried out and is shown in Table 10.12 below.

Table 10.12 Facilities which accepted over 1,000 tonnes of Mixed Residual Waste in 2017.

Facility Name	Facility Type	Location	Tonnes Managed
Bryn Pica Landfill	Non-Hazardous Landfill	Rhondda Cynon Taf	18,862
Bryn Pica Waste Operations	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	68,804
Llantrisant Recycling	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	14,684
The Recycling Centre EPR/KP3636HB	Haz Waste Transfer	Rhondda Cynon Taf	1,881
Veolia Es Cleanaway (UK) Limited	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	65,828
Waste Transfer Station Tir Eryd Yard	Non-Hazardous Waste Transfer	Rhondda Cynon Taf	12,194
Dowlais C/a Site	Civic Amenity Site	Merthyr Tydfil	4,190
Merthyr Borough Recycling Centre Ltd-transfer Station	Material Recycling Facility (MRF)	Merthyr Tydfil	10,806
Trecatti Landfill	Non-Hazardous (SNRHW) Landfill	Merthyr Tydfil	169,221
Coed Top Hill	Biological Treatment	Caerphilly	4,105
Gellia'r-gwellt Uchaf Transfer & Composting Station	Material Recycling Facility (MRF)	Caerphilly	27,534
J Pesci & Sons Ltd	Material Recycling Facility (MRF)	Caerphilly	1,330
The Granary	Non-Hazardous Waste Transfer	Caerphilly	9,379
The Recycling Centre	Non-Hazardous Waste Transfer	Caerphilly	26,753

10.6. Preliminary Impact Assessment

Construction Phase

Geology

- 10.6.1. No sites of geological importance will be affected by the scheme. Exposed rockfaces may be present in some of the abandoned quarries in the surrounding area, representing a

potential low sensitivity receptor, however these will not be directly affected resulting in a neutral impact.

Mineral Resource

- 10.6.2. The National Mineral Resource Map of Wales⁷⁰ shows the site to be underlain by sub-alluvial sand and gravel, sandstone with potential for high specification aggregate and shallow coal reserves, while the Consultants Coal Mining Report⁷¹ provides evidence of deep coal reserves. The CMRA identified that at present there are no future plans for extraction at the site. The Proposed Scheme would effectively sterilise the near surface underlying reserves, though in reality it is unlikely these reserves would see future mining due to constraints in the area, such as Old Smokey, near to which quarrying couldn't be undertaken without inducing instability. Welsh Planning Policy is to currently not allow any future extraction of coal, and it is unlikely that this stance would change in the future as the UK works towards decarbonisation. Further, if the materials below the scheme were to become economically viable to extract then the proposed landforms could be excavated as they do not contain any proposed structures.

Material Assets

- 10.6.3. The majority of the impacts associated with the Proposed Scheme, in terms of materials and waste, would occur during the construction phase. They relate to the extraction and use of raw materials and the generation and disposal of wastes from the Proposed Scheme.
- 10.6.4. A large quantity of material will be generated during construction. 3D terrain modelling shows this to require removal of in the region of 195,000m³ of spoil, with approximately 35,000m³ of this to infill such features as the slip scar. The desired landscape to be created at the slip sites is one of flattened hillslope better matching the surrounding terrain. This will result in a net export of approximately 160,000m³.
- 10.6.5. However, this 160,000m³ of exported material will be re-used within the red line boundary to create an irregular landform lying to the rear of Old Smokey, as described in Chapter 3 above. The new landform will allow the permanent re-establishment of iconic Valleys' habitats and the establishment of a nature reserve in this location, thereby providing an opportunity for the beneficial reuse of the colliery material. The intention is for this Scheme to act as case study and example of how to best manage the re-purposing of colliery material heaps and inform similar projects across Wales.
- 10.6.6.
- 10.6.7. As discussed above, the materials required for the scheme will primarily originate from the site and as such very large material efficiencies should be achieved. It is expected that the scheme would meet the requirements for a neutral impact as detailed in Table 10.1, achieving >99% overall material recovery / recycling (by weight) of non-hazardous Construction Demolition Waste (CDW) to substitute the use of primary materials.
- 10.6.8. An amount of material will also be required for specific engineering purposes, such as the construction of temporary haul routes, however these volumes have yet to be calculated.

⁷⁰ Humpage et al. (2010), *The National Mineral Resource Map of Wales*

⁷¹ The Coal Authority (2020), *Consultants Coal Mining Report*, Ref: 71006970622001

They are expected to be negligible in comparison to the bulk of the Proposed Scheme and in terms of regional supply, representing perhaps a **Neutral** or **Slight** impact.

- 10.6.9. Measures to control the management and temporary storage of materials during construction will be detailed within a Construction Environmental Management Plan (CEMP) and Materials Management Plan (MMP) and are therefore not covered in this assessment.

Waste

- 10.6.10. In addition to surplus materials for all the above material resources, the following wastes may potentially be generated:
- plastics, wood, and metals from packaging and defective products;
 - waste oils from construction vehicles; and
 - construction worker welfare wastes.
- 10.6.11. Unsuitable material is not expected and has not been encountered in earlier phases of work (Phases 2 and 3). However, should material be excavated on-site in this phase which is found to not be suitable for reuse or cannot be rendered suitable for reuse following treatment then it may require disposal off-site. Bryn Pica and Trecatti Landfills form the most likely locations for disposal of excess material. Trecatti is licenced to accept up to 625,000 tons of non-hazardous waste per year, with Bryn Pica limited to 150,000 tonnes.
- 10.6.12. Unsuitable material is not expected and any that is identified will be less than the annual permitted limits of both locations, representing a minor impact on the sites. However, both facilities are regionally important with a limited total capacity, representing a medium sensitivity receptor. In a worst-case scenario, the impacts to these receptors are assessed as **Slight**.

Operation Phase

Geology and Mineral Resource

- 10.6.13. The issues around resource sterilisation and impacts to geological receptors that were discussed in the construction phase will remain in the operational phase. In terms of resource sterilisation, despite the release of land used as haul roads and construction compounds, local resources will be **adversely affected** once the Proposed Scheme is complete, when compared with the baseline.

Material Assets and Waste

- 10.6.14. The effects of the Proposed Scheme during its operational phase are expected to be **Negligible** compared to those of the construction phase with regard to materials and waste. Once construction is complete the Proposed Scheme will not require large quantities of materials to be imported or exported from site. As such the magnitude of the impact is assessed as negligible and the significance of impact is considered neutral.

Summary

- 10.6.15. A summary of impacts is presented in Table 10.13.

Table 10.13 Summary of impacts.

Receptor name	Impact	Effect	Magnitude	Significance
Geological receptors (Negligible to low sensitivity)	Potential degradation of exposed geological features	Permanent loss of geological feature of interest	Negligible Adverse - With the exception of nearby exposed quarry faces, no sites of interest are present.	Negligible
Onsite mineral resources (Low sensitivity)	Reduction in mineral resources in the area	Depletion or sterilisation of onsite mineral resources	Slight Adverse - No strategically important minerals are present within the site footprint	Slight
Regional mineral resources (Medium sensitivity)	Reduction in available mineable resource at local quarries	Depletion of mineral resources within the region	Slight Adverse - The scheme will require a quantum of imported material for specific engineering purposes.	Slight
Local waste management facilities (Medium sensitivity)	Production of large volumes of waste material.	Reduction in the waste capacity of the region and strain upon the waste management capabilities of the region	Slight Adverse - Construction waste and surplus materials will be minimised. Welfare wastes are likely to be a negligible quantity Production of MMP, applying the CL:AIRE protocol, to enable the reuse of excavated materials onsite	Slight

10.7. Mitigation, Enhancement and Monitoring

Geology

- 10.7.1. No significant effects are anticipated in relation to geological receptors and as such mitigation measures are not required. As no new geological features will be exposed by the works there is little scope for the enhancement of this resource in the area.
- 10.7.2. A further round of ground investigation (as described in Appendix 10.3) is proposed to compliment the works undertaken in January 2021 once the majority of the slipped material has been moved. Seven rotary hole boreholes to target depths of between 15m and 20m equipped with monitoring wells will be installed for the purpose of assessing groundwater conditions during the later stages of the stabilising earthworks for a period of six months. Four existing wells will be selected for assessing groundwater conditions at the Receptor Site during the fill placement stages, though it is only expected that the wells will record water in the wettest winter months and even then, perhaps only a portion will show water within the monitoring wells.

Mineral Resource

- 10.7.3. Any outcropping seams which may have become exposed during the 2020 landslip will be reburied during Phase 4 works to remove the potential of oxidation and subsequent combustion of the coal. There is some confidence that undocumented, historically worked seams are not present beneath Llanwonno Tip and a ground investigation is proposed for the Receptor Site in order to determine if there are any present beneath that location. Further, five sampling locations have been selected from the slip face to further investigate the composition of the colliery material. Settlement due to deep workings is not expected to be an issue due to the length of time since mining was concluded.
- 10.7.4. A watching brief will be implemented to identify any high coal containing pockets (provisionally material with calorific value above 10 MJ/kg) and this can be placed as an activity within the Materials Management Plan (MMP) (Appendix 10.5) for the scheme. Testing would be triggered by visually pointing out any large pocket with say 25-30% or more coal by volume and then separating this material for CV testing.

Material Assets and Waste

- 10.7.5. Measures will be implemented to collectively mitigate the impacts identified from both the use of materials and the management of waste in relation to the Proposed Scheme. There is significant synergy between materials re-use and the avoidance of the generation of waste, and therefore there is a substantial overlap between the mitigation measures for materials and waste.
- 10.7.6. The importance of careful management of materials to promote re-use and waste reduction has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes and provide the basis for mitigating environmental effects associated with materials and waste.
- 10.7.7. The principal mitigation measure relating to this topic will be the development and implementation of an MMP. The MMP has been drafted in accordance with the CL:AIRE industry recognised Definition of Waste: Code of Practice (DoWCoP). This provides a clear, consistent and efficient process which enables the reuse of excavated materials onsite and the movement of material between sites. DoWCoP enables the direct transfer and reuse of clean naturally occurring soil materials between sites.
- 10.7.8. Further mitigation relating to this top will be through the implementation of a CEMP. The CEMP will be developed during the detailed design phase (i.e. before the start of construction) and implemented during construction phase. The CEMP will include the following:
- details of the approach to environmental management throughout the construction phase, with the primary aim of mitigating any adverse impacts from construction activity on the identified sensitive receptors;
 - methods for the prevention and control of any potential short-term construction phase impacts (e.g. construction dust, and the risk of accidental spillages of contaminating materials) and also permanent impacts (e.g. disturbance to vegetation, archaeology and heritage);
 - good materials management methods, such as location of temporary haul routes and re-use of temporary works materials from haul routes, plant and piling mattresses etc; and

- risk/impact-specific method statements and strategic details of how relevant environmental impacts will be addressed throughout the Proposed Scheme.

- 10.7.9. Although not required by the regulations, a Site Waste Management Plan (SWMP) should be developed and regularly updated during the Proposed Scheme. The SWMP would identify, prior to the start of construction, the types and likely quantities of wastes that may be generated. It would set out how these wastes would be reduced, reused, managed and disposed.
- 10.7.10. Implementation of the DoWCoP MMP and the accompanying recommended SWMP would ensure that material reuse is maximised by minimising waste at source (reducing the requirement for new construction materials) and during construction.

10.8. Residual Impact Assessment

- 10.8.1. No significant impacts are expected from the construction or operational phase.

10.9. Cumulative Effects

Geology

- 10.9.1. There is a lack of sensitive geological receptors in the area for the scheme to interact with, meaning cumulative effects with other projects are unlikely.

Material Assets and Waste

- 10.9.2. Due to a lack of information regarding the detailed design of other schemes in the area an assessment of cumulative effects is not feasible. As there is little need to import or export material for this scheme any effects are unlikely to be significant. Phases 2 and 3 of the Proposed Scheme do not require large scale disposal of materials in waste management facilities, so no undue burden will be placed on the capacity of the region by the construction of all phases. The requirement for imported material on all phases is also low, limiting the impact on the availability of construction products in the region.

10.10. Summary

- 10.10.1. This chapter assesses the potential effects associated with material resources and waste both required and generated by the Proposed Scheme as well impacts to geological receptors.
- 10.10.2. There are no geological or geomorphological features of scientific interest or importance within or adjacent to the study area that would be impacted by the scheme. Impacts to the stability of the Proposed Scheme due to legacy mining issues are felt to be unlikely due to the length of time since mining operations ceased, though a ground investigation is proposed for the Receptor Site in order to determine the presence of undocumented shallow workings.
- 10.10.3. Construction of the Proposed Scheme would sterilise underlying mineral resources. However, the underlying sand, gravel, sandstone and coal deposits do not constitute a resource of particularly high value, and there are already constraints on their extraction due to the nearby town and existing colliery spoil mounds. The impact to onsite mineral resources is therefore assessed as **Slight Adverse**.

- 10.10.4. A MMP will be drafted according to the CL:AIRE protocol to ensure the reuse of the majority of the colliery material on site.
- 10.10.5. Material generated by the Proposed Scheme which cannot be reused will have to be disposed of off-site. Trecatti and Bryn-Pica landfills have been determined as the most likely destinations. The quantity of expected material would not have a significant impact on the capacity of these sites, with the impact assessed as **Slight Adverse**.
- 10.10.6. Neither the construction nor operation of the Proposed Scheme is not expected to give rise to significant effects.

11. Water Environment and Flood Risk

11.1. Introduction

- 11.1.1. The purpose of this chapter is to provide an assessment of the potential generic and specific impacts on the water environment likely to arise as a result of the Proposed Scheme during the construction and operational phases. Aspects of the water environment considered in this assessment are hydrology and flood risk, water quality and fluvial geomorphology.
- 11.1.2. This chapter assesses any changes to rivers quality and geomorphology that could occur as a result of the proposed works and the impact of these upon the Water Framework Directive (WFD) classification of the water features, based on a supporting WFD Compliance Assessment (Volume 3: Appendix 11.1). Also considered, are the potential impact on surface water drainage and flooding. The principal features of the water environment that are referred to throughout this chapter can be seen in Volume 2: Plans V2-S11-0001 and V2-S18-0002.
- 11.1.3. The drainage and surface water design has been iteratively updated to reflect issues identified during the impact assessment, as such conclusions reported within this document reflect the current design inclusive of embedded mitigations.
- 11.1.4. The impact of the Proposed Scheme on groundwater quality due to drainage and potential impacts to and from groundwater flooding are also addressed in this chapter. Issues relating to water pollution due to contaminated land are considered. The resulting effects on aesthetics and aquatic ecology are addressed in Chapter 8: Landscape and Visual Effects, and Chapter 9: Biodiversity and nature Conservation, respectively.

Study Area Context

- 11.1.5. The principal water body within the study area is the Afon Rhondda Fach.
- 11.1.6. As the development lies at the top of the valley of the Afon Rhondda Fach, the majority of site boundary falls within the catchment of the Afon Rhondda Fach, a primary watercourse and tributary of the Afon Rhondda Fawr.
- 11.1.7. The study area covers the extent of the proposed development area and a 1km buffer around the redline boundary, as depicted in Volume 2: V2-S11-0001. This covers the Afon Rhondda Fach catchment as well as the network of minor drains and watercourses located both within the RLB and between the RLB and the Afon Rhondda Fach.
- 11.1.8. Within the study area the catchment is predominantly rural and semi-urban, characterised by a narrow floodplain flowing through a steep sided valley. As the river runs through the settlements of Ferndale, Tylorstown, Stanleytown and Pontygwaith, the surrounding land use varies from semi-urban to mixed agricultural use and woodland.

11.2. Legislation and Policy

- 11.2.1. The following list sets out the principal legislation and European, national, regional and local policies of relevance to the assessment on water quality and flood risk:

Water Environment (Water Framework Directive) (England and Wales) Regulations

- 11.2.2. The Water Framework Directive established a framework across the European Union for the protection of water bodies (including terrestrial ecosystems and wetlands directly dependent upon them) which aims to prevent further deterioration, enhance their status, promote sustainable water use, reduce pollution and mitigate the effects of floods and droughts. This was subsequently transposed into UK law. Water bodies include surface waters (rivers, large lakes, canals, transitional and coastal waters) and groundwater bodies (superficial and bedrock aquifers). The baseline condition of all water bodies was presented in the River Basin Management Plans (RBMPs) in 2009, with Wales being split into its major river basin catchments. The 2015 RBMPs provided Cycle 2 updates and there are a further 2 cycles to be repeated in 2021 and 2027, by which point all waterbodies should be achieving *Good* status.

Severn River Basin District River Basin Management Plan (RBMP) (2015)

- 11.2.3. This document sets out the current state of water bodies within the Severn River Basin District and identifies the key pressures affecting the water environment. It also sets out environmental objectives for protecting and improving water bodies as well as a programme of measures, actions needed to achieve these objectives. This plan also reports on progress since the original 2009 plan.

Flood and Water Management Act 2010

- 11.2.4. The Flood and Water Management Act aims to manage and reduce flood risk posed to people, homes and businesses, as a result of increased climate change whilst helping to safeguard community groups from unaffordable rises in surface water drainage charges and protecting water supplies to consumers.

Planning Policy Wales (2018)

- 11.2.5. Planning Policy Wales (PPW) sets out the land use planning policy for Wales and provides the policy framework for the effective preparation of local planning authorities' development plans.
- 11.2.6. Section 6.6 of PPW provides specific policies to protect people and property from flooding which must be implemented by all local planning authorities. The PPW also ensures that local planning authorities adopt a sequential approach to their decision making, steering development away from flood risk areas. Where development must be in locations at risk from flooding, local authorities are to ensure that the development is resilient or resistant to flooding and safe for use, without increasing risk to others.
- 11.2.7. This policy is also supplemented by Technical Advice Note 15 (discussed below) amongst others.

RCTCBC Flood Risk Management Plan (2015)

- 11.2.8. This Plan seeks to minimise the risk to communities to flooding by better understanding the risk from all sources and identifying measures to benefit communities and the natural environment. In doing so, the Flood Risk Management Plan takes forward the objectives and measures set out in the Local Flood Risk Management Strategy (LFRMS) described below.

RCTCBC Local Flood Risk Management Strategy (2013)

- 11.2.9. Under the Flood and Water Management Act 2010, RCTCBC became a Lead Local Flood Authority (LLFA) and was given the duty to develop, maintain, apply and monitor a strategy for local flood risk management (the LFRMS), balancing the needs of communities, the economy and the environment. The strategy only deals with local flood risk which is defined in the act as being a flood risk from surface runoff, groundwater and ordinary watercourses.

Rhondda Cynon Taf Local Development Plan

- 11.2.10. The Rhondda Cynon Taf Local Development Plan (LDP)⁷² was adopted by the Council in March 2011. This provides the basis for determining planning applications, covering a 15-year period up to 2021. The policies and factors within them which relate to the water environment are:

- Policy AW 2 - Sustainable Locations;
- Policy AW 6 - Design and Placemaking;
- Policy AW 8: Protection and Enhancement of the Natural Environment; and
- Policy AW 10: Environmental Protection and Public Health (includes light pollution).

11.3. Guidance

- 11.3.1. The following guidance documents were referred to during the production of this chapter.

ICE Environmental Impact Assessment Handbook (ICE, 2019)

- 11.3.2. The Water Environment and Flood Risk Chapter of the ES will, like the majority of the report, be written using the ICE EIA Handbook for guidance, specifically chapter 7.5 of the handbook, which focuses on water. This has formed the basis for the allocation of 'values' to receptors and 'magnitudes' of impacts described below.

PINS Advice Note 18: The Water Framework Directive (PINS, 2017)

- 11.3.3. This advice note produced by the planning inspectorate provides guidance on the WFD, its purpose, legal context and its implications on development consent in the UK. Although the note is intended to be applied for Nationally Significant Infrastructure Project, it provides a helpful description of the various stages of a WFD assessment and the considerations to be made at each of these.

Updated Local Authority services and the water environment - Advice note on the Water Framework Directive (NRW and WLGA, 2017)

- 11.3.4. This advice note produced by NRW and the Welsh Local Government Association (WLGA) provides further guidance on WFD, within the specific context of Wales, aimed primarily at Welsh Local Authorities.

⁷²The Rhondda Cynon Taf Local Development Plan (LDP)
<https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/RelateddocumentsLDP20062021/AdoptedLocalDevelopmentPlan.pdf>

Technical Advice Note 15 - Development and Flood Risk (Welsh Government, 2004)

- 11.3.5. This TAN provides technical guidance which supplements the policy set out in Planning Policy Wales in relation to development and flooding. It advises on development and flood risk and provides a framework within which risks arising from both river and coastal flooding, as well as from additional run-off from development in any location, can be assessed.

11.4. Assessment Methodology

Study Area

- 11.4.1. The study area for this impact assessment has been determined to reflect the nature and magnitude of the proposals, considering impacts on surface water bodies and groundwater bodies within a radius of 1km of the site redline boundary. The extent of the study area can be seen in Volume 2: Plan V2-S11-0001.

Baseline data collection

- 11.4.2. Sensitive receptors and baseline conditions have been established utilising the following sources:
- Geology of Britain Viewer produced by the British Geological Society;
 - Long term flood risk maps produced by Natural Resources Wales (NRW). These maps display the extent of flooding that would occur on the basis that no flood defences are in place and describe the extent to which land is afforded protection by the presence of defences. This includes from rivers, surface water and reservoirs;
 - Water Watch Maps produced by NRW. These maps are a collection which display the WFD Cycle 1 and Cycle 2 information, including water body measure and objectives;
 - Groundwater Vulnerability Maps produced by the British Geological Society;
 - River Basin Management Plan produced by NRW and the Environment Agency;
 - Light Detection and Ranging (LIDAR) 2 m composite Digital Terrain Mapping (DTM); and
 - Ordnance Survey (OS) Terrain 5.
- 11.4.3. A drainage survey has been undertaken on site, to identify the location and nature of minor watercourses and drains within the redline boundary.
- 11.4.4. The results of ground investigations (GI) undertaken on site, both historically and during the development of the Scheme, have also be consulted during the preparation of this chapter. This includes GI undertaken at Llanwonno Upper Tip and the Receptor Site and information summarised in the PSSR (Appendix 10.1) and borehole logs (in Appendix 10.4), as well as in the WFD Assessment (Appendix 11.1).
- 11.4.5. Photographs collected during ecological, landscape and visual site visits, as well as ground investigation surveys were also utilised.

Assessment

11.4.6. The significance of potential impacts on water environment and flood risk receptors has been determined in a consistent manner to cover impacts occurring both during the construction of the Proposed Scheme as well as during its operation. The significance of these impacts is based on:

- The ‘value’ (or sensitivity) of the receptor, taking into consideration its function, legal and policy framework protection status as well as other social and environmental factors, on a scale of sensitivity from “Low” to “Very High”;
- The magnitude of the impact on the receptor; and
- The influence of embedded and additional mitigation measures.

11.4.7. The identification of the baseline conditions, using the sources above, will provide an understanding of the water environment and flood risk receptors and allow for a ‘value’ (or sensitivity) to be allocated to each of these receptors. The ‘value’ of a receptor may vary, depending on a wide range of attributes, for example, water quality, geomorphology or biodiversity, and will be attributed using the descriptors provided in Table 11.1.

Table 11.1 Descriptions and Examples of Receptor Value or Sensitivity.

Value or sensitivity of receptor (and Scale)	Quality / substitutability	Typical Examples
Very High (National Scale)	High quality / not substitutable	River. Surface waters used for a major public drinking water supply; source protection zone SPZ1 within a principal aquifer. Critical water source for a major fishery, water-dependent habitat or aquatic species with statutory protection. Flood defence asset system that protects critical national infrastructure or a significant number of residential properties. Essential infrastructure or highly vulnerable development.
High (Regional to Local Scale)	High quality / not readily substitutable	Stream. Surface waters or principal aquifer used for a major industrial/agricultural water abstraction; private drinking water supply. Water sources for a fishery, water-dependent habitat or aquatic species of regional/local importance. Flood defence asset system that protects several residential properties. More-vulnerable development.
Medium (Local Scale)	Medium quality / substitutable	Tributary watercourse with a continuous baseflow; secondary aquifer. Flood defence asset system that protects a small number of residential properties. Less-vulnerable development.
Low	Low quality / readily substitutable	Minor local water feature such as a ditch or surface water sewer. Unproductive strata (groundwater).

11.4.8. Once the value of receptors has been determined, comparing the baseline against the Proposed Scheme will help identify sources, pathways, and the ‘magnitude’ of any impacts on the water environment and flood risk occurring during the construction or operational phases of the development. The ‘magnitude’ of an impact will be defined in accordance with the descriptions and examples provided in Table 11.2, considering both adverse and beneficial impacts on each of the relevant water environment components. The ‘magnitude’

of an impact may vary between receptors, depending on the nature of the pathway available for that impact to manifest itself.

Table 11.2 Description and Examples of Impact Magnitudes.

Magnitude of Impact	Typical Description	Typical Examples
High Adverse	<p>Loss of an existing or creation of a major new feature</p> <p>Significant change in the quality of a feature's key attributes</p> <p>Significant change in flood risk</p>	<p>Culverting of a significant length of watercourse (adverse); restoration of a significant length of watercourse (beneficial)</p> <p>Change in the status of any individual quality element used to define a water body's ecological status</p> <p>Significant change in the peak flood level (>100 mm) or in the duration of property flooding (>1 h)</p>
Medium Adverse	<p>Loss or restoration of part of a feature</p> <p>Moderate change in a feature's key attributes</p> <p>Moderate change in flood risk</p>	<p>Construction of a new concrete retaining wall along a river (adverse) or removal of an existing one, restoring a natural riverbank (beneficial)</p> <p>Moderate change in an individual quality element that does not result in that quality element changing status</p> <p>Increase in the peak flood level (>50 mm) or in the duration of property flooding (<1 h)</p>
Slight Adverse	<p>Minor or slight change</p>	<p>Removal or creation of minor, localised buffer zones or enhanced marginal habitats on a surface water body</p> <p>Minor but measurable change in an individual quality element that does not result in that quality element changing status</p> <p>Change in the peak flood level (>10 mm)</p>
Negligible Adverse	<p>Change that is unlikely to be detectable</p>	<p>Adverse or beneficial change that is unlikely to be measurable or that is within the limits of uncertainty</p>

- 11.4.9. The prediction of effects and their significance will also be carried out with reference to the construction and operational phases of the Proposed Scheme, considering both adverse and beneficial effects on each of the relevant water environment components. These include: the effects of runoff or pollution on surface water and groundwater bodies as well as the effects of flooding. Determining the significance of effects identified is then essentially a function of the magnitude of an impact and the sensitivity of the receptor, as depicted in the significance matrix in Table 11.3. Descriptions are also provided for each of these significances in Table 11.4.

Table 11.3 Water Environment Effects Significance Matrix.

Magnitude of Impact	Receptor Value (or Sensitivity)				
		Very High	High	Medium	Low
	High	Major	Major	Moderate	Slight
	Medium	Major	Moderate	Slight to Moderate	Slight
	Slight	Moderate	Slight to Moderate	Slight	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 11.4 Description of Effect Significance Categories.

Significance category	Description
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- 11.4.10. For impacts associated with low probability events, the above methodology could suggest an artificially high significance of the effect on the water environment. Therefore, the output of the assessment has been reviewed using professional judgement and, where considered appropriate, the assessed magnitude has been reduced to reflect the low probability of occurrence.
- 11.4.11. The significance of potential impacts on the water environment was assigned both with and without any proposed mitigation. When assessing the Proposed Scheme without mitigation, the embedded mitigation measures were included in the assessment of impact. Additional mitigation was only included in the assessment of impact in the with mitigation scenario.
- 11.4.12. Cumulative effects of the Proposed Scheme and other committed developments within the area will be considered. The study area will be extended to include any schemes with planning secured or those identified in the Local Development Plan that could have impacts on the local flood risk, water quality, geomorphology, or aquatic ecology. The interactions between the effects will then be assessed.
- 11.4.13. The mitigation hierarchy, alongside best practice, has been applied to develop measures to mitigate against the potential temporary and permanent impacts of the Proposed Scheme. Workshops with environmental specialists and engineers have been undertaken to identify

the best possible methods. Ongoing consultation with specialists from statutory bodies support this process.

- 11.4.14. For this assessment, the base year has been set as 2021 and the completion of the Proposed Scheme will be 2022. Where the magnitude of impacts and significance of effects is expected to vary over time, the assessment has considered impacts in 2022 (Year 1) and 2036 (Year 15).

Limitations and Assumptions

- 11.4.15. The assessments made regarding water quality impact are based on baseline data derived from available published water quality information as well as some site collected data. The assessments made on flood risk are based on data from NRW, a drainage survey and other relevant plans.

11.5. Baseline Conditions

Surface water

Main Rivers and WFD Surface Waterbodies

- 11.5.1. The Proposed Development does not lie directly within the floodplain of a main river but does lie within the catchment area of two main rivers and WFD surface water bodies.
- 11.5.2. As the development lies at the top of the valley of the Afon Rhondda Fach, the majority of site boundary falls within the catchment of the Afon Rhondda Fach, a primary watercourse and tributary of the Afon Rhondda Fach. After forming its headwaters north west of Maerdy, the Afon Rhondda Fach flows in a largely south-easterly direction before nearing the Proposed Scheme area, at Tylorstown. The river then continues generally south to meet the Afon Rhondda Fawr which in turn joins the River Taff at Pontypridd.
- 11.5.3. The eastern edge of the site lies within the catchment of the Nant Clydach, the headwaters of which form to the east of the Proposed Development and flow in a south-westerly direction before joining the River Taff north of Cilfynydd.
- 11.5.4. The Afon Rhondda Fach and Nant Clydach are both subject to assessment under the Water Framework Directive (WFD) and currently have an overall potential of *Poor*, comprising a *Good* potential for chemical factors and a *Poor* potential ecological factors. Further information on these waterbodies is available in Table 11.5 below. Please note that the WFD 'status' of waterbodies is referred to as a 'potential' if a watercourse is designated as a 'heavily modified water body', such as in the case of the Afon Rhondda Fach.
- 11.5.5. A third WFD watercourse catchment, the Aman River, is located approximately 1km north of the redline boundary but does not directly interact with the Proposed Scheme. It has therefore not been given any further consideration in this chapter.
- 11.5.6. Further details on the watercourses discussed above are available in the WFD Assessment for the Scheme (see Appendix 11.1) and the location of these WFD waterbodies and catchments are depicted in Volume 2: Plan V2-S11-0001.

Minor Watercourse and Drains

- 11.5.7. A review of historical mapping indicates that numerous springs were previously present to the north of the study area, with small watercourses running straight down the valley, into

the Afon Rhondda Fach. Mapping from 1948 indicates that, although the springs remained in place, the watercourses were diverted to accommodate the mining activities taking place on site at the time.

- 11.5.8. The results of the drainage survey indicate that, as a result of the activities, numerous diverted ordinary watercourses such as minor streams and drainage ditches are located across the site, running from the top of the hill and flowing down into the Afon Rhondda Fach. The survey identified a total of 22 drainage channels located on the valley side, within the study area, forming a large network collecting surface water from the top and sides of the valley and discharging it into the Afon Rhondda Fach. The majority of these watercourses are ephemeral and artificial, consisting of either excavated drainage ditches, concrete channels or footpaths that now act as flow routes. This network of drains is depicted in Volume 2: Plan V2-S11-0002.
- 11.5.9. The drains appear to form two distinct networks or catchments that both discharge into the Afon Rhondda Fach; one captures the west and northwest of the site (including Llanwonno Tip) and the other the east and the southeast of the site (including 'Old Smokey' and the Receptor Site). Both of these drainage networks discharge rain into the Afon Rhondda Fach.
- 11.5.10. Llanwonno Upper Tip is bordered and drained by ditches; two to the east (channels 13 and 14), a ditch directly to the west (channel 17) and a disused tramway running to the south, directly below the tip, acting as a drainage ditch (channel 10/10A).
- 11.5.11. Surface water captured within these channels flows downstream, along two principal flow paths (one directly below the tip and the other slightly to the south) that discharge into the Afon Rhondda Fach. Channel 22 is a naturalistic channel and is located directly below the tip, transporting some of the flows from the above tip down to the Afon Rhondda Fach.
- 11.5.12. Old Smokey, however, is primarily drained by shallow concrete channels that surround the mound, capturing surface water and directing it along two principal flow paths:
- The western side of Old Smokey is drained by a concrete channel (channel 5) that directs surface water flows in a southerly then westerly direction, down the valley. The lower reaches of the channel have a more natural form and are no longer concreted, discharging surface water directly into the Afon Rhondda Fach below; and
 - The eastern side of Old Smokey is also drained by a concrete channel (channel 2) that directs flows in a southerly direction, beyond the site boundary and into further drains. The upper reaches of the channel (directly adjacent to Old Smokey) run beside a footpath and show signs of structural damage. A review of aerial mapping and topography suggests that these flows eventually reach the Afon Rhondda Fach; however, this flow route is a much longer than its western counterpart.
- 11.5.13. In addition to these surveyed watercourses, there are several adits lying uphill of Llanwonno Upper Tip that are known to discharge mine water which flows through the network of channels discussed above.

Drains at Llanwonno Upper Tip

- 11.5.14. There are several watercourses and issues above the tip (including Channel 14) that have been captured by temporary drainage measures, installed during Phase 1 of the remediation works, immediately after the landslip event. These drainage measures form a series of 6-inch plastic pipes that collect water from culverts at Llanwonno Road, pipe them along the

valley feature on the uphill side of the tip and subsequently discharge at the southern end of the tip, where it meets the former tramway.

- 11.5.15. The base of the tip lies on a slack, which has water issues along its entire length and inevitably beneath the tip itself. Since the landslide has occurred, water issues have formed deep erosive gullies down to the valley bottom. It is considered that prior to the slip, a longitudinal drain, beneath the tramway, captured these issues and took the water away to the north, and then down to the valley bottom, via a channel that is still partially present (Channel 22), immediately south of Llanwonno Lower Tip.
- 11.5.16. At the very southern end of Llanwonno Tip is a tramway turning circle. A culvert is present immediately south of this (between channels 14 and 18), passing beneath the tramway. This culvert (channel 14) discharges water flowing from the small valley formed between the natural hillside and crest of the tip into an unlined drain. The culvert has been reformed recently as part of the Phase 1 remediation works so that a series of 6-inch plastic water pipes pass through it.
- 11.5.17. Approximately 300m uphill from Llanwonno Upper Tip, the tramway intersects the lower edge of a slack. At this point, the tramway meets a narrow track, leading northwards, up towards Llanwonno Road. Within the slack, the local area uphill is boggy and forms a small drainage basin (Channel 11), which discharges at the intersection of the track and tramway. The water at this intersection has, in the past, flowed down the tramway (Channel 10) and resulted in deep erosive gullies that have required periodic repairs.
- 11.5.18. Further details on the minor watercourses discussed above are available in the WFD Assessment for the Scheme (see Appendix 11.1) and depicted in Volume 2: Plan V2-S11-0002.

Water quality

- 11.5.19. Due to its historic use of the site for mining activities, waterbodies on site are currently affected by pollution from a number of sources including mine water and colliery material tips.
- 11.5.20. A Ground Investigation was undertaken at Llanwonno Tip in January 2021 and included chemical testing of the colliery material at Llanwonno Tip, as well as the collection and testing of leachate samples. A summary of the results is available in Appendix 11.1. Leachate testing of the material comprising Llanwonno Tip also showed the samples to be free from contaminants. No PAHs, monoaromatics or TPH species were present above detection limits. For metals, all except lead were below relevant screening criteria (Water Framework Directive EQS). This creates a potential for the colliery material to be acting as a source of lead pollution to the nearby Afon Rhondda Fach.

Afon Rhondda Fach

- 11.5.21. Three sets of water samples were collected from the Afon Rhondda Fach in November and December 2020, upstream of the location of the slip (as well as in a tributary draining the tip location, downstream of channel), as part of a previous phase of the project (see results in the WFD Assessment, in Appendix 11.1). These were tested for water quality and revealed that concentrations of dissolved copper and zinc in the Afon Rhondda Fach exceed Water Framework Directive EQS. This suggests that the chemical WFD elements of the Afon Rhondda Fach could be of a lesser quality than is reflected in the waterbody's current classification. Additionally, one of the samples obtained from the tributary contained

concentrations of dissolved lead exceeding EQS; however, levels in the Rhondda Fach remained below the EQS threshold.

Minor surface waterbodies

- 11.5.22. Two surface water monitoring points located in drainage features between 20m and 40m from the proposed Receptor Site were tested for a comprehensive suite of water quality parameters in two separate monitoring rounds. Water samples were shown to be largely free from contamination, though recorded bioavailable manganese and copper concentrations exceeded EQS thresholds. Manganese is a common contaminant in colliery spoil, so these results are not unexpected. Further details are available in the WFD assessment in Appendix 11.1.

Surface Water Resources

- 11.5.23. There are no surface water abstractions within 500m of the Proposed Scheme, including drinking water abstractions. However, there is one active surface water abstraction for potable water located 1.05km north east of the Proposed Scheme, at Clydach Reservoir.
- 11.5.24. Three active discharge consents to surface water bodies were identified within 500m of the site, as listed in *Table 11.6* below.

Table 11.5 Baseline conditions for WFD waterbodies within less than 1km of the Proposed Scheme.

Waterbody	Water Framework Directive Potential (2018)	Heavily Modified?	Reason for not achieving Good Status	Objectives	Designation(s)/ Protected Area(s)
Afon Rhondda Fach - source to confluence Rhondda RGB109057027210 Surface waterbody	<i>Overall: Poor</i> <i>Ecological: Poor</i> <i>Chemical: Good</i>	Yes	Fish element: Sewage discharge, intermittent from wastewater treatment and diffuse from urban pollution (intermittent and diffuse) and barriers to fish migration.	<i>Good ecological status by 2027*</i>	-
Nant Clydach - source to confluence R Taff GB109057027250	<i>Overall: Poor</i> <i>Ecological: Poor</i> <i>Chemical: Good</i>	No	Data unavailable	<i>Good ecological status by 2027*</i>	-
SE Valleys Carboniferous Coal Measures GB40902G201900 Groundwater body and Secondary A aquifer	<i>Overall: Poor</i> <i>Quantitative: Good</i> <i>Chemical: Poor</i>	N/A	Pollution from abandoned mines	<i>Good chemical status by 2027*</i>	Drinking water protected area

Table 11.6 Discharge consents in the study area.

Operator	Status	Discharge Type	Receiving Water	Location
-	Effective	Sewage Discharges – Sewer Storm Overflow	Rhondda Fach	Two permits at the same location, located 288m south
-	Effective	Trade Discharges – Site Drainage	Rhondda Fach	Ferndale – Banana Colliery Tip 313m west

Groundwater and Geology

Site Hydrogeology

- 11.5.25. The underlying geology at the site is described in further detail in Section 10. The solid geology consists of Upper Coal Measures (Pennant Measures) in the upper parts of RH01 and Rhondda Sandstones in the lower parts.

- 11.5.26. The Pennant Sandstone Formation is recognised as having large quantities of groundwater within a multi-layered aquifer system, with the sandstone units forming distinct and separate aquifer units between the lower permeability argillaceous layers of coal and mudstone which form aquitards.
- 11.5.27. Superficial glacial deposits comprising clayey silty sand, gravel and cobbles underlie RH01 and cover the adjacent hillside.
- 11.5.28. The topsoil within RH01 consists of colliery spoil, predominantly comprising sand, gravel and cobble-sized fragments of mudstone and coal with lesser quantities of siltstone, sandstone and ironstone.
- 11.5.29. The entirety of the development site and the surrounding area are underlain by the SE Valleys Carboniferous Coal Measures (GB40902G201900), a groundwater WFD body. It currently has a *Poor Overall* status, comprising a *Good Quantitative* status and *Poor Chemical* status. Further information on this waterbody is available in Table 11.5.
- 11.5.30. The site is underlain by a secondary A bedrock aquifer. These are Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The westernmost extent of the site, adjacent to the Afon Rhonda Fach, is underlain by a Secondary A and a Secondary Undifferentiated superficial aquifer. Secondary undifferentiated aquifers are assigned where it is not possible to attribute either category A or B to a rock type.
- 11.5.31. There are no groundwater abstractions within 500m of the Proposed Scheme, including drinking water abstractions.

Groundwater levels

- 11.5.32. Data from the Halcrow stability report indicates that groundwater is present⁷³ within the colliery spoil in the basal 1-2 m of the Llanwonno Upper Tip. Halcrow state that there is generally between 0.3 and 2.4 m of groundwater above the base of the Upper Tip. Groundwater is also present within the superficial deposits as well as the sandstone units. Groundwater flow directions mimic the surface topography with flow down towards the base of the valley.
- 11.5.33. Six recent boreholes (BH01 to BH07) and three existing wells (BH01A to BH03A) from previous GI have been monitored for groundwater, below the footprint of the proposed Receptor Site, with two rounds of testing completed in March 2021. The results (presented in Appendix 11.1 of this report) indicate that the equilibrium water table lies more than 70m below ground level (bgl).

Groundwater quality

- 11.5.34. The Proposed Scheme is not within a nitrate vulnerable zone (NVZ) or Source Protection Zone (SPZ).
- 11.5.35. The bedrock aquifer on site is shown to have **High** vulnerability in the site location. These areas can easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits. The superficial geology on site is shown to have a 'Medium' vulnerability.

⁷³ Halcrow group Limited (2004), Llanwonno Tips Reclamation Scheme Stability Report

- 11.5.36. No groundwater quality testing was undertaken at Llanwonno Upper Tip; however, leaching from Llanwonno Tip was visibly noted, indicates the potential for groundwater contamination. Hydraulic connection is considered likely between the colliery spoil and superficial deposits but that argillaceous bands will protect deeper groundwater.
- 11.5.37. A borehole (BH07), which recorded the most perched groundwater immediately after drilling at the Receptor Site, was tested for a comprehensive suite of water quality parameters, in two separate monitoring rounds. Water samples were shown to be largely free from contamination, though recorded bioavailable manganese and copper concentrations exceeded EQS thresholds.

Flood Risk

- 11.5.38. The NRW flood maps indicate that the Proposed Scheme lies within NRW Flood Zone A which is described as “Considered to be at little or no risk of fluvial or coastal/tidal flooding” and is thereby not at risk of flooding from rivers and sea.
- 11.5.39. As mentioned above, the Proposed development interacts with multiple small watercourses and drains located across the site and is therefore at risk of surface water flooding in certain specific locations. Details of these minor watercourses are available in the ‘Surface water’ section above. The landslip that occurred in February 2021 is thought to be as a result of the accumulation of surface water at the head of the Llanwonno Upper Tip and at the head of the lower part of the Upper Tip, forming ponds and destabilising material within the tip.
- 11.5.40. Temporary piped drains are current installed along some of the drainage channels surrounding Llanwonno tip (Channel 14 and part of Channel 13) to provide sufficient drainage to the tip area, following the slip.
- 11.5.41. The Proposed Scheme location is also not at risk of flooding from reservoirs.
- 11.5.42. The majority of the site is considered to be at a negligible risk of groundwater flooding. However, the westernmost part of the site, adjacent to the Afon Rhondda Fach, is at a Moderate risk of groundwater flooding.

Future baseline

Climate Change

- 11.5.43. In the UK, the effects of climate change are likely to comprise more extreme weather events, a general increase in summer temperatures and warmer, milder winters. Changes in rainfall distribution and a rise in sea levels are also expected. As a result, it is expected that storm events will occur more regularly in the future, and that high flows within the Afon Rhondda Fach and drains associated with Llanwonno Tip are likely to increase in intensity and regularity, further increasing the risk of flooding and potential future landslips. These impacts are discussed in further detail in Chapter 13 ‘Major Accidents and Disasters’.

11.6. Preliminary Impact Assessment

- 11.6.1. This section discusses the potential impacts and effects posed to and by the Proposed Scheme associated with geomorphology, water quality and flood risk prior to the application mitigation measures. All construction impacts (as well as their magnitude and significance) are summarised in Table 11.7, whereas operational impacts are presented in Table 11.8.

Construction Phase

Geomorphology

- 11.6.2. The construction of the Proposed Scheme will not affect the banks or geomorphology of the Afon Rhondda Fach or any other main rivers in the area as the proposals are located on the top of the river valley.
- 11.6.3. The Proposed Scheme is creating changes to the existing drainage arrangement and minor watercourses at RH01 as well as at the Receptor Site. This has been allocated a **Slight Adverse** magnitude; however, as discussed in Section 11.5, these watercourses are either artificial or already heavily modified, as a result of the historical mining activities on site, so their sensitivity is considered to be **Low**, resulting in a **Negligible** significance. The Proposed Scheme also offers an opportunity to return this network of watercourses to a more naturalistic state.

Water quality

- 11.6.4. The Proposed Scheme will have no impacts on surface or groundwater abstractions for potable water as no groundwater abstractions are located within the vicinity of the Proposed Scheme and all surface water abstractions are located on waterbodies that are not affected by the Scheme.
- 11.6.5. The activities required to construct the Proposed Scheme, such as the use of plant for the excavation and transport of material, present risks of pollution to the water environment through potential oil spills or the mobilisation of contaminants present in the colliery material. These impacts would directly affect the water quality of minor watercourses within the redline boundary as well as indirectly affect the Afon Rhondda Fach and other minor watercourses downstream of the RLB. The direct impacts on minor watercourses would have a **High Adverse** magnitude whereas the indirect impact on the Afon Rhondda Fach would have a 'Medium' magnitude, resulting in a **Slight** and **Moderate** significance respectively.
- 11.6.6. During construction, the Proposed Scheme also has the potential to adversely affect groundwater, and more specifically the SE Valleys Carboniferous Coal Measures WFD groundwater body, through the mobilisation of contaminants during excavation and material handling or through creation of new pathways for contaminants to enter the water body. The magnitude of this impact is considered to be **Medium Adverse**, with a significance of **Slight to Moderate**. Due to the known depth of the groundwater body (particularly at the Receptor Site) and presence of aquitard strata protecting deeper groundwater, the significance of the impact has been deemed to be **Slight** and not significant in EIA terms.

Flood risk

- 11.6.7. The construction of the Proposed Scheme will interact with multiple minor watercourses and therefore be subjected to the risk of surface water flooding during construction. This impact is considered to be of **Medium Adverse** magnitude and **Slight** significance.
- 11.6.8. However, no potential impacts associated with fluvial or groundwater flooding are anticipated.

Table 11.7 Preliminary construction phase impacts.

Receptor	Sensitivity	Impact	Effect	Magnitude	Significance
Afon Rhondda Fach - source to confluence Rhondda	High	Indirect Impact - Soil, dust, and pollutants entering the watercourses from machinery, fuel tank leakages and earthworks.	Increased suspended sediment load, fine sediments settling on bed substrate, and effects on water quality. Effects on water quality that could result in a reduction of WFD status as well as the poisoning of animals and plants along the banks and in the channel.	Medium Adverse	Moderate
		Indirect Impact - Disturbance of existing contaminants in the Llanwonno Upper Tip (RH01) flowing into the river.	Contaminants and toxic substances could enter the watercourse, causing damage to the water environment and aquatic ecology.	Medium Adverse	Moderate
Unnamed drains within the red line boundary	Low	Soil, dust, and pollutants entering the watercourses from machinery, fuel tank leakages and earthworks.	Increased suspended sediment load, fine sediments settling on bed substrate, and effects on water quality. Effects on water quality that could result in the poisoning of animals and plants along the banks and in the channel.	High Adverse	Slight
		Disturbance of existing contaminants in the Llanwonno Upper Tip (RH01).	Contaminants and toxic substances could enter the watercourse and cause damage to the water environment and aquatic ecology.	High Adverse	Slight
		Physical changes to existing drains and drainage network within the redline boundary	Geomorphological and ecological effects on the drainage network within the redline boundary.	Slight Adverse	Negligible
Working areas, floodplain and valley side	Low	Changes to runoff rates and flow characteristics that increase local flood risk through storage of material/temporary structures as well as works to the drainage network. Increase in impermeable surfaces through hard standing or compaction of soils.	Potential to temporarily alter surface water flow routes and increase runoff within the red line boundary. This could pose a flood risk to construction staff as well as equipment and plant on site.	Medium Adverse	Slight

Receptor	Sensitivity	Impact	Effect	Magnitude	Significance
SE Valleys Carboniferous Coal Measures	Medium	Potential creation of new pathways for contaminants and pollutants during excavation works for the removal of colliery material from Llanwonno Tip.	Potential for contaminants to reach the SE Valleys Carboniferous Coal Measures WFD waterbody and aquifer, affecting water quality and its WFD status.	Medium Adverse	Slight
		Indirect Impact - Pollutants from machinery or fuel tank leakages	Potential for contaminants and pollutants to infiltrate the ground and enter the aquifer	Medium Adverse	Slight
		Indirect Impact - Disturbance of existing/ historic contaminated land and contaminated perched groundwater in the Llanwonno Upper Tip (RH01).	Potential for contaminants and pollutants to infiltrate the ground and enter the aquifer	Medium Adverse	Slight

Operation Phase

Geomorphology

- 11.6.9. Once constructed, the Proposed Scheme will not interact directly with the geomorphology of the Afon Rhondda Fach. Nor will it indirectly impact the river, as it will not cause any significant increases or alterations in its flows.
- 11.6.10. In fact, by reducing the likelihood of future slips, such as the February 2020 slip, the Proposed Scheme will prevent any future physical damage to or realignment of the Afon Rhondda Fach, ensuring current geomorphological processes remain in place. This will also ensure processes occurring in the drainage network remain in place also.

Water quality

- 11.6.11. Following the transport of the colliery material and the formation of the new Receptor Site, the operation of the Proposed Scheme has the potential to have adverse impacts on the water quality of the Afon Rhondda Fach and minor watercourses within and downstream of the redline boundary. The disturbance of and handling of the material could encourage the gradual leaching and mobilisation of contaminants within the deposited material at the proposed Receptor Site which in turn could potentially increase manganese and copper concentrations in local watercourses.
- 11.6.12. On-site surface / near-surface mobile contaminants have the potential to enter the shallow groundwater regime via leaching and migration and impact the underlying aquifers and via seepage outflows impact watercourses within the local area. As a result, the Proposed Scheme has the potential to adversely affect the SE Valleys Carboniferous Coal Measures WFD groundwater body.
- 11.6.13. The Proposed Scheme will also have beneficial impact on the water quality of the Afon Rhondda Fach and the SE Valleys Carboniferous Coal Measures WFD groundwater body. By creating a more stable landform, the Proposed Scheme aims to reduce the risk of future slips, which would in turn reduce the potential for contamination of the water environment.

Flood risk

- 11.6.14. Due to its location and its scale, the Proposed Scheme is likely to be subject to surface water flooding during its operation. However, as the fill material is granular, it is not thought that the rainwater infiltration/run off patterns will be significantly affected at the Receptor Site. Nevertheless, where the fill is thickest, some minor changes to surface water drainage may occur, which has the potential to lead to **Slight Adverse** impacts to the surrounding area.
- 11.6.15. The design of the Proposed Scheme includes surface water drainage (as described in Section 3), including the creation of swales and formalising some of the drains around Llanwonno Upper Tip. This drainage design is considered to have a **Slight Beneficial** impact on surface water drainage, with a **Slight** significance.
- 11.6.16. By reducing the likelihood of future slips, the Proposed Scheme will prevent the occurrence of any fluvial or surface water flood events as a result of slipped material blocking or diverting the Afon Rhondda Fach. This impact is considered to be of **Slight Adverse** magnitude and **Moderate** significance.

- 11.6.17. The proposals have the potential to cause changes in groundwater levels at both the Receptor Site and Llanwonno Tip, following the deposition of the colliery material, having a **Slight Adverse** magnitude and **Slight** significance.

Table 11.8 Preliminary operational phase impacts.

Receptor	Sensitivity	Impact	Effect	Magnitude	Significance
Afon Rhondda Fach - source to confluence Rhondda (Including unnamed drains along the valley side)	High	Indirect Impact - Permanent reduction in the amount of pollutants and sediment reaching the Afon Rhondda Fach by increasing length of pathway between the source of potential contamination (colliery material) and the receptor.	Potential reduction in metal concentrations within the Afon Rhondda Fach (such as Manganese and Copper) and likely beneficial effects on ecological receptors within the river as a result.	Slight Beneficial	Slight
		Indirect Impact - Potential increase in amount of metals and sediment entering the watercourse, due to mobilisation of metals and sediment.	Potential increase in metal concentrations within the Afon Rhondda Fach (such as Manganese and Copper) and likely adverse effects on ecological receptors within the river as a result.	Slight Adverse	Moderate
		Reduced likelihood of future slips	Reduced likelihood of major water pollution events or severe hydromorphological changes occurring in the future.	Slight Beneficial	Moderate
Floodplains and flood risk receptors	Medium	Potential changes to surface water drainage arrangement at the Receptor Site.	Increased surface water flood risk posed within the Receptor Site area and downstream.	Slight Adverse	Slight
		Improvement to the drainage network at Llanwonno Tip.	Reduction of surface water flood risk posed within the Llanwonno Tip area and downstream.	Slight Beneficial	Slight
SE Valleys Carboniferous Coal Measures	Medium	Increase in amount of pollutants and sediment entering the waterbody, due to mobilisation of metals and sediment.	Potential for local reduction in quality of groundwater body	Slight Adverse	Slight
		Indirect Impact - Permanent reduction in amount of pollutants and sediment entering the waterbody by increasing length of pathway between the source of potential contamination (colliery material) and the receptor.	Prevention of future reduction in quality of groundwater body	Slight Beneficial	Slight

Receptor	Sensitivity	Impact	Effect	Magnitude	Significance
		Potential changes in groundwater levels at both the Receptor Site and Llanwonno Tip due to changes soil/material depth above the groundwater, following the movement of colliery material.	Change to groundwater mobility and availability in the area.	Slight Adverse	Slight

Summary

- 11.6.18. The above preliminary assessment has identified a number of adverse effects of the Proposed Scheme on Water Environment & Flood Risk receptors during construction. The majority of these, such as potential temporary effects on unnamed drains and the SE Valleys Carboniferous Coal Measures, are not considered significant in EIA terms. However, the generation of dust and pollution during construction, as well as the potential to mobilise existing metals in local soils, could have a **Moderate** and therefore significant indirect effect on the Afon Rhondda Fach.
- 11.6.19. The operation of the Scheme has been identified as having a number of adverse and beneficial effects on Water Environment & Flood Risk receptors. Of these, only effects on the Afon Rhondda Fach are considered to be significant in EIA terms. These are:
- Beneficial effects of increasing the length of the pathway between the source of potential contamination (colliery material) and the Afon Rhondda Fach, by moving the colliery material (**Slight** Significance);
 - Beneficial effects of stabilising the colliery material, preventing any future slips and resulting reduction in water or geomorphological quality (**Moderate** Significance); and
 - Adverse potential effects of increasing the amount of metals and sediment entering the Afon Rhondda Fach, following the mobilisation of metals and sediment during construction (**Moderate** Significance).
- 11.6.20. Effects on SE Valleys Carboniferous Coal Measures, the local drainage network and floodplains are all of **Slight** significance and therefore not considered significant in EIA terms.

11.7. Mitigation, Enhancement and Monitoring

Construction Phase

- 11.7.1. The following mitigation measures should be applied during construction of the Scheme, in order to prevent occurrence of significant effects on Water Environment & Flood Risk receptors:
- Best practice construction methods will be applied to prevent pollution events such as oil spill or increased sediment loading of watercourses during construction. These will be recorded in the CEMP. This should include measures to capture and process pollutants within surface water (e.g. straw bales) and should be developed in accordance with the NRW guidance; and
 - Best practice construction methods will be applied to prevent surface water flooding during construction and will be recorded in the CEMP. This could include measures such as the reduction of impermeable areas within the construction areas and compound or the implementation of temporary drainage, where required. It is noted that temporary drainage is already in place, following the February 2020 landslide.
- 11.7.2. The CEMP should be approved by NRW and RCTCBC, and LLFA, where relevant, prior to construction commencing.
- 11.7.3. All proposed measures to mitigate construction impacts are outlined in Table 11.9 below.

Operational Phase

- 11.7.4. A number of measures have been proposed to mitigate for operational impacts of the Scheme, particularly on the Afon Rhondda Fach and the SE Valleys Carboniferous Coal Measures. These have been split between measures proposed at Llanwonno Tip and the Receptor Site.

Llanwonno Tip

- 11.7.5. The design of the Proposed Scheme will require careful considerations for surface water drainage to ensure that it does not increase the risk of surface water and groundwater flooding. The current design at Llanwonno Tip consists of a network of swales and herring bone drains to collect surface water flows and direct them towards a network of three drainage channels below the tip. These will, in turn, direct waters towards an existing channel and outfall to the Afon Rhondda Fach. Further details of the outline drainage design are available in Appendix 10.2. Further considerations for drainage should be made throughout the detailed design process.
- 11.7.6. Careful consideration for water quality will also need to be made during the design of the Proposed Scheme, to ensure that the proposals do not have a detrimental effect on the water quality of surface water and groundwater bodies within proximity of the site. The current proposal is for the swales and their surrounds to be vegetated with appropriate plants such as rushes and sedges, as well as species currently on site (in line with the biodiversity mitigation strategy in Appendix 9.7), to capture and retain some of the metals (such as lead) found to be present in the colliery material, thereby reducing the amount reaching the Afon Rhondda Fach and SE Valleys Carboniferous Coal Measures. The current layout of the drainage and associated planting at Llanwonno Tip is presented in Volume 2: Plan V2-S16-0003. Further details on the choice and location of vegetation will be developed in parallel with the detailed drainage design.
- 11.7.7. To check that groundwater levels remain stable at Llanwonno Tip (within the seasonal variation) following the re-landscaping of the area, 7 rotary open holed boreholes with dual piezometric installations shall be installed, two uphill of the re-landscaped area and five within the re-landscaped area. This drilling will need to be done once the works are complete or near complete for safety reasons. These will be used to monitor groundwater levels, ideally over 6 months employing a once-a-month frequency (during winter), and if a particularly heavy period of rainfall occurs then the monitoring schedule changed to bring the next monitoring round forward. Refer to appendix 10.3 for further information on the proposed monitoring and provisional location of boreholes.

Receptor Site

- 11.7.8. Similarly, to Llanwonno Tip, drainage is a key consideration at the Receptor Site. The outline drainage design proposals for the Receptor Site consist of a network of swales surrounding the new landform and running across the top of it. These will feed into two attenuation ponds which discharge into the existing drainage network. Further details of the outline drainage design are available in Appendix 10.2. Further considerations for drainage should be made throughout the detailed design process.
- 11.7.9. The swales within and around the Receptor Site are also proposed to be vegetated with appropriate plants such as rushes and sedges, as well as species currently on site (in line with the biodiversity mitigation strategy in Appendix 9.7), to capture and retain some of the metals (such as lead) found to be present in the colliery material, thereby reducing the

amount reaching the Afon Rhondda Fach and SE Valleys Carboniferous Coal Measures.

The current layout of the drainage and associated planting at the Receptor Site is presented in Volume 2: Plan V2-S16-0001. Again, further details on the choice and location of vegetation will be developed in parallel with the detailed drainage design.

- 11.7.10. At the Receptor Site, seven boreholes have been drilled to check the depth to competent strata and also to check the depth to coal seams and derive existing groundwater levels before emplacement of colliery material. Wells shall be left in place to facilitate the monitoring of groundwater levels across the site. Thereby, levels can be gauged during the stages of material placements, to ensure that there is no significant increase in groundwater levels resulting from the emplacement. These will be used to monitor groundwater levels, ideally over 6 months employing a once-a-month frequency (during winter), and if a particularly heavy period of rainfall occurs then the monitoring schedule changed to bring the next monitoring round forward. Refer to appendix 10.3 for further information on the proposed monitoring and provisional location of boreholes.
- 11.7.11. All proposed measures to mitigate operational impacts are outlined in Table 11.10 below.

11.8. Residual Impact Assessment

Construction Phase

- 11.8.1. It is anticipated that measures outlined in Table 11.9 will be incorporated into a CEMP. The CEMP will mitigate against all impacts associated with construction. The CEMP would need to be approved by NRW, RCTCBC and the LLFA prior to construction commencing.
- 11.8.2. Where measures are implemented, it is anticipated that no significant residual construction impacts will occur.

Operational phase

- 11.8.3. Following the implementation of mitigation measures outlined in Section 11.7 above and in Table 11.10, it is considered that no significant adverse effects on Water Environment & Flood Risk receptors will remain.
- 11.8.4. The adverse impacts of leaching metals from handled colliery material on the water quality of the Afon Rhondda Fach and SE Valleys Carboniferous Coal Measures, following construction, will retain a **Slight** significance in Year 1 but reduce to **Negligible** by Year 15. This is due to the effectiveness of the topsoil capping and re-vegetating of topsoil and swales increasing with time, as vegetation establishes and grows, stabilising the topsoil and extracting/retaining larger quantities of metal.
- 11.8.5. Any potential impacts associated with surface water flooding as a result of colliery material at the Receptor Site will be mitigated through the provision of a detailed drainage design, providing a residual **Negligible** effect.

Table 11.9 Construction phase mitigation and Residual Impact Assessment.

Ref	Receptor and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
WEFR M1	Afon Rhondda Fach - source to confluence Rhondda (High)	Indirect Impact – Adverse effects on water quality and ecological features as a result of soil, dust, and pollutants entering the watercourses from machinery or fuel tank leakages	Medium Adverse	To prevent any pollution events during construction, appropriate pollution prevention measures will be included in the CEMP and applied across the construction site, particularly during the excavation and handling of material. Where relevant, the proposed works shall comply with and refer to DEFRA & the EA's Pollution Prevention Guidance as well as NRW guidance.	Negligible Adverse	Negligible
		Indirect Impact – Adverse effects on water quality and ecological features as a result of the disturbance of existing contaminants in the Llanwonno Upper Tip (RH01).	Medium Adverse		Negligible Adverse	Negligible
	Unnamed drains within the red line boundary (Low)	Direct adverse effects on water quality and ecological features as a result of soil, dust, and pollutants entering the watercourses from machinery or fuel tank leakages	High Adverse		Slight Adverse	Negligible
		Direct adverse effects on water quality and ecological features as a result of the disturbance of existing contaminants in the Llanwonno Upper Tip (RH01).	High Adverse		Slight Adverse	Negligible
	SE Valleys Carboniferous Coal Measures (Medium)	Potential for the water quality of the SE Valleys Carboniferous Coal Measures WFD waterbody and aquifer due to the creation of new pathways for contaminants and pollutants during excavation works at Llanwonno Tip.	Medium Adverse		Negligible Adverse	Negligible
		Indirect Impact – Adverse effects on water quality and ecological features as a result of soil, dust, and pollutants entering the watercourses from machinery or fuel tank leakages	Medium Adverse		Negligible Adverse	Negligible

Ref	Receptor and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
		Indirect Impact – Adverse effects on water quality and ecological features as a result of the disturbance of existing contaminants in the Llanwonno Upper Tip (RH01).	Medium Adverse		Negligible Adverse	Negligible
WEFR M2	Working areas, floodplain and valley side (Low)	Potential increase in surface water flood risk due to storage of material/temporary structures as well as works to the drainage network. Increase in impermeable surfaces through hard standing or compaction of soils.	Medium Adverse	The afore mentioned CEMP will include appropriate measures to manage drainage and surface water flood risk during construction.	Negligible Adverse	Negligible
N/A	Unnamed drains within the red line boundary (Low)	Geomorphological and ecological effects on the drainage network within the redline boundary, as a result of physical changes to the existing drains and drainage network.	Slight Adverse	No mitigation proposed	Slight Adverse	Negligible

Table 11.10 Operation phase mitigation and Residual Impact Assessment.

Ref	Receptor and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
WEFR M3	Afon Rhondda Fach - source to confluence Rhondda (High)	Potential degradation of chemical and ecological quality elements of the Afon Rhondda Fach due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse	<p>The drainage design of the Llanwonno Tip includes swales. These will be appropriately vegetated in order to capture and retain some of the metals (such as lead) found to be present in the colliery material, thereby reducing the amount reaching the Afon Rhondda Fach and SE Valleys Carboniferous Coal Measures.</p> <p>The effectiveness of this mitigation measure is expected to increase with time, as vegetation establishes within and around the swales.</p>	Year 1- Slight Adverse	Year 1- Slight
	SE Valleys Carboniferous Coal Measures (Medium)	Potential degradation of chemical quality elements of the SE Valleys Carboniferous Coal Measures due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse		Year 15- Negligible Adverse	Year 15- Negligible
WEFR M4	Afon Rhondda Fach - source to confluence Rhondda (High)	Potential degradation of chemical and ecological quality elements of the Afon Rhondda Fach due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse	<p>The drainage design of the Receptor Site includes swales and attenuation areas. These will be appropriately vegetated (with rush and sedge species for example) to capture and retain some of the metals (such as lead) found to be present in the colliery material, thereby reducing the amount reaching the Afon Rhondda Fach and SE Valleys Carboniferous Coal Measures.</p> <p>The effectiveness of this mitigation measure is expected to increase with time,</p>	Year 1- Slight Adverse	Year 1- Slight
	SE Valleys Carboniferous Coal Measures (Medium)	Potential degradation of chemical quality elements of the SE Valleys Carboniferous Coal Measures due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse		Year 15- Negligible Adverse	Year 15- Negligible

Ref	Receptor and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
				as vegetation establishes within and around the swales.		
WEFR M5	Afon Rhondda Fach - source to confluence Rhondda (High)	Potential degradation of chemical and ecological quality elements of the Afon Rhondda Fach due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse	Topsoil shall be reinstated to cap both the remainder of Llanwonno tip and the Receptor Site, allowing natural regeneration of vegetation in these areas. This would reduce the mobilisation of sediment and leachate following the deposition of the colliery material. The effectiveness of this mitigation measure is expected to increase with time, as vegetation establishes itself and stabilises the topsoil capping.	Year 1- Slight Adverse	Year 1- Slight
	SE Valleys Carboniferous Coal Measures (Medium)	Potential degradation of chemical quality elements of the SE Valleys Carboniferous Coal Measures due to increased leaching and mobilisation of metals, following the handling and deposition of colliery material.	Slight Adverse		Year 15- Negligible Adverse	Year 15- Negligible
WEFR M6	SE Valleys Carboniferous Coal Measures (Medium)	Potential changes in groundwater levels at both the Receptor Site and Llanwonno Tip due to changes soil/material depth above the groundwater, following the movement of colliery material.	Slight Adverse	Monitoring wells to be installed prior to the placement of material on the Receptor Site, to monitor any changes in groundwater levels with at least two rounds of water level monitoring before placement of the material at the Receptor Site	Negligible Adverse	Negligible
WEFR M7				Boreholes will be drilled at Llanwonno Upper Tip, at a time when most of the material has been moved (once the valley slope is stable), in order to monitor whether groundwater levels remain stable (within seasonal		

Ref	Receptor and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
				variations), particularly in the vicinity of springs, streams and former ponding area. Groundwater levels will be monitored over 6 months, during winter, employing a once-a-month frequency		
N/A	Afon Rhondda Fach - source to confluence Rhondda (High)	Permanent reduction in the amount of pollutants and sediment reaching the Afon Rhondda Fach by increasing length of pathway between the source of potential contamination (colliery material) and the receptor.	Slight Beneficial	No mitigation required	Slight Beneficial	Slight
N/A	SE Valleys Carboniferous Coal Measures (Medium)	Permanent reduction in amount of pollutants and sediment entering the waterbody by increasing length of pathway between the source of potential contamination (colliery material) and the receptor.	Slight Beneficial	No mitigation required	Slight Beneficial	Slight
WEFR M8	Floodplains and flood risk receptors (Medium)	Increased surface water flood risk posed within the Receptor Site area and downstream, as a result of depositing the colliery material.	Slight Adverse	Provisions of appropriate drainage design. An outline design has been provided for this but continued consideration shall be made for this during detailed design.	Negligible Beneficial	Negligible

11.9. Cumulative Effects

- 11.9.1. The cumulative effects of proposed development adjacent to and in conjunction with the assessed effects of the Proposed Scheme are considered within this section of the report. The following assessment of cumulative effects considers planning applications within the study area which have been consented for development by the local planning authority.
- 11.9.2. Phases 2 and 3 of the Tylorstown project (ref 20/0993/35) have moved material from the Afon Rhondda Fach valley to multiple Receptor Sites along the riverbank and reprofiled the river to its previous alignment. Further works will be required to finalise the landscaping of these Receptor Sites and therefore have the potential to further affect the Afon Rhondda Fach.
- 11.9.3. No cumulative construction impacts are anticipated as the construction works for Phase 2/3 are anticipated to be complete by the time works on Phase 4 commence (March 2022).
- 11.9.4. In terms of operation, the Proposed Scheme alongside Phases 2 and 3 will cumulatively have a beneficial impact on the Afon Rhondda Fach by restoring the river to its old course (Phase 2/3) and subsequently reducing the likelihood of future slips occurring (Phase 4).
- 11.9.5. As is the case for the colliery material at Receptor Site C, the material deposited at Receptor Sites A and B have the potential to leach into surface and groundwater. However, it is assumed that appropriate mitigation will be provided for this (through appropriate drainage design and vegetation planting), ensuring no significant effects occur.

11.10. Summary

- 11.10.1. This chapter has assessed the potential effects of the Proposed Scheme on the Water Environment & Flood Risk during its construction and operational stages. The Proposed Scheme is expected to have no significant adverse effects on Water Environment & Flood Risk receptors in the local area as well as significant (**Moderate**) and non-significant beneficial effects, by preventing future slips that could damage the water environment. These key impacts are summarised below.
- 11.10.2. During construction:
- the generation of dust and pollution during construction, as well as the potential to mobilise existing metals in local soils, could have a **Moderate** and therefore significant indirect effect on the Afon Rhondda Fach and a **Slight** indirect effect on the SE Valleys Carboniferous Coal Measures. However, these will be mitigated through the use of best practice working methods and their recording in a CEMP, reducing their significance to **Negligible**.
- 11.10.3. During operation:
- Beneficial effects of increasing the length of pathway between the source of potential contamination (colliery material) and the Afon Rhondda Fach, by moving the colliery material (**Slight** Significance);
 - Beneficial effects of stabilising the colliery material, preventing any future slips and any resulting effects on water or geomorphological quality (**Moderate** Significance);
 - Adverse potential effects of increasing the amount of metals and sediment entering the Afon Rhondda Fach, following the mobilisation of metals and

sediment during construction (**Moderate** significance). This will however be mitigated through appropriate capping of colliery material with vegetated topsoil and the integration of vegetated swales in the drainage network. This will reduce the significance of the effect to **Slight** by Year 1 and eventually **Negligible** by Year 15, once vegetation has established and grown; and

- Effects on SE Valleys Carboniferous Coal Measures, the local drainage network and floodplains are all of **Slight** significance and therefore not considered significant in EIA terms. Mitigation measures reduce the significance of these to **Negligible**.

12. Noise

12.1. Introduction

- 12.1.1. This chapter assesses the potential noise effects during the construction phase of the Proposed Scheme. Construction vibration and operational noise and vibration effects were scoped out at the scoping stage.

Study Area

- 12.1.2. The study area has been defined as the area within 1km of the red line boundary for the construction works. The red line boundary includes the area required for the extraction, transport and deposition of the Phase 4 tip (see Volume 2: V2-S03-0001). This is a wider area than the typically taken for construction works but it was considered appropriate given the rural nature and the varying undulating topography of the area.

12.2. Legislation and Policy

Legislation

- 12.2.1. The Control of Pollution Act 1974 section 60 defines the control of noise on construction sites. Section 61 describes the obtention of prior consent for work on construction sites. In the same Act, section 71 requires Welsh Ministers (as transferees of the functions of the Secretary of State) to approve a code of practice for the carrying out of works to which section 60 applies. Section 72 defines Best Practicable Means when referred to construction.
- 12.2.2. The Noise from Audible Intruder Alarms (Wales) (Revocation) and Control of Noise (Codes of Practice for Construction and Open Sites) (Wales) Order 2017, approves British Standard BS 5228-1:A1:2014 for the purpose of giving guidance on appropriate methods for minimising noise from construction sites, as required by Section 71 of the Control of Pollution Act 1974.

Planning Policy

- 12.2.3. Planning Policy Wales Edition 10 of December 2018 constitutes the relevant national policy in terms of noise. The section about Restoration and Aftercare of Mineral sites does not include specific policies on noise.
- 12.2.4. Paragraph 6.7.26 of the Policy on Managing Potential Environmental Risk Arising through Construction Phases states that *“Planning authorities must consider the potential for temporary environmental risks, including airborne pollution... arising during the construction phases of development. Where appropriate, planning authorities should require a construction management plan, covering pollution prevention, noisy plant, hours of operation... and details for keeping residents informed about temporary risks.”*
- 12.2.5. Rhondda Cynon Taf Local Development Plan up to 2021 adopted March 2011 constitutes the relevant local policy in terms of noise. Policy AW 10 - Environmental Protection and Public Health states that *“Development proposals will not be permitted where they would cause or result in a risk of unacceptable harm to health and/or local amenity because of: ...;2. Noise pollution; Or any other identified risk to the environment, local amenity and public health or safety unless it can be demonstrated that measures can be taken to*

overcome any significant adverse risk to public health, the environment and/or impact upon local amenity.”

12.3. Guidance

12.3.1. The following guidance documents have been considered in this chapter:

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise;
- Minerals Planning Guidance: The Control of Noise at Surface Mineral Workings. (MPG 11 April 1993; Department of Environment and Welsh Office)⁷⁴; and
- Minerals Technical Advice Note 2: Coal, January 2009⁷⁵.

12.4. Assessment Methodology

Assessment of Short-term Impacts – Construction Phase

- 12.4.1. In addition to constituting the approved code of practice for the purpose of giving guidance on appropriate methods for minimising noise from construction sites, BS 5228-1 also includes several methodologies in order to assess the potential impacts arising from construction noise.
- 12.4.2. Table 12.1 shows the BS 5228-1 ‘ABC’ method, which categorises the sensitivity of the surrounding area to construction noise as a function of the current noise levels in that area. Thus, construction noise is more likely to be perceived to be present and intrusive in areas with low existing noise levels (Category A), than in areas with intermediate (Category B), or high noise levels (Category C).
- 12.4.3. Construction noise levels outside dwellings exceeding Table 12.1 thresholds for a relevant period of time are likely to cause an adverse effect. A relevant period of time is considered to be 10 days (or nights) in any 15 consecutive days or at least 40 days of any six consecutive months. If construction noise levels slightly exceed those thresholds levels for a short period of time are typically considered bearable for most of the population.

Table 12.1: BS 5228-1 ABC Method Threshold of Potential Significant Effects at Dwellings.

Period	Threshold value in dB $L_{Aeq,T}$		
	Category A ^A	Category B ^B	Category C ^C
Night-time (23:00-07:00)	45	50	55
Evening and weekends	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75

⁷⁴ <https://gov.wales/sites/default/files/publications/2019-01/minerals-planning-guidance-11.pdf>

⁷⁵ <https://gov.wales/sites/default/files/publications/2018-11/minerals-technical-advice-note-mtan-wales-2-coal.pdf>

Period	Threshold value in dB $L_{Aeq,T}$		
	Category A ^A	Category B ^B	Category C ^C
^A Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.			
^B Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.			
^C Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			
^D 1900-2300 weekdays, 1300-2300 Saturdays and 0700-2300 Sundays.			

- 12.4.4. For construction works involving substantial earth moving for a period in excess of six months, BS 5228-1 Section E.5 considers that these construction works might be more akin to surface mineral extraction than to conventional construction activity. In this situation, BS 5228-1 refers to the guidance contained within the Technical Guidance to the National Planning Policy Framework on Mineral Noise. BS 5228-1 then suggests that a limit of 55 dB $L_{Aeq,1h}$ (free-field) is adopted for daytime construction noise for these types of activities but only where the works are likely to occur for a period in excess of six months. It also informs that *“Precedent for this type of approach has been set within a number of landmark appeal decisions associated with the construction of ports.”*
- 12.4.5. The construction works object of this EIA (Phase 4) are expected to last approximately six months, with a high likelihood of this being exceeded slightly.

Sensitive Receptors

- 12.4.6. Noise-sensitive receptors are defined as any occupied premises outside a site used as dwellings (including gardens), places of worship, educational establishments, hospitals or similar institutions, or any other properties likely to be adversely affected by an increase in noise levels.
- 12.4.7. The effects of noise on noise-sensitive receptors are varied and complicated. They include interference with speech communication, disturbance of work or leisure activities, disturbance of sleep, annoyance and possible effects on mental and physical health. In any neighbourhood, some individuals will be more sensitive to noise than others.

Significance Criteria

- 12.4.8. After the assessment of short-term impacts in line with BS 5228-1, other considerations will be utilised to arrive to the conclusion on whether significant adverse effects are likely. Some of these considerations are as follows:
- Whether the adverse noise effects are limited to nuisance, causing a change of behaviour and therefore affecting the quality of life; or otherwise the adverse noise effects cause disturbance, potentially affecting health;
 - Whether the adverse noise effects are so widespread that affect the community as a whole; or otherwise only effect a very limited number of noise-sensitive receptors at a level which can be considered ‘private’; and
 - The duration of the adverse effects.

Limitations and Assumptions

- 12.4.9. A construction model has been created with the environmental noise prediction software CadnaA (version 2021 build 181.5100). CadnaA includes the prediction model of BS 5228-1 Annex F for estimating noise from construction sites.
- 12.4.10. The following assumptions apply to the assessment presented in this chapter:
- The transport of material between the extraction and Receptor Sites will require 15,000 truckloads approximately; over a period of approximately six months. It has been assumed an average of 135 to 140 HGVs movements per day evenly distributed over a working shift of 10 hours a day;
 - The construction works will be carried out by 3 excavators and 4 heavy goods vehicles (HGVs). The plant utilised in the Phase 2 and 3 works have been taken as a reference: a Volvo A20 and a Volvo A30 as HGVs; and a CAT 320 as an excavator. Since no noise emission data has been made available for these items of plant; data in BS 5228-1 Annex C Current sound level data on site equipment and site activities has been used. Specifically, the following sources from Table C.10 Sound level data on other quarries (i.e. sand and gravel):
 - Table C.10 item no 1: Tracked hydraulic excavator (face shovel extracting/loading dump trucks) with a sound pressure level at 10m of 80 dB $L_{Aeq,T}$; and
 - Table C.10 item no 19: Articulated dump truck (Transport of material) with a drive-by maximum sound pressure level 87 dB L_{Amax} measure at 10m;
 - Sound pressure levels of both excavators and HGVs have been entered with a spectrum of octave bands as reported in BS 5228-1 Table C.10;
 - The extraction area has been modelled as an area noise source at a height of 1.5m following the current topography of the Phase 4 tip; where two excavators and two HGVs have been modelled as moving sources over a 10-hour shift period;
 - The haul route between the extraction and Receptor Sites has been modelled as a linear noise source at a height of 1.5m above local ground with 14 HGVs per hour travelling at a speed of 10km/h;
 - The Receptor Site has been modelled as an area noise source at a height of 5m (the indicative average planned height of the material to be deposited); where two excavators and two HGVs have been modelled as moving sources over a 10-hour shift period;
 - The number of excavators modelled (two at the extraction area and two at the Receptor Site) is greater than the three excavators expected to be used during the works. Therefore, it is considered that the prediction model represents a reasonable worst-case scenario; and
 - No buildings' height data was available for this assessment. All buildings have been considered to have an average height of 8m above local ground.
- 12.4.11. The following limitations apply to the assessment presented in this chapter:

- Noise-sensitive receptors have been identified through the use of aerial photography such as OS Map, Google Maps, Google Earth and Bing Maps as well as through a site visit undertaken on 1 and 2 December 2020;
- Building layouts have been imported from OS Vector Map downloaded from the OS Open Data Hub. Building layouts are presented in simplified polygons;
- Topographic data has been downloaded as 2m Lidar Composite Dataset from the portal Lle – A Geo-portal for Wales⁷⁶;
- Construction assumptions have been provided by the design team. Different construction patterns may give rise to different noise levels; and
- No noise sources have been modelled for the construction compound, located to the north of the Receptor Site.

12.5. Baseline Conditions

Summary

- 12.5.1. The Proposed Scheme is located in a rural area to the east of Tylorstown. Tylorstown is a village crossed by the A4233, which constitutes the major noise source in the village. At the other side of the Afon Rhondda Fach, there are some scattered properties, which have been labelled in Figure 12.1 below: Blaenllechau towards the north west of the Llanwonno Upper Tip; Welshpoultry and Cefn llechau uchaf towards the south of the Receptor Site; and further east, Llanwonno. Towards the north east, there is St Gwyino Forestry where Daerwynno Outdoor Activity Centre is located.

⁷⁶ <http://lle.gov.wales/catalogue/item/LidarCompositeDataset/>

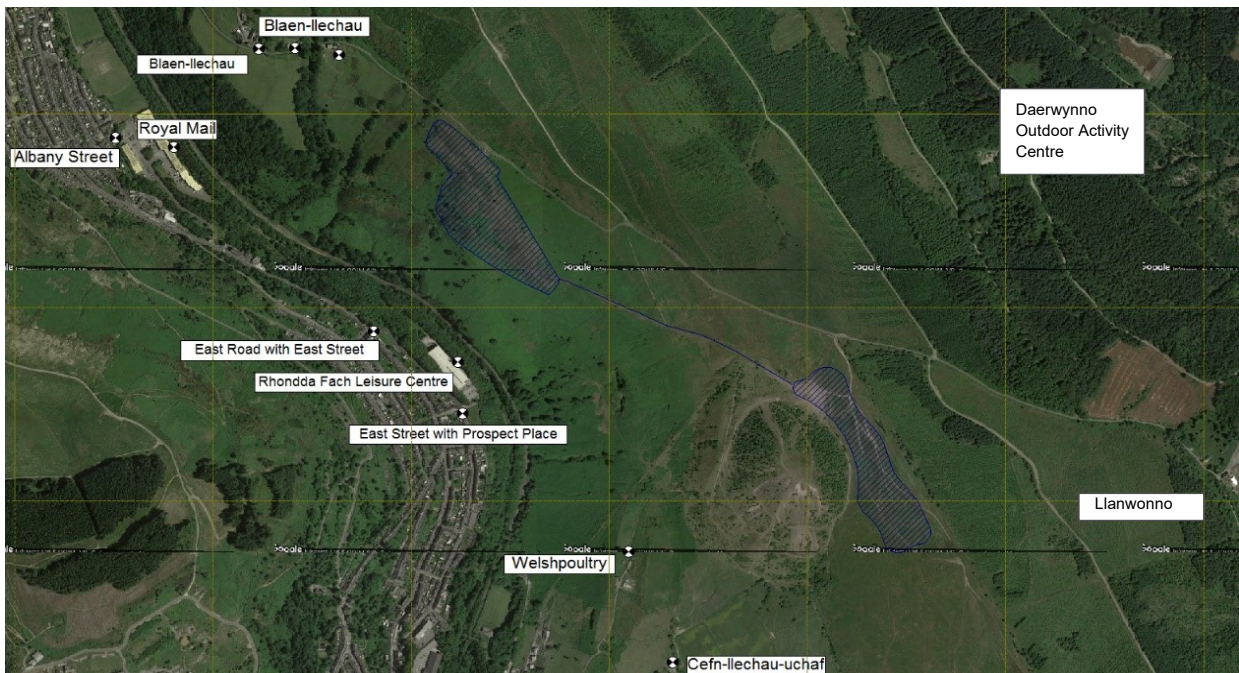


Figure 12.1: Noise-Sensitive Receptors in the Vicinity of the Proposed Scheme.

- 12.5.2. An acoustic consultant carried out a noise survey in the area on 1 and 2 December 2020 (see Volume 3 Appendix 12.1 for full report). Although unattended measurements had been planned, these were replaced by attended measurements since construction works related to the Phases 2 and 3 of the Project were taking place at the time, potentially falsifying results of an unattended survey. The survey aimed to define the acoustic character of the area.
- 12.5.3. Table 12.2 shows the results of the survey in terms of the residual noise level, i.e. the equivalent noise level without the influence of the Phases 2 and 3 of the works; and as the background noise level, i.e. the equivalent noise level which is exceeded 90% of the time. All measurements were carried out during daytime. Noise levels in the quietest area of Tylorstown are represented by the measurements at the area of the Rhondda Fach Leisure Centre. Residual noise levels are in the area of 48-49 dB $L_{Aeq,T}$ with the dominant noise source being road traffic noise from the A4233. Background noise levels are in the area of 41-42 dB $L_{A90,T}$. At the properties at Blaenllechau, residual noise levels ranged from 54 to 59 dB $L_{Aeq,T}$ due to traffic passing along the minor road in front of the properties. However, the background noise levels remained on 40-41 dB $L_{A90,T}$ showing that the increase in noise levels in the residual noise is due to just a small number of events (vehicles passing by). At Welshpoultry residual noise level ranged from 41 to 43 dB $L_{Aeq,T}$ with background noise levels ranging from 38 to 40 dB $L_{A90,T}$.
- 12.5.4. Therefore, all the noise-sensitive receptors surrounding the Proposed Scheme are in quiet locations and would be classified as Category A in Table 12.1 above. At Tylorstown the dominant noise source is road traffic. At Blaenllechau there is occasional road traffic noise with natural and agricultural sounds dominating during lulls. At Welshpoultry, the dominant noise source are natural and agricultural sounds.
- 12.5.5. Although Ferndale Shooting Club is located to the north west, there was no activity identified during the measurement period. In relation to the Motocross Track located to the

east of Llanwonno, there was some dirt bikes identified however there were not dominant and the exact location of the source was not determined.

Table 12.2: Noise Survey Results.

Measurement position	Measurement date	Residual noise dB LAeq,T	Background noise dB LA90,T
Blaenllechau*	01/12/2020	59.3	40.3
	02/12/2020	54.3	41.3
Welshpoultry*	01/12/2020	43.0	40.3
	02/12/2020	40.8	37.9
Rhondda Fach Leisure Centre*	01/12/2020	48.6	41.2
	02/12/2020	48.2	42.7
East Street (with Phase 2 and 3 construction works)*	02/12/2020	55.5	48.4

* Construction noise from Phases 2 and 3 was present at times but with no relevant influence on the measurement results.

** Construction noise was not audible during the survey with road traffic noise being the dominant source during the survey. See Appendix 12.1 for further details on the noise survey.

12.6. Preliminary Impact Assessment

Construction Phase

- 12.6.1. A noise model has been created to predict the expected noise levels during construction. Construction works include the extraction of material from the existing tip (RH01), the transport of this material along a haul route and the deposition of the material at the Receptor Site. The assumptions and working conditions introduced in the noise model have been detailed in the subsection Limitations and Assumptions in Section 12.4 above.
- 12.6.2. Table 12.3 shows the predicted noise levels at the surrounding noise-sensitive receptors. They are presented in terms of average noise levels (LAeq,10h) which represent the average noise level along a working day, where the different excavators and HGVs are working around each of the site areas. Construction noise levels are also presented in terms of the highest noise level (LAeq,1h,highest) which is the expected noise level if all the plant in an area (for instance, two excavators and two HGVs on the extraction tip site) were all concentrated in the area closest to the receptor. In practice, this would only occur occasionally.
- 12.6.3. Construction noise levels at Blaenllechau to the north east, and at Welshpoultry and Cefn llechau uchaf to the south are predicted to be around 50 dB LAeq,T. At the closest residential areas of Tylorstown (East Road and East Street), construction noise levels are predicted to be around 52 to 55 dB LAeq,T, but not exceeding 55 dB LAeq,T. Construction noise levels above 55 (56.6 dB LAeq,1h,highest) are only expected occasionally at Rhondda Fach Leisure Centre with typical levels being around 54 dB LAeq,T.

Table 12.3: Predicted Construction Noise Levels as Daily Average and as Highest Levels.

Receiver		Construction noise levels	
Name	Receiver ID	L _{Aeq,10h} [dB(A)]	L _{Aeq,1h,highest} [dB(A)]
Cefn llechau uchaf	S_01	47.9	49.0
Welshpoultry	S_02	50.0	52.0
Blaenllechau	NW_01	51.2	53.1
Blaenllechau	NW_02	50.3	50.7
Blaenllechau	NW_03	49.2	48.3
East Street with Prospect Place	T_01	52.7	54.7
Rhondda Fach Leisure Centre (non-residential)	T_02	54.3	56.6
East Road with East Street	T_03	53.5	53.5
Royal Mail (non-residential)	T_04	48.0	52.1
Albany Street	T_05	46.9	53.2

- 12.6.4. Table 12.4 shows the partial construction noise levels at each receptor expected to come from the different areas of the Proposed Scheme. The works at the Receptor Site are likely to be only noticeable at Cefn llechau uchaf with construction noise levels at the other receptors being clearly below background noise levels. Construction noise levels at Blaenllechau and in Tylorstown might be noticeable at times when works are undertaken at the extraction area and the haul route.

Table 12.4: Typical Construction Noise Levels at Each Representative Noise-Sensitive Receptor in Function if the Works Occur on the Existing Tip, Haul Route or Receptor Site.

Name	Extraction Tip Phase 4 dB L _{Aeq,T}	Haul Route dB L _{Aeq,T}	Receptor Site dB L _{Aeq,T}
Cefn llechau uchaf	40.9	45.1	42.2
Welshpoultry	44.0	48.6	29.3
Blaenllechau	49.6	45.6	35.3
Blaenllechau	48.4	45.3	35.2
Blaenllechau	46.8	45.0	34.8
East Street with Prospect Place	50.1	49.4	26.0
Rhondda Fach Leisure Centre	52.5	49.6	25.7
East Road with East Street	52.0	48.1	28.9
Royal Mail	45.2	44.5	29.6
Albany Street	43.6	44.0	30.3

- 12.6.5. As detailed in Section 12.4 Assessment Methodology, BS 5228-1 suggests a limit of 55 dB L_{Aeq,1h} (free-field) for daytime construction noise for earth moving activities likely to occur for a period in excess of six months. As shown in Table 12.3 above this limit is not exceeded in any residential receptor and it is only expected to be exceeded occasionally at Rhondda Fach Leisure Centre.
- 12.6.6. Figure 12.2 shows the predicted typical construction noise levels at a height of 4 metres above the local ground. Within the grey area, construction noise levels range from 50 to 55 dB L_{Aeq,T} whereas within the yellow areas they range from 45 to 50 dB L_{Aeq,T}. Construction noise levels at Llanwonno and at St Gwyno Forestry, where Daerwynno Outdoor Activity Centre is located, are predicted to be below 35 dB L_{Aeq,T}.

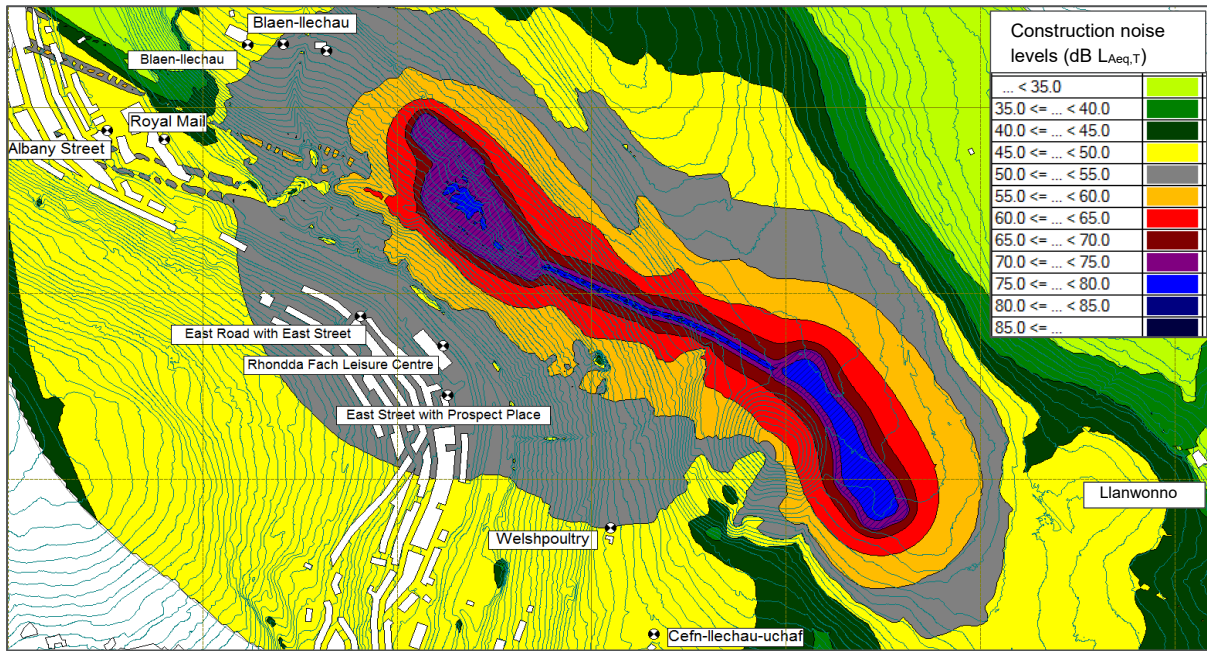


Figure 12.2: Construction Noise Levels dB L_{Aeq,T} at a Height of 4m Above Local Ground.

12.6.7. Figure 12.3 shows the view of the construction works from the area of Blaenllechau. The extraction site (RH01) is seen in blue with the haul route going upwards towards the Receptor Site which its only visible for a small area located 5m above the existing ground.

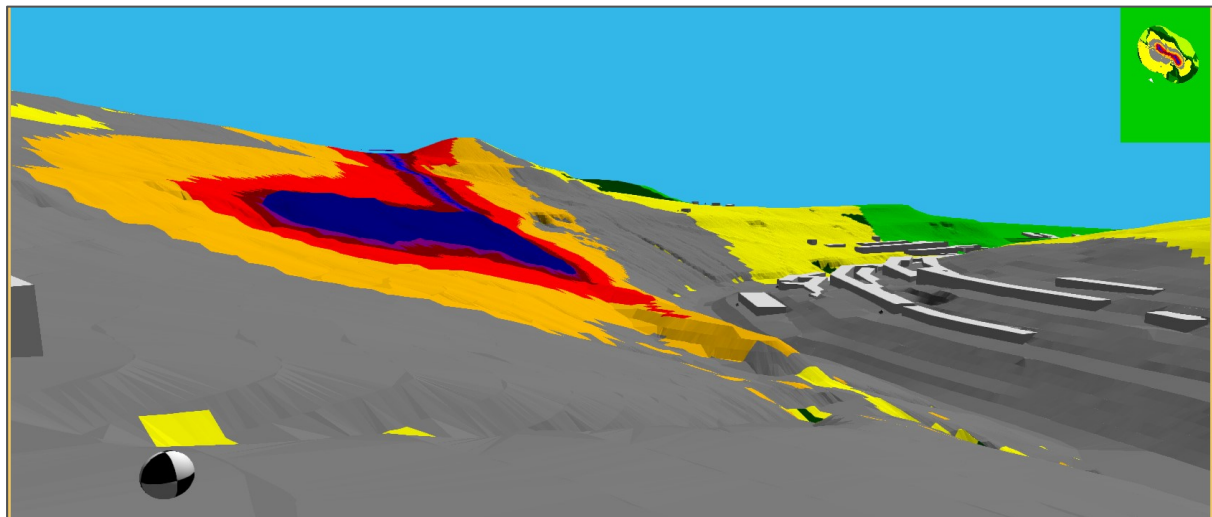


Figure 12.3: View of the Works From the Area of Blaenllechau with Tylorstown on the Right.

12.6.8. Figure 12.4 shows the view from Tylorstown at the junction between East Road and East Street. The extraction site (RH01) is seen in blue with the haul route going upwards towards the Receptor Site which is not visible from this area.

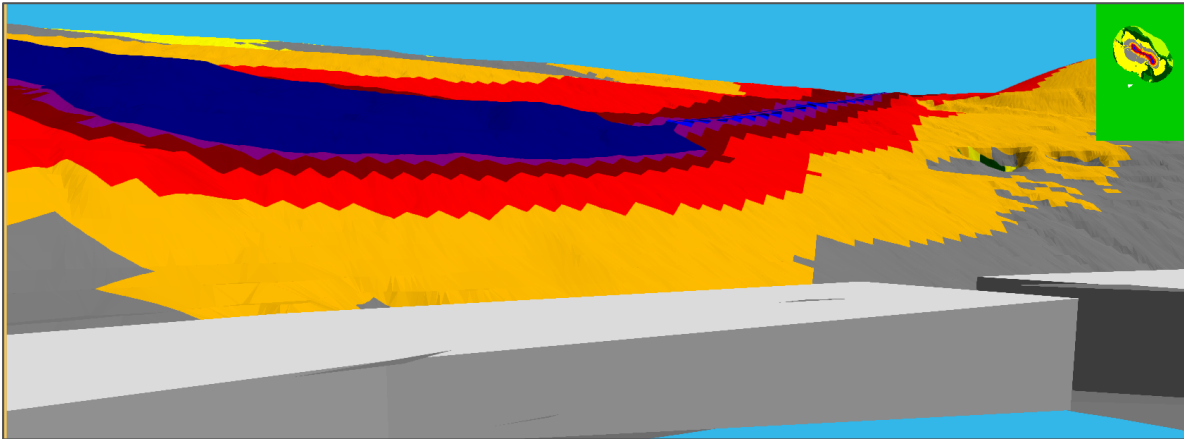


Figure 12.4: View of the Works From the Area of Tylorstown (East Road with East Street).

12.6.9. Figure 12.5 shows the view of the construction works from the area of Cefn llechau uchaf. The extraction site and the haul route are seen at the background. The Receptor Site is seen to the right at a height of 5m above the existing ground.

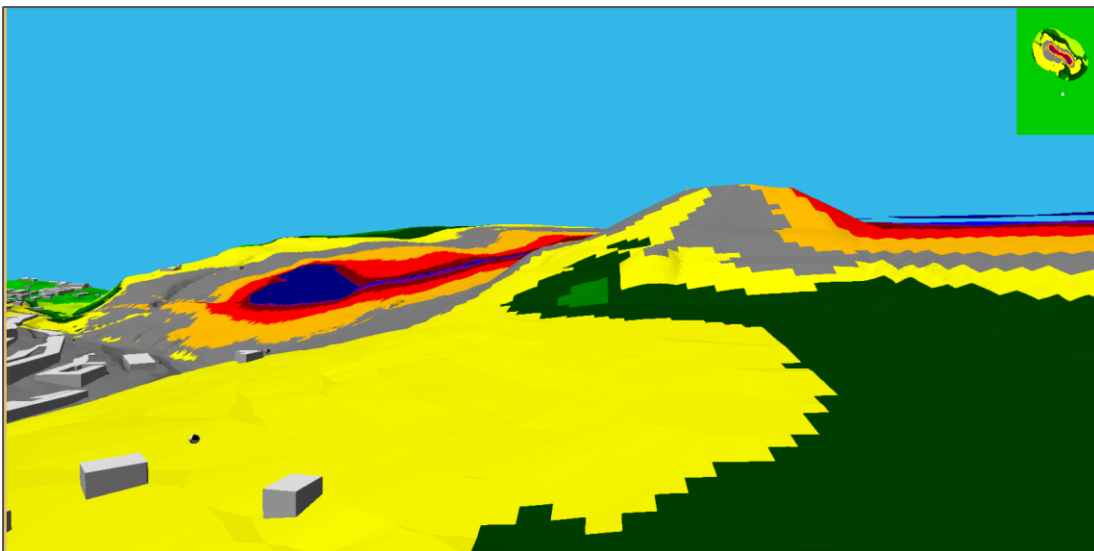


Figure 12.5: View of the Works From the Area of Cefn llechau uchaf. The Receptor Site is Seen on the Right Edge as a Thin Blue Line at a Height of 5m Above Local Ground.

Summary

12.6.10. BS 5228-1 suggests a limit of 55 dB $L_{Aeq,1h}$ (free-field) for daytime construction noise for earth moving activities likely to occur for a period in excess of six months. This limit is not exceeded at any residential receptor and it is only expected to be exceeded occasionally at Rhondda Fach Leisure Centre.

12.7. Mitigation, Enhancement and Monitoring

Short-term Impacts

- 12.7.1. The following mitigation in the form of best practicable means is envisaged:
- Construction works should only take place during weekdays daytime and Saturday mornings; and
 - The number and type of items of plant will be in line with the limitations and assumptions stated in subsection Limitations and Assumptions in section 12.4.

12.8. Residual Impact Assessment

Construction Phase

- 12.8.1. Adverse effects during construction could occur if works were undertaken during night-time.
- 12.8.2. BS 5228-1 suggests a limit of 55 dB $L_{Aeq,1h}$ (free-field) for daytime construction noise for earth moving activities likely to occur for a period in excess of six months. This limit is not exceeded at any residential receptor and it is only expected to be exceeded occasionally at Rhondda Fach Leisure Centre. Both adverse effects and significant adverse effects are considered negligible when mitigation is taken into account.

12.9. Cumulative Effects

- 12.9.1. Phase 4 is expected to last for a period of approximately six months. The type of noise produced by Phase 4 will be of similar nature to the construction noise of both Phases 2 and 3. Since Phase 4 will not be carried out in parallel to Phases 2 and 3, the cumulative effects of Phase 4 at continuation of Phases 2 and 3 is still considered negligible as stated in early section 12.8.

12.10. Summary

- 12.10.1. This chapter has assessed the potential noise effects during the construction phase of the Proposed Scheme. BS 5228-1:A1:2014 is the approved code of practice for the purpose of giving guidance on appropriate methods for minimising noise from construction sites, as required by Section 71 of the Control of Pollution Act 1974.
- 12.10.2. BS 5228-1 suggests a limit of 55 dB $L_{Aeq,1h}$ (free-field) for daytime construction noise for earth moving activities likely to occur for a period in excess of six months. This limit is not exceeded at any residential receptor and it is marginally exceeded occasionally at Rhondda Fach Leisure Centre (a non-residential receptor). Consequently, noise adverse effects during construction are considered negligible.
- 12.10.3. Construction vibration and operational noise and vibration effects were scoped out at the scoping stage.

13. Major Accidents and Disasters

13.1. Introduction

- 13.1.1. This chapter assesses the impact of the Proposed Scheme on Major Accidents and Disasters as well as the vulnerability of the Proposed Scheme to Major Accidents and Disasters.
- 13.1.2. Major Accidents and Disasters are considered to be natural or man-made events with a low likelihood of occurring but that would have high consequences, such as the loss of life or significant disruption or damage to infrastructure. In the EIA Regulations 2017, Schedule 4, Part 8 states: 'a description of the expected significant effects of the development on the environment deriving from the vulnerability of the proposed development to risks of major accidents and/or disasters which are relevant to the project concerned.'
- 13.1.3. IEMA's 'A Major Accidents and Disasters Primer' (IEMA Primer)⁷⁷ defines Major Accidents and Disasters as the following:
- **Major accident** – *'an event (e.g. road traffic incident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives.'* They can be caused by both man-made and natural disasters.
 - **Disaster** – *'a man-made/external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident'.*
- 13.1.4. The assessment of this topic differs from the other topics assessed within EIA as it is driven towards the identification of hazards and the assessment, as well as management of risks/safety issues to both human and environmental receptors, rather than just an assessment of environmental impacts. In order to do so, this chapter sets out the current baseline in terms of hazards and receptors before identifying risks associated with the proposed development and proposing mitigation measures to reduce them.

Study Area

- 13.1.5. The geographical scope of this chapter (the 'study area') will cover the immediate extent of the Proposed Scheme area, as any areas that could theoretically be subjected to slips, both currently and as a result of the Proposed Scheme.

13.2. Legislation and Policy

- 13.2.1. The following list sets out the principal legislation and European, national, regional, and local policies of relevance to the assessment on Major Accidents and Disasters.

⁷⁷ IEMA, 2020. Major Accidents and Disasters in EIA: A Primer. Available here: <https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer>

Legislation

EU Regulation 402/2013 on the Common Safety Method of Risk Evaluation and Assessment (CSM-RA) (as amended by Regulation EU 2015/1136)

- 13.2.2. This Regulation is used throughout the rail industry, and although this project is not rail based, the Regulation contains an effective structure for assessing hazards, risks and safety which can also be applied to the assessment of Major Accidents and Disasters for the Proposed Scheme.

Construction (Design and Management) Regulations 2015 (CDM Regulations)

- 13.2.3. The CDM Regulations aim to improve health and safety and apply to all construction projects from concept through to completion. Therefore, they have been applied to the Proposed Scheme throughout the development process.
- 13.2.4. The CDM Regulations state that there are five key elements to securing construction health and safety. These include:
- management of risks through application of the general principles of prevention;
 - appointment of the right people and organisations at the right time;
 - making sure everyone has the information, instruction, training and supervision they need to carry out their jobs in a way that secures health and safety;
 - cooperation and communication; and
 - consultation and engagement with workers to promote and develop effective measures to secure health, safety and welfare.
- 13.2.5. The CDM Regulations make sure that the risk of the Proposed Scheme is reduced as far as is reasonably practical.

Health and Safety at Work Act 1974

- 13.2.6. This piece of legislation provides the framework for the regulation of workplace health and safety in the UK. It places general duties on employers, people in control of premises, manufacturers and employees. The main principle is that foreseeable risks to persons will be reduced so far as is reasonably practical and that adequate evidence will be produced to demonstrate that this has been done, including:
- Securing health, safety and welfare of persons at work; and
 - Protecting persons other than persons at work against risks to health or safety arising out of or in connection with the activities of persons at work.

Local Policy

Rhondda Cynon Taf County Borough Council (RCT) County Borough Emergency Plan⁷⁸

- 13.2.7. The Emergency Plan is written to be activated “*if an emergency reaches the point where it exceeds the capability of individual Services to respond and manage independently*”. The objectives of RCT’s Emergency Plan are the following:
- To ensure a coordinated major incident response and the continuity of service delivery;
 - To provide generic guidance on the response to emergencies;
 - To outline emergency management and business continuity responsibilities of the Council; and
 - To ensure control is established at a senior level within the service areas affected.
- 13.2.8. Processes stated in the Emergency Plan would come into focus if there was a ‘major incident’, which is defined in the Plan as ‘*any emergency that requires the implementation of special arrangements by one or more of the emergency services, the NHS or local authority.*’
- 13.2.9. In Section 16 of the County Borough Emergency Plan 2020, ‘Potential emergencies’ include ‘*land movement or other associated geological problems*’ that require ‘*specific contingency arrangements be prepared*’ and this would include landslides. In an event like a landslide, that has been defined as a major incident, the Duty Officer would be immediately notified, so that the precise nature of the incident can quickly be defined. The plan also states that a response would include, not exclusively, the input of the following key organisations:
- Appropriate services of RCTCBC;
 - South Wales fire service;
 - South Wales police;
 - The Welsh Ambulance Services National Health Service Trust; and
 - Cwm Taf Morgannwg University Health Board.
- 13.2.10. The South Wales Local Resilience forum would also ensure that a cooperative response is coordinated.

13.3. Guidance

Major Accidents and Disasters in EIA: A Primer (IEMA, 2020)

- 13.3.1. This primer published by IEMA is the first concerted attempt at providing a robust assessment methodology for Major Accidents and Disasters, based on known current practice within the UK. It identifies key terminology to be used and has been structured

⁷⁸ Rhondda Cynon Taf County Borough Emergency Plan, 2020. Available here: <https://www.rctcbc.gov.uk/EN/Resident/EmergenciesSafetyandCrime/RelatedDocuments/CountyBoroughEmergencyPlanMarch2020.pdf>

around a typical assessment approach to offer a proportionate method for considering major accidents and/or disasters through screening, scoping and assessment.

13.4. Assessment Methodology

- 13.4.1. The Cabinet Office of National Risk Register of Civil Emergencies (2017) has been used to identify potential risks to the environment through accidents and disasters, however this document only considers potential risks in the following five years from its publication, which was in 2017. The lifespan of the project will be beyond this timescale and so other risks have been identified for the longer-term such as effects from climate change.

Assessment of Impacts

- 13.4.2. Potential hazards that can occur during the construction and operation phases of the Proposed Scheme are separated into the following groups shown in Table 13.1 below.

Table 13.1 Hazard groups and example risks

Hazard group	Example risks
Transport	Major road traffic accident
	Collapse/damage to structures
Climate change driven extreme weather events	Storm damage, direct or indirect, to assets during construction or operation
	Flooding during construction or operation
Ground hazards	Subsidence during operation
	Sinkholes during construction or operation
	Landslip during construction or operation
	Earthquakes during construction or operation

- 13.4.3. In order to determine if there is a risk to environmental receptors there must be a clear linkage from the source of the risk (the hazard), via a pathway, to the potential receptors. Assessment of risk has been limited to consideration of only those that have the potential to create severe immediate and/or long-term effects on environmental receptors. Effects which are not of severe significance, which are short-term or are immediately remediable are not considered here. Additionally, potential risks to project staff are not considered here as they are anticipated to be assessed under contractor-based site-specific assessments.

Sensitive Receptors

- 13.4.4. Sensitive receptors are identified through a review of base mapping and aerial photography. The sensitive receptors for Major Accidents and Disasters are likely to align with those considered under other EIA topics, therefore consultation with other technical chapter topic leads has been undertaken to recognise receptors that have been identified within their

environmental topics, such as within Biodiversity and Water Environment & Flood Risk. These receptors include:

- local residents and local amenity users;
- ecological features located within and below Llanwonno Tip and the proposed Receptor Site, including Old Smokey slopes SINC; and
- the Afon Rhondda Fach.

Significance Criteria

13.4.5. Unlike other EIA topics in the ES, this chapter does not use a standard EIA matrix. The methodology developed for assessing the risk of Major Accidents and Disasters to human and environmental receptors will involve the following steps:

- evaluating the severity/consequences of the events;
- determine the likelihood of occurrence of the events; and
- assess the risk posed by each event and the tolerability of the risk(s).

13.4.6. Severity and likelihood of events in relation to receptors will be defined using the terms defined in Table 13.2 and Table 13.3 respectively.

Table 13.2 Definition of Likelihood in Safety Risk Ranking Matrix

Likelihood	Definition
Extremely unlikely	$<10^{-5}$ to 10^{-3} /year, less than once per 100,000
Very unlikely	10^{-5} to 10^{-3} /year, between once per 100,000 and once per 1000 years
Unlikely	10^{-3} to 10^{-1} /year, between once per 1000 and once per 10 years
Reasonably likely	10^{-1} to 1/year, between once per 10 years and once per year
Likely	>1 per year, greater than once per year

Table 13.3 Definition of Severity in Safety Risk Ranking Matrix

Severity	Definition (human receptors / environmental receptors)
None	No injury or damage / No damage
Minor	Nuisance offsite / Damage to locally significant environmental receptors
Significant	Short term, minor effects / Damage or loss to nationally significant environmental receptors
Severe	Few people require hospital treatment. Emergency plan in operation / Reversible loss of Internationally significant environmental receptors
Major	Serious injuries. Tens in hospital / Permanent irreversible loss of Internationally significant environmental receptors
Catastrophic	One or more fatalities. Several serious injuries

- 13.4.7. The Major Accidents and Disasters Safety Risk Assessment Matrix in Table 13.4 will be used, to assign a risk category to the potential events and identify whether it is tolerable.
- 13.4.8. The risk assessment will consider the Proposed Scheme design and embedded mitigation. This assessment will apply expert judgement to identify material adverse events and determine any intolerable risks. Assessment of risk tolerability for Major Accidents and Disasters in the UK generally incorporates consideration of the ‘as low as reasonably practicable’ (ALARP) principle, meaning that intolerable risk should be eliminated and that any residual risk should be reduced where practicable.

Table 13.4 Major Accidents and Disasters Safety Risk Assessment Matrix

		Likelihood				
		Extremely unlikely	Very unlikely	Unlikely	Reasonably likely	Likely
Severity	None					
	Minor					
	Significant					
	Severe					
	Major					
	Catastrophic					
Risk categories						
Tolerable Risk - Manage for continuous improvement		Tolerable Risk if ALARP (incorporate risk reduction measures)		Intolerable Risk		

Limitations and Assumptions

- 13.4.9. The assessment primarily focuses on Major Accidents and Disasters associated with the slip of material within Llanwonno Upper Tip and Old Smokey and does not account for any other type of landslips in the area. It also does not account for any accidents and disasters from sources other than those that have been identified and considered below.

13.5. Baseline Conditions

- 13.5.1. In Tylorstown, the risk of natural disasters is typically related to flooding, climate and storm events. This includes the landslide that occurred on Sunday 16th February as a result of Storm Dennis, which caused the Llanwonno Upper Tip to fail and slip above the village of Tylorstown. It is the remaining material that has not slipped, that is being moved to a safer location as part of the Proposed Scheme.
- 13.5.2. As discussed in Chapter 1 of this report, the landslide led to approximately 28,000m³ of colliery material filling the bottom of the valley from the toe of the slope outwards in an extremely low angled and widely distributed debris envelope. This filled the channel of Afon Rhondda Fach and diverted its course to the western side of the valley bottom. The slipped material also covered an essential water main and disused railway, also fracturing a foul water sewer. The objective of the Proposed Scheme is to prevent any further slips of material in this very steep sided valley through relocation of approximately 160,000m³ of material from below Llanwonno Upper Tip.
- 13.5.3. The site is not at risk of fluvial flooding but there is a level of surface water flooding in the area. Risks related to surface water flooding are assessed in more detail in Chapter 11 'Water Environment and Flood Risk' and a drainage strategy (Appendix 11.2) has been developed to manage these risks in relation to the Proposed Scheme. Currently, there are temporary drainage measures in place from Phase 1 remediation works to control the flow of several watercourses above the slip.
- 13.5.4. According to the Coal Mining Risk Assessment (CMRA) (Appendix 10.2) quarries are present at the level of Llanwonno Upper Tip, both up and down valley, and there is a likelihood that a buried quarry lies beneath the southern end of Llanwonno Upper Tip.

Historical Context

- 13.5.5. Tylorstown and the surrounding area has a 100-year history of colliery mining. The first colliery mines (Pendyrys colliery, also known later as No.6 and No.7 tips) were sunk in Tylorstown between 1873 and 1876 by Tylor's Colliery Company, after Alfred Tylor bought the mineral rights of Pendyrys farm in 1872.
- 13.5.6. These mines were part of the Ferndale Colliery that was a series of nine mines located around Ferndale. The first was Ferndale No.1 developed in Blaenllechau in 1857 and the final, No.9, was developed in 1907. By the 1930's, all but three of the mines were still in operation until the entire complex was closed by the National Coal Board in 1959. For more specific detail about the mining history of the site see Table 3.0 in Appendix 10.2.

Slope Stability

- 13.5.7. A slope stability assessment was conducted by Capita (Redstart) in 2020 (Appendix 13.1). This concluded that the remaining Llanwonno Upper Tip complex is at approximate unity in terms of overall global stability with a Factor of Safety (FoS) of 1.00. The FoS quantifies how much stronger a system is than required and for reliability, structures are typically built

stronger than necessary. For this assessment, the FoS set out in the Mines and quarries (Tips) Regulations (1971) and the National Coal Board (NCB) 'Codes and Rules – Tips' (1971) were used, requiring a minimum FoS of 1.20 for closed classified tips where water tables are known (such as the Proposed Scheme).

- 13.5.8. In relation to the Proposed Scheme, the reprofiling of the Upper Tip area, combined with drainage measures to control surface and groundwater levels, increases the stability of the area, achieving a FoS of 1.20 in the landslide and north-eastern areas (Figure 13.1), and a FoS of 1.30 for the south-western area in line with the FoS suggested in the Regulations.
- 13.5.9. The slope stability report also identified that the overall stability of the Upper Tip is sensitive to changes in groundwater levels, therefore the Proposed Scheme will implement a robust and well-maintained drainage system to keep surface and ground water levels at acceptable levels.

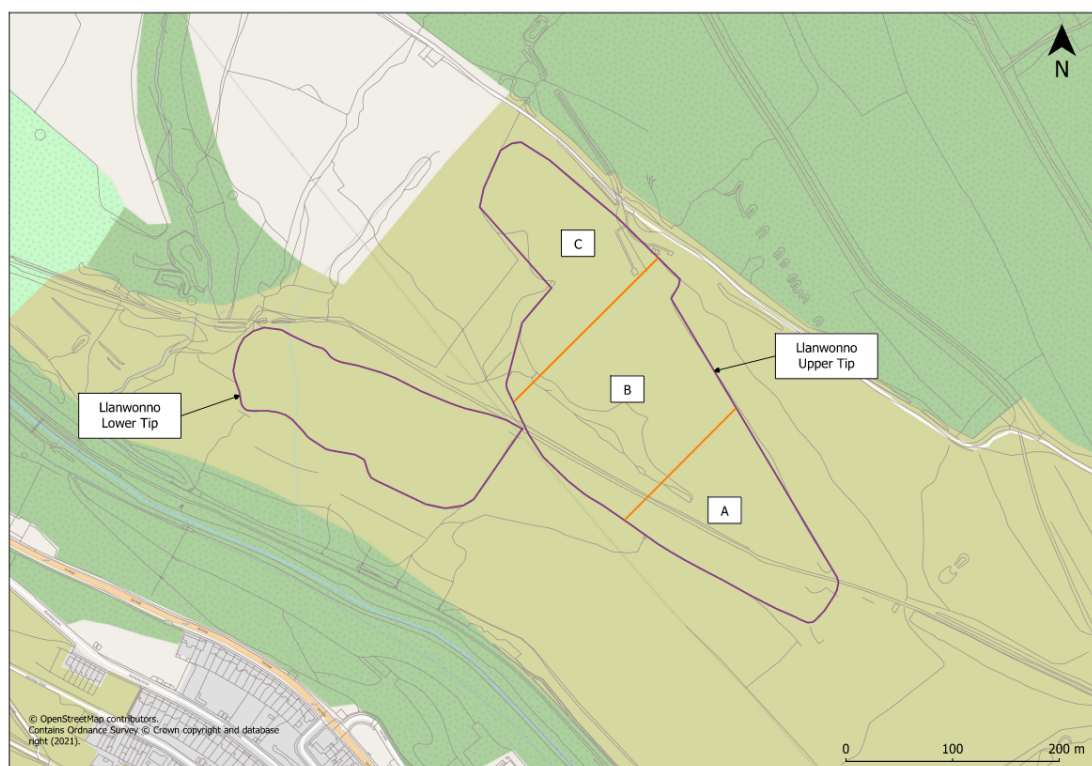


Figure 13.1 Aerial view of Llanwonno Upper and Lower Tips (prior to landslide) and areas divided as in stability report. A) south-western area, B) landslide area and, C) north-eastern area (this figure is to give an idea of the location of the areas in relation to the Proposed Scheme. For specific details on the location of each area see Appendix 13.1).

Key Receptors

- 13.5.10. Key receptors of Major Accidents and Disasters include:

- Rhondda Fach Leisure Centre;
- Residents of Tylorstown;
- NCN Route 881 running below the slip site;
- Recreational users (pedestrians and cyclists) of the local area around the site;
- and

- The Afon Rhondda Fach, the river that flows in the valley below the site.

- 13.5.11. There are no historical or active landfills or waste sites within 500m of the site.
- 13.5.12. According to the Groundsure Report page 41, 4no. Some Category 3 – Minor Pollution Incidents - have been identified within a 500m radius of the site. The most recent was in 2013 and therefore all are considered historical. These previous pollution incidents are unlikely to have an impact on the Proposed Scheme.
- 13.5.13. The site is within an area of low risk to unexploded ordnance according to risk maps provided by Zetica UXO Ltd.

Local Emergency Services

- 13.5.14. The closest fire station is Ferndale fire station and there is a police station within Tylorstown, although these are both small stations that, in a large-scale emergency, would require support from the surrounding areas.
- 13.5.15. The nearest 24-hours hospital with an A&E is Royal Glamorgan Hospital in Ynysmaerdy, Talbot Green, 11km away, with Prince Charles Hospital in Merthyr Tydfil 14km away and Princess of Wales Hospital 16.8km away from the Proposed Scheme, in Bridgend. The closest hospital is Ysbyty Cwm Rhondda, 1.1km away, however, it is not 24-hours and only has a minor incidents unit.

Emergency Access

- 13.5.16. For access to the site during an emergency response, Blaenllechau Road, a B Road, runs adjacent to the Proposed Scheme and will serve as the access road to the site. The entrance to the site will be located on Blaenllechau Road (ST 01544 96211), from where an access track will lead to the main haul route (currently disused tramway/footpath). For access to the bottom of the site during an emergency the NCN Route 881 could potentially be used.
- 13.5.17. Blaenllechau Road connects Ferndale (via Commercial Street) to the small village of Llanwonno and eventually heads towards Pontypridd, approximately 7.7km to the south. However, this is not a main route between Ferndale and Pontypridd. Blaenllechau Road is also not used by any public transport providers.
- 13.5.18. The A4233 is the main road that runs through Tylorstown and links up several settlements in the Rhondda Fach valley, such as Maerdy, Ferndale and Porth. The road connects to the A4233 via Commercial Street and Station Street, northwest of the Proposed Scheme.
- 13.5.19. To the west of Stanleytown the A4233 connects to the B4512 Penrhys Road which leads to Penrhys and Ystrad. This would be the main route to access the site.
- 13.5.20. A number of minor and unnamed roads connect to Blaenllechau Road within 1km of the Proposed Scheme, providing access to farms, St Gwyno Forestry and Ferndale Shooting Club amongst others. One of these minor roads is Farm Road, to the south of the Proposed Scheme, which links up to Blaenllechau Road via an unnamed track road and to Stanleytown, south of Tylorstown.

13.6. Preliminary Impact Assessment

- 13.6.1. This assessment of Major Accidents and Disasters will focus on the hazard groups of transport, utilities, climate change and extreme weather events, and ground hazards, e.g.

impacts and effects of potential land slips on local receptors, as well as any additional impacts occurring as result. These risks are shown in Table 13.5 and are discussed in more detail under the subheadings ‘*construction phase*’ and ‘*operation phase*’ below.

Construction Phase

- 13.6.2. The landslide that moved the material down into the valley was caused by heavy rainfall, and so there is the potential that further slips could occur during construction. However, geotechnical surveys and groundwater monitoring during construction will be undertaken, for more information see the ground Investigation (GI) scope (Appendix 8.3). Additionally, best practice measures will be followed to ensure that the likelihood of this worst-case impact occurring is low.
- 13.6.3. Impacts caused by severe weather events such as flooding, droughts/heatwaves, snow etc. could cause risk to the construction workers on site, and the location of the site on the top of a steep valley increases the risks that these weather events could cause, however, best practice measures will be implemented and followed on site which will prevent these events causing significant harm to as low as reasonably practical.
- 13.6.4. Major Accidents and Disasters caused by transport, in particular construction traffic, have been identified as being unlikely during the construction of the Proposed Scheme due to the haulage route being off public highways and not interacting with aspects external to the red line boundary of the site. Therefore, construction traffic and transport are not considered likely to cause a significant impact or risk (refer to the Transport Statement submitted with this application for more information).

Operation Phase

- 13.6.5. The operation phase of the Proposed Scheme will be passive; therefore, the Proposed Scheme will not be contributing to increased risks during operation. The operational phase of the Proposed Scheme will most likely reduce the risk of the area to Major Accidents and Disasters as the Receptor Site is in a much safer location that is much more stable than the current location of the material. It is located away from the steep slope of the valley, where it will also be further away from receptors in the valley such as the river and facilities (e.g. the Rhondda Fach Leisure Centre) of Tylorstown.
- 13.6.6. Ground water during operation of the Proposed Scheme has the potential to cause instability of the Receptor Site so this needs to be managed through installation of drainage and monitoring post-construction.

Table 13.5 Potential hazards to the construction phase of the Proposed Scheme

Hazard Group	Major Event Type	Relevance to Scheme - Reasons	Relevant Receptors	Likelihood	Severity	Pre-Mitigation Risk
Transport	Major road traffic accident	The Proposed Scheme will not involve the use of any public highways. All movement of construction vehicles will occur within the red line boundary.	Construction vehicles, site workers and plant as well as local traffic.	Unlikely	Minor	Tolerable
	Collapse/damage to structures	The Proposed Scheme does not involve the building of or on any permanent structures interacting with traffic.	N/A	N/A	None	Tolerable
Utilities	Gas explosion from gas mains	There are no gas mains on site so gas explosions on site from gas mains is not a risk.	N/A	N/A	None	Tolerable
	Ground instability/collapse from high-pressure water main leak	No water mains on the site.	N/A	N/A	None	Tolerable
	Electrocution	No power lines crossing the site.	N/A	N/A	None	Tolerable
Climate change driven extreme weather events	Storm damage – heavy rain, thunderstorms, direct or indirect to assets	The Proposed Scheme is on top of the valley and can be vulnerable to storms.	Construction workers Construction plant	Reasonably likely	Minor	Tolerable
	Coastal Flooding	The site is inland.	N/A	N/A	None	Tolerable
	Fluvial Flooding	The site is on the side of quite a steep valley (see water chapter for more details).	Construction vehicles, plant and workers	Extremely unlikely	Minor	Tolerable

Hazard Group	Major Event Type	Relevance to Scheme - Reasons	Relevant Receptors	Likelihood	Severity	Pre-Mitigation Risk
	Pluvial (surface water) Flooding	Surface flooding is known to occur around the site during periods of heavy rainfall (see water chapter for more details).	Construction workers Construction plant and vehicles	Likely	Minor	Tolerable
	Groundwater flooding	Area is very receptive to high levels of rainfall and excess ground water may cause instability in the ground in the area.	Construction workers Recreational users of the footpaths	Unlikely	Minor	Tolerable
	Droughts/Heatwaves	Significant droughts and heatwaves are relatively uncommon in Wales; however, it is still a risk.	Construction workers	Reasonably likely	Minor	Tolerable
	Wildfires: forest fire, bush/brush pasture	The Proposed Scheme is located next to a forest and in a rural area with minimal buildings/infrastructure. In times of drought wildfires are possible.	Construction workers Recreational users of the area	Unlikely	Significant	Tolerable
	Sub-zero temperatures and heavy snow	Weather in the location of the Proposed Scheme can get below zero, and snowfall and icy conditions can occur.	Construction workers	Likely	Minor	Tolerable
	Poor air quality	The Proposed Scheme site is not within a built-up urban area, but large quantities of soil are being relocated so dust production will occur.	Construction workers	Likely	Minor	Tolerable
Ground hazards	Subsidence	The Proposed Scheme is within an area which has an extensive mining history, there is potential that subsidence and sinkholes may occur on site. However, the CMRA (Appendix 10.2) confirms that all subsidence	Construction workers and plant	Unlikely	Significant	Tolerable
	Sinkholes		Construction workers and plant	Unlikely	Significant	Tolerable

Hazard Group	Major Event Type	Relevance to Scheme - Reasons	Relevant Receptors	Likelihood	Severity	Pre-Mitigation Risk
		associated with coal extraction from the seams within the red line boundary should have now ceased.				
	Landslips	The area has had landslips in the past and another could occur during the Proposed Scheme. The aim of the Proposed Scheme is to reduce the risk of this in the future, however.	Construction workers Afon Rhondda Fach Rhondda Fach Leisure Centre Residents of Tylorstown NCN Route 881 and users	Unlikely	Severe	Tolerable – if ALARP
	Earthquakes	The Proposed Scheme is not in or close to an active area. Any earthquakes in the area rarely cause damage.	Construction workers and plant	Extremely unlikely	Minor	Tolerable
	Mines and storage caverns	The Proposed Scheme is within an area which has an extensive mining history. The material that is being relocated is colliery material from a historic mine. The CMRA (Appendix 10.2) confirmed that there were shallow workings beneath the haul road, but these will be at least 30m depth. There are no other historical adits located within the red line boundary of the Proposed Scheme.	Construction workers and plant	Unlikely	Severe	Tolerable – if ALARP
	Unexploded Ordnance (UXO)	The Proposed Scheme is in a low risk area for UXO.	Construction workers and plant	Extremely unlikely	Severe	Tolerable

Hazard Group	Major Event Type	Relevance to Scheme - Reasons	Relevant Receptors	Likelihood	Severity	Pre-Mitigation Risk
	Gas explosion from mines	There is no mine gas recorded within 500m of the site boundary. The CMRA confirmed that the Coal Authority has no record of mine gas emission requiring action (Appendix 10.2).	Construction workers and plant	Extremely unlikely	Severe	Tolerable

13.7. Mitigation, Enhancement and Monitoring

- 13.7.1. Mitigation is recommended where the likelihood of the event occurring is rated as 'Reasonably Likely' or 'Likely', where the 'Pre-mitigation Risk' is at the level of '*Tolerable – if ALARP*' or the 'Severity' is 'Significant' or higher.

Short-term Impacts

- 13.7.2. As stated in the IEMA Primer, primary (modifications made to the location or design of the Scheme made during the pre-application phase) and tertiary (actions that will be undertaken to meet other existing legislative requirements or that are considered standard practices to manage commonly occurring environmental effects) mitigation of a development's vulnerability to major accidents and/or disasters, for infrastructure and other built environment developments, is covered by a wide range of other safety and non-safety-related legislation. This mitigation is generally sufficient to manage vulnerabilities to major accidents and/or disasters without the need for secondary mitigation in most circumstances.
- 13.7.3. To reduce the risk of further landslides occurring, in January 2021 a ground investigation was undertaken to ensure that the material being moved from Llanwonno Tip to the Receptor Site is stable enough to be moved and stored within the Receptor Site area. Further ground investigation is proposed to compliment that done in January 2021, to ensure that ground stability under the Receptor Site is appropriate for the deposition of the material. For more information, see Chapter 10: Geology, Soils and Waste.
- 13.7.4. Construction methodologies will minimise risk of slips and best practice measures will be used throughout the construction of the Proposed Scheme. Ground investigations conducted will also ensure that design decisions are made with the best understanding of ground conditions and stability.
- 13.7.5. The design of the Proposed Scheme will align with the Construction (Design and Management) Regulations 2015 (CDM) to ensure effective management, safety compliance and best practice is put in place.

Long-term Impacts

- 13.7.6. The Proposed Scheme will improve the stability of both the relocated material and the remaining material within Llanwonno Tip during the operation of the Proposed Scheme. However, there is still a low potential of pluvial and/or groundwater flooding causing future instability issues within and around Llanwonno Tip and the Receptor Site. To mitigate for this, seven water monitoring wells (two uphill of the re-landscaped area and five within the re-landscaped area) will be monitored over six months for water levels and quality at Llanwonno Tip and monitoring sites for water levels and quality will also be present within the Receptor Site. Drainage has also been designed into the Receptor Site to ensure drainage of the area is sufficient with the Receptor Site present (see drainage strategy in Appendix 11.2 for more detail).

13.8. Residual Impact Assessment

Construction Phase

- 13.8.1. Construction (Design and Management) Regulations 2015 (CDM) will be adhered to and best practice guidance will be followed. Geotechnical surveys will be conducted to ensure the stability of the site during construction. The residual risk of significant impacts from Major

Accidents and Disasters is not likely during construction and therefore there is not expected to be any residual impacts.

Operational phase

- 13.8.2. The Proposed Scheme will result in a beneficial residual impact with improved stability and reduced risk of landslips or natural disasters on site through moving the material to a more stable location away from the steep valley edge.

Table 13.6 Mitigation and residual effects.

Major Event Type	Before Mitigation Risk	Mitigation/Risk Reduction Measures	Residual Risk
Major road traffic accident	Tolerable	N/A	Tolerable
Collapse/damage to structures	Tolerable	N/A	Tolerable
Gas explosion from gas mains	Tolerable	N/A	Tolerable
Ground instability/collapse from high-pressure water main leak	Tolerable	N/A	Tolerable
Electrocution	Tolerable	N/A	Tolerable
Storm damage – heavy rain, thunderstorms, direct or indirect to assets	Tolerable	Adhere to best practice guidance to ensure safety on site in bad weather conditions.	Tolerable
Coastal Flooding	Tolerable	N/A	Tolerable
Fluvial Flooding	Tolerable	N/A	Tolerable
Pluvial (surface water) Flooding	Tolerable	Ensure appropriate drainage is put in place around the construction compound and the haulage route (any new impermeable surfaces) to avoid build-up of water that could lead to instability of the ground.	Tolerable
Groundwater flooding	Tolerable	Monitoring of groundwater levels throughout construction. The mine water discharges from the adits above Llanwonno Road are being considered as part of the drainage works (see Chapter 11 'Water Environment and Flood Risk' for more detail).	Tolerable
Droughts/Heatwaves	Tolerable	Following of best practice guidance on site e.g. ensure hydration of workers, use of hats and sun cream etc.	Tolerable
Wildfires: forest fire, bush/brush pasture	Tolerable	Ensure that emergency routes are identified, and fire fighters/emergency vehicles are able to access the site easily.	Tolerable
Sub-zero temperatures and heavy snow	Tolerable	Following of best practice guidance on site e.g. gritting of haulage road, be aware of local	Tolerable

Major Event Type	Before Mitigation Risk	Mitigation/Risk Reduction Measures	Residual Risk
		weather forecasts, only attending site if safe for staff to do so.	
Poor air quality	Tolerable	Follow Institute of Air Quality Management (IAQM) Mineral Dust guidance (for more information see 'Air Quality' chapter).	Tolerable
Subsidence	Tolerable	Conduct ground investigations to ensure the integrity of the ground below where material is being removed and where it is being placed in the receptor site. Follow best practice guidance and implement the CEMP.	Tolerable
Sinkholes	Tolerable		Tolerable
Landslips	Tolerable – if ALARP	Complete a ground investigation survey before works begin to assess the stability of the area. Monitor the stability of the ground throughout the construction of the Proposed Scheme, as well as six months after its construction. Follow best practice guidance.	Tolerable
Earthquakes	Tolerable	N/A	Tolerable
Mines and storage caverns	Tolerable – if ALARP	Conduct ground investigations to ensure the integrity of the ground below where material is being removed and where it is being placed in the receptor site. The haul road will be constructed with high tensile geogrid reinforcement to ameliorate the risks from collapse of the audit (Appendix 10.2). Follow best practice guidance and implement the CEMP.	Tolerable
Unexploded Ordnance (UXO)	Tolerable	Stop works immediately if construction plant/workers see something unidentified in any of the earthworks.	Tolerable
Gas explosion from mines	Tolerable	The Proposed Scheme is not susceptible to mine gas issues.	Tolerable

13.9. Cumulative Effects

- 13.9.1. There are unlikely to be any significant cumulative effects to the Proposed Scheme for Major Accidents and Disasters. It should be noted that with Phase 2 and 3 of the Tylorstown Landslip development taking place in Llanwonno Tip and within part of the red line boundary of the Proposed Scheme, there could be potential for some continuity of ground instability between the two projects, which has the potential to cause subsidence or further landslips.
- 13.9.2. Additionally, the power line being fixed as part of Phases 2 and 3 may interact with the Proposed Scheme, leading to potential safety issues if not managed correctly. This, however, will also be mitigated through use of best practice guidance and monitoring of the site to ensure stability and safety of the site is maintained between Phases 2 and 3, and the Proposed Scheme.

13.10. Summary

- 13.10.1. This chapter has assessed the likely risks of Major Accidents and Disasters posed to and by the Proposed Scheme during its construction and operation.
- 13.10.2. The Proposed Scheme itself will reduce the risk of major accidents and/or disasters by moving material at risk of slipping in the future. The material is being moved from the Llanwonno Upper Tip site, which lies within a development high risk area, to the Receptor Site, which lies outside of the development high risk area. This will protect key receptors (such as the Afon Rhondda Fach, Rhondda Fach Leisure Centre, NCN Route 881 and Residents of Tylorstown) against the impacts of future slips.
- 13.10.3. In addition to this, the following measures have been put in place to ensure that any risk of future slips is as low as reasonably practicable:
- monitoring the groundwater levels and conducting stability safety checks of the area for six months; and
 - adhering to guidance within the CDM Regulations to ensure safety is integrated into the design of the receptor site and maintained during construction.
- 13.10.4. In conclusion, the Proposed Scheme will reduce the risk of future slips and have a beneficial impact on Major Accidents and Disasters in the local area. No other risk of Major Accidents and Disasters were identified to be of sufficient likelihood or severity to be considered further in this assessment.

14. Pedestrians, Cyclists and Equestrians

14.1. Introduction

- 14.1.1. This chapter assesses the impact of the Proposed Scheme on Pedestrians, Cyclists and Equestrians (PCE) within the study area. For this chapter the Design Manual for Roads and Bridges (DMRB), Sustainability and Environment, LA 112: Population and human health guidance has been used as it provides the most robust guidance for this topic⁷⁹. Although the ICE EIA handbook has been used for the majority of the chapters in this ES, it does not contain detailed guidance regarding the assessment of impacts on PCE. It was therefore decided that using DMRB guidance would be best suited for this chapter.
- 14.1.2. Rather than individual user types, receptors for the purpose of this assessment are based on PCE *provision* e.g. Public Rights of Way (PRoW) including the National Cycle Network (NCN) routes, and other access routes. This chapter therefore assesses the effects of the Proposed Scheme on these routes in terms of accessibility (the availability of access), access (the means through which this is achieved), and the effects of severance (the extent to which users are able (or not) to move between communities and facilities).
- 14.1.3. A PRoW can be classified into three different types of routes:
- Public footpath – for use on foot only;
 - Bridleway – for use on foot, horseback and bicycle; and
 - Byway – open to all traffic including motor vehicles.
- 14.1.4. RCT has over 650km of footpaths, over 80km of bridleway and over 18km of byways⁸⁰.
- 14.1.5. As required by LA 112, the likely effects of changes to accessibility, provision of access and severance are identified and reported in this chapter as a positive, neutral or negative change for PCE affected by the Proposed Scheme during both the construction and operational phases.

Study Area

- 14.1.6. LA 112 specifies that the study area for assessing effects on PCE must consist of the construction footprint/project boundary (including compounds and temporary land take), plus a 500m buffer to be extended or reduced accordingly with the likelihood of effects occurring within that area.
- 14.1.7. Due to the topography of the area, the study area for this assessment will include inside the Red Line Boundary (RLB) and a 250m buffer around the RLB to cover the PRoWs and other informal footpaths that may be impacted by the Proposed Scheme.

⁷⁹ Design Manual for Roads and Bridges, Sustainability and Environment, LA 112: Population and Human Health, 2020: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3/LA%20112%20Population%20and%20human%20health-web.pdf>

⁸⁰ Rhondda Cynon Taf Council website, 2020. Accessible here: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/Countryside/Publicrightsofway.aspx>

14.2. Legislation and Policy

Legislation

14.2.1. The legislative framework for the assessment of PCE is set by the following:

- **the Countryside and Rights of Way (CROW) Act 2000** - Introduces to England and Wales the right to roam across open access land (generally mountains, moors, heath and down), and introduces improvements to PRow legislation such as measures for strategic planning and management;
- **the Highways Act 1980** - Provides the legal framework for the creation of public footpaths and other PRow in England and Wales;
- **the Active Travel (Wales) Act 2013** - requires local authorities to map and continuously improve walking and cycling facilities for functional (e.g. commuting) journeys, and to identify and implement new and improved active travel routes. New road schemes are also required to ensure active travel modes are integral to planning and design from the outset⁸¹;
- **the National Park and Access to the Countryside Act 1949** – required surveying authorities to prepare a map and statement of public rights of way for their area, which would become the ‘definitive map and statement’ and the legal record of PRow; and
- **the Wildlife and Countryside Act 1981 (England and Wales)** - requires surveying authorities to keep the definitive map and statement under continuous review and to make modification orders where it appears that a route should amended, added, deleted or re-graded.

Local Planning Policies

South East Wales Valley Local Transport Plan (2015)

14.2.2. The Local Transport Plan (LTP) has been jointly developed by five local authorities (including RCTCBC)⁸². The LTP sets out the vision and objectives for transport in the South East Wales Valleys area and provides a short term (to 2020) and long term (to 2030) programme of interventions designed to achieve these goals.

14.2.3. The LTP has been informed by the now- defunct South East Wales Regional Transport Plan (RTP), developed by the now- disbanded South East Wales Transport Alliance (SEWTA). SEWTA consisting of 10 south east Welsh local authorities acting as a joint local government committee to improve transportation in south east Wales. The RTP was published in March 2010⁸³. The vision, policies and objectives of the RTP have been taken forward into the LTP.

⁸¹ Welsh Government, February 2020, Active Travel Guidance: https://gov.wales/sites/default/files/consultations/2020-02/active-travel-guidance_1.pdf

⁸² South East Wales Local Authorities, January 2015, South East Wales Valleys Local Transport Plan: <https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Travel/Relateddocuments/SouthEastWalesValleysLocalTransportPlanJanuary2015.pdf>

⁸³ South East Wales Transport Alliance, March 2010, Regional Transport Plan: https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/SEWTA_Regional_Transport_Plan.pdf

14.2.4. The vision of the LTP is stated as: “A modern, accessible, integrated and sustainable transport system for the SE Wales Valleys and beyond which increases opportunity, promotes prosperity for all and protects the environment; where walking, cycling, public transport and sustainable freight provide real travel alternatives.”.

14.2.5. The wider goals of the LTP are to:

- Develop the economy, through improving connectivity for business and freight, making transport more effective and efficient, providing access to employment, education, shopping and leisure, and improving transport integration;
- Promote social inclusion and equality, by providing a transport system that is safe, accessible, and affordable to all sections of the community; and
- Protect the environment, by minimising transport emissions and consumption of resources and energy, by promoting walking, cycling, quality public transport, modal shift and minimising demand on the transport system.

14.2.6. Core activities and interventions of the LTP are identified as:

- Developing innovative walking, cycling and Smarter Choices programmes;
- Continuing investment in the regional rail system;
- Improving the quality of bus services across the region;
- Developing better public transport integration; and
- Making better use of the regional road system.

14.2.7. Long- term objectives of the LTP refer to all users of the transport system, including vulnerable users, those with disabilities, young people, older people, cyclists, equestrians, and others. Objectives that are relevant to PCE include:

- **Connectivity and accessibility:** To improve access for all and promote equality of opportunity to employment opportunities, services, healthcare, education, tourism and leisure facilities, and to improve connectivity by sustainable transport between the SE Wales Valleys and the rest of Wales, the UK and Europe;
- **Quality and efficiency:** To improve interchange within and between modes of transport, and to improve the quality, efficiency and reliability of the transport system;
- **Environment:** To promote sustainable travel and to make the public more aware of the consequences of their travel choices on climate, the environment and health; and
- **Land use and regeneration:** To ensure developments in the SE Wales Valleys are accessible by sustainable transport, and to make sustainable transport and travel planning an integral component of regeneration schemes.

Rhondda Cynon Taf Local Development Plan (LDP)

14.2.8. The RCT area- wide policy AW7 specifies that⁸⁴: “*Development proposals which affect areas of public open space, allotments, public rights of way, bridleways and cycle tracks will only be permitted where it can be demonstrated that:*

- *There is a surplus of such facilities in the locality, or;*
- *The loss can be replaced with an equivalent or greater provision in the immediate locality; or*
- *The development enhances the existing facility.”*

Out & About Two: The Rights of Way Improvement Plan (ROWIP) for Rhondda Cynon Taf

14.2.9. In accordance with the CRoW Act 2000, Local Highway Authorities (LHA) are required to produce a ROWIP. The ROWIP is a 10-year strategic document that sets out how the LHA intends to manage and improve the opportunities to access the outdoors to make it more useful to the public. RCT’s ROWIP (Out & About Two) covers open access land, key countryside sites, parks, permissive access routes and PRoW⁸⁵.

14.2.10. The ROWIP is based on an assessment of the local access resource, it’s capability to meet present and future public needs, and the opportunities these provide for recreation, exercise, etc. The first ROWIP (Out & About) was published in 2007/8 and was based on 75 actions relating to six objectives which were identified during the original consultation. Following the review of the first ROWIP in 2017/18, Out & About Two was published in 2019 based on the same six objectives:

- promoting outdoor countryside activity for health, regeneration, tourism and recreation;
- walking and cycling as transport options;
- protecting the access resource;
- improving provision for pedestrians, cyclists, equestrians, off-road vehicles and users with mobility or sensory disabilities;
- involving local communities and voluntary organisations in the development, promotion and use of access opportunities; and
- developing a more efficient management system for statutory Rights of Way work, including the Definitive Map.

14.2.11. Unlike the first ROWIP, detailed actions are not included in the ROWIP. Instead key themes for action are identified under each of the six objectives. Detailed actions are set out in annual delivery plans which will be used to implement these objectives.

⁸⁴ Rhondda Cynon Taf County Borough Council, 2006, Local Development Plan 2006 – 2021: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LocalDevelopmentPlan20062021.aspx>

⁸⁵ RCTCBC, 2019, Out & About Two: The Rights of Way Improvement Plan for Rhondda Cynon Taf: <https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/Countryside/relateddocuments/OutAboutTwoTheRightsofWayImprovementPlanforRhonddaCynonTaf20192029.pdf>

14.3. Assessment Methodology

Guidelines

- 14.3.1. The assessment of impact on PCE has been conducted in line with the guidance outlined in DMRB LA 112 as it provides the most relevant methodology for the topic. The ICE EIA handbook, used for the majority of the chapters in this ES, does not contain detailed guidance regarding the assessment of impacts on PCE.

Methodology

Identifying Receptors

- 14.3.2. As required by DMRB, the study area is defined by the likelihood of impacts occurring within a variable radius buffer around the anticipated construction footprint, allowing for temporary land take, with a 250m buffer used as the initial radius. All the affected receptors lie at least partly within 250m of the Proposed Scheme.
- 14.3.3. Receptors were identified from a variety of sources. PRoWs were identified from the digital working copy of the RCTCBC definitive map⁸⁶. NCN routes were identified from the online map provided by Sustrans⁸⁷. The informal footpath routes were identified through consultation with the RCTCBC PRoW officer and technical leads who conducted site visits for topic-related surveys and noted the use of paths other than the marked PRoWs within the area.

Determining the Sensitivity of Receptors

- 14.3.4. The sensitivity of the receptors has been assigned, as required by LA 112, and detailed in Table 14.1. Where there is any doubt as to where a receptor sits within this scale, a precautionary approach has been taken and the receptor assigned to the higher of the two values.

⁸⁶ RCTCBC, 2020, Definitive PRoW Map: <https://my.rctcbc.gov.uk/myRhondda.aspx>

⁸⁷ Sustrans, 2020, The National Cycle Network: <https://www.sustrans.org.uk/national-cycle-network>

Table 14.1 Receptor sensitivity and descriptions.

Receptor sensitivity (Value)	Description
Very High	<p>National trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient PCE route. Little/no potential for substitution.</p> <p>Routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs.</p> <p>Public access land is completely severed between communities and their land/assets, with little/no accessibility provision, alternatives are only available outside the local planning authority area.</p>
High	<p>Regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution.</p> <p>Public access land is severed between communities and their land/assets, with limited accessibility provision, alternative facilities are only available in the wider local planning authority area.</p>
Medium	<p>Public rights of way and other routes, close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys.</p> <p>Public access land is substantially severed between communities and their land/assets, but with existing accessibility provision, limited alternative facilities are available at a local level within adjacent communities.</p>
Low	<p>Not designated or formally recognised routes such as informal footpaths, and routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes.</p> <p>Public access land has limited existing severance between community and assets, with alternatives available at a local level within the wider community.</p>
Negligible	<p>N/A to PCE receptors.</p> <p>Public access land has no or limited severance or accessibility issues, alternatives are available within the same community.</p>

Identification of Impacts

14.3.5. A GIS exercise was undertaken to identify where PRowS and other routes had the potential to be affected by the Proposed Scheme footprint and temporary construction works, both in terms of direct severance/obstruction and the reduction of accessibility through e.g. introduction of conditions that might hinder disadvantaged and/or less mobile users. Use of GIS showed the PCE receptors in relation to the RLB of the Proposed Scheme and allowed for impacts to be identified. The assessment then established:

- Whether or not permanent or temporary closures/diversions will be required; and
- The impacts on journey lengths and times as a result.

- 14.3.6. For the assessment of construction phase impacts, it is assumed that the Proposed Scheme Red Line Boundary presents an impassable barrier to PCE for the full duration of the construction period due to the presence of construction operations, vehicles and plant, site enclosure etc.

Assigning Magnitude to Impacts

- 14.3.7. The magnitude of any change was determined and defined using, as guidance, the descriptors provided by DMRB, shown in Table 14.2. The nomenclature of these magnitude descriptors adapted to align with that used in other chapters of this ES.

Table 14.2 Magnitude of change descriptors.

Magnitude of impact (change)	Typical description
High Adverse	<p>Loss of resource and/or quality and integrity of public access land or route;</p> <p>Severe damage to key characteristics, features or elements;</p> <p>Introduction (adverse) or removal (beneficial) of complete severance to accessibility provision;</p> <p>Change in ambience of the area that is disruptive to users and prevents use of the route/area in consequence; and/or</p> <p>>500m increase (adverse) / decrease (beneficial) in PCE journey length.</p>
Medium Adverse	<p>Partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access;</p> <p>Introduction (adverse) or removal (beneficial) of severe severance with limited/moderate accessibility provision;</p> <p>Change in ambience of the area that could impact the amount some users use the route/area; and/or</p> <p>>250m - 500m increase (adverse) or decrease (beneficial) in PCE journey length.</p>
Slight Adverse	<p>Discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to public access</p> <p>Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision;</p> <p>Change in ambience of the area that is minimal but is perceptible to users; and/or</p> <p>>50m - 250m increase (adverse) or decrease (beneficial) in PCE journey length.</p>
Negligible Adverse	<p>Very minor loss or detrimental alteration to one or more characteristics, features or elements of public access land;</p> <p>Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision;</p> <p>Minimal change in ambience of the area that is barely perceptible and unlikely to impact the use of the route/area; and /or</p> <p><50m increase (adverse) or decrease (beneficial) in PCE journey length.</p>
No change	<p>No loss or alteration of characteristics, features, elements, ambience, or accessibility; no observable impact in either direction.</p>

Assessing the Significance of Effects

14.3.8. To determine the significance of effects, the sensitivity of the receptor and the magnitude of the impacts will be applied to assign a descriptor of significance using the matrix and approach described in the Section 2.5 'General Approach to Assessment' of this ES. This follows the same matrix-based approach prescribed in DMRB LA104⁸⁸ but with an adapted

⁸⁸ DMRB Sustainability and Environment, LA104; Environmental Assessment and Monitoring:
<https://www.standardsforhighways.co.uk/dmrb/search/78a69059-3177-43dc-94bd-465992cfda82>

nomenclature that aligns with that used throughout this ES (Table 14.4). Where there is any doubt as to where a receptor sits within this scale, a precautionary approach has been taken and the receptor assigned to the higher of the two categories. The descriptors of significance for impacts on PCE are summarised in Table 14.3.

Table 14.3: Generic descriptors for impact significance.

Significance category	Typical description
Very Major	Effects at this level are material in the decision-making process.
Major	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 14.4 Assessment matrix.

	Receptor Value (or Sensitivity)					
		Very High	High	Medium	Low	Negligible
Magnitude of Impact	High	Very Major	Major	Moderate	Slight	Slight
	Medium	Major	Moderate	Slight to Moderate	Slight	Negligible to Slight
	Slight	Moderate	Slight to Moderate	Slight	Negligible to Slight	Negligible to Slight
	Negligible	Slight	Slight	Negligible to Slight	Negligible	Negligible
	No change	Negligible	Negligible	Negligible	Negligible	Negligible

Identification and Assessment of Inter-Project Cumulative Impacts

- 14.3.9. The list of known committed developments within the study area as described in intro chapters (See Section 2.5) has been reviewed in relation to the residual effects of the Proposed Scheme for PCE receptors. Where other developments have the potential to affect receptors that retain a residual impact from the Proposed Scheme, consideration will be given as to whether a cumulative effect may arise. Effects will be identified primarily through the anticipated location and footprint of these developments, and an estimate of where these could potentially cause severance to PCE routes.

Identification of Mitigation Measures

- 14.3.10. An impact assessment will be undertaken based on the Proposed Scheme design to determine the significance of the impacts on the Proposed Scheme baseline without mitigation, which will guide the mitigation development in reducing the magnitude of impacts wherever possible. The data gathered from the desk study exercise was used to identify appropriate and proportionate mitigation measures.
- 14.3.11. As specified in LA 112, mitigation measures shall be employed in the following hierarchy of preference; avoidance and prevention, reduction, and remediation.
- 14.3.12. Mitigation for PCE receptors generally includes:
- Avoidance and prevention- identifying alternatives to or variations upon the design and/ or construction methods that avoid the severance of PCE routes, reducing accessibility or increasing journey times;
 - Reduction- altering the design to minimise severance and disruption to PCE routes during construction and operation; and
 - Remediation- the provision of preferably equivalent alternative routes during operation, and the management of construction activities to reduce disruption where possible.
- 14.3.13. Mitigation that is deployed through its incorporation *into* the Proposed Scheme design, such as the landscaping of the receptor site to allow continued access, is referred to as “embedded mitigation”, as opposed to measures that are applied *to* the Proposed Scheme during construction or operation.

Limitations and Assumptions

- 14.3.14. No site surveys or route user surveys have been used to inform this assessment and the assessment has been limited to a desk-based study. Therefore, some assumptions about the accessibility of routes and the proportion of user groups utilising them may be inaccurate. A worst-case scenario is assumed to prevent underestimating the sensitivity of receptors and the Proposed Scheme impacts; therefore, all receptors are assumed to be used daily by the general public.
- 14.3.15. Visual inspection of the study area was limited to the use of Google Maps and Google Street View imagery, which is limited in scope due to the area’s semi- rural nature and, in the case of the Street View imagery, is generally dated from 2009, if available at all.
- 14.3.16. For the construction phase assessment, it is assumed that the area within the Red Line Boundary presents a total obstruction to PCE movements throughout the full construction period.

Consultations

- 14.3.17. Consultation occurred with the Public Rights of Way (PRoW) officer 16 November 2020 through email communication to discuss the impacts the Proposed Scheme would have on PRoW footpaths in the area. The design impacts were then discussed further with PRoW officer 24 November 2020 as it was identified that the Proposed Scheme will dissect a PRoW. Following submission of the scoping report, the PRoW officer stated within the scoping opinion (received 17 December 2020) that the impacts on PRoWs should be included within

the ES to identify what mitigation measures will be put in place for the PRowWs that are being dissected by the Proposed Scheme.

- 14.3.18. To date, no consultation with the general public has taken place. The Proposed Scheme will be going through the PAC process, which will allow anyone from individuals to community groups to comment on the Proposed Scheme before planning permission is provided. Consultation will take place prior to the submission of the planning application (April 2021). At this stage the general public/local community will have the opportunity to comment on any impacts to PCE caused by the Proposed Scheme.

14.4. Baseline Conditions

- 14.4.1. LA 112 specifies that the indicative data for the PCE assessment baseline should include:

- The type, location and extent of PCE provision within the study area; and
- The frequency of use of the PCE provision within the study area.

- 14.4.2. There are no Active Travel routes within the Red Line Boundary (RLB) or within 250m of the Proposed Scheme. There are two areas of CRoW open access land in the study area, including open country and public forest – see Table 14.5 for more detail.

- 14.4.3. Table 14.5 identifies the PCE receptors within 250m of the Proposed Scheme and identifies the receptor sensitivity using the criteria provided above (in Section 14.3). General network use is presumed to be high, with all receptors being used on a daily basis by the general public. The location of these features and their relation to the proposed Scheme is depicted in V2-S14-0001.

Table 14.5 PCE Receptors

Assigned receptor number	Receptor name	Description
1	Footpath TYL/9/1	<p>This footpath crosses through the RLB of the site to the west of the receptor site running in a north-west to south-east direction from Blaenllechau Road to the north-west of the RLB and meets footpath YCC/16/1 (receptor 2) to the south-east.</p> <p>Receptor sensitivity: Medium- Recreational route used by the community, but alternative routes are available.</p>
2	Footpath YCC/16/1	<p>This footpath runs adjacent to the RLB approximately 260m to the north-east of the site. Starting south of Blaenllechau Road and heading in a north-south direction.</p> <p>Receptor sensitivity: Medium- Recreational route used by the community, but alternative routes are available.</p>
3	Other informal footpaths	<p>The area within the RLB and the surrounding 250m buffer consists of a network of several informal footpaths that are not recorded on the PRoW maps but can be seen on Google map images satellite view. These are used recreationally and on a regular basis by the general public.</p> <p>Receptor sensitivity: Low- not designated or formally recognised routes, also known as informal footpaths.</p>
4	Open country public access land	<p>Open country public access land covers the area of RH01, the haulage route and access road, but not the receptor site area within the RLB.</p> <p>Receptor sensitivity: Low- public access land has limited existing severance between community and assets, with alternatives available at a local level within the wider community.</p>
5	Public forest	<p>Public forest is present directly adjacent to the RLB running along Blaenllechau Road to the north-east. There are also small sections of public forest within the RLB.</p> <p>Receptor sensitivity: Low- public access land has limited existing severance between community and assets, with alternatives available at a local level within the wider community.</p>
6	National Cycle Network (NCN) Route 881	<p>NCN Route 881 usually runs along the bottom of the Rhondda Fach valley in a north-west to south-east direction and connects in the north-west to NCN Route 47 and to NCN Route 4 in the south-east, however due to the Tylorstown landslide it has been closed since February 2020 between Stanley Town and Station Road Bridge at Ferndale.</p> <p>Receptor sensitivity: Very High – National route used for recreational and commuting with daily usage.</p>
7	NCN Route 47	<p>NCN Route 47 runs parallel to the RLB, 180m north-east of the Proposed Scheme. Part of the route will be used as the access route for the delivery of plant used on site during construction.</p> <p>Receptor sensitivity: Very High – National route used for recreationally with daily usage.</p>

Assigned receptor number	Receptor name	Description
8	Informal footpath running below Llanwonno upper tip	This discussed tramway acted as a footpath before the February 2020 landslip, connecting the area adjacent to Old Smokey to the Rhondda Fach valley below. However, this route is currently severed, as a result of the landslip.

14.4.4. As discussed in Table 14.5, the National Cycle Network Route 881 usually runs along the bottom of the Rhondda Fach valley but has been closed since February 2020 between Stanley Town and Station Road Bridge at Ferndale, following the Tylorstown landslide. As it is located directly downslope of the Proposed Scheme, it has been considered as a receptor in this assessment.

14.4.5. Further details about the use of NCN Route 47 along the Forest Road as access for larger construction vehicles to the site can be found within the accompanying Transport Statement (Appendix 14.1).

Summary

14.4.6. There are seven PCE receptors identified within the 250m study area, which include a network of informal footpaths, one PRow footpath that crosses through the site (RLB) of the Proposed Scheme, and one other PRow footpath within the 250m study area connecting to other PRows outside the study area. Two of the receptors are classified as open access land under CRow, including open country and public forest within the RLB and the NCN 881 and NCN 47 are the final receptors. NCN Route 881 is considered even though the route is currently closed, as the closure is only temporary. There are no Active Travel routes in the study area.

14.5. Preliminary Impact Assessment

14.5.1. The anticipated effects of the Proposed Scheme's construction and operational phases are outlined separately for clarity. This section assesses the Proposed Scheme effects prior to the application of mitigation but does account for mitigation embedded in the Proposed Scheme design from the outset.

14.5.2. In general, effects on PCE provision are created when the means of access to a route or destination are hindered (e.g. blocked by construction site hoarding, path closures, permanent severance by structures) and/ or when accessibility is reduced (e.g. the alternative route to a destination is longer than the original, or the surfacing inadequate for less able users).

14.5.3. LA 112 defines the magnitude of impacts by the increase/ decrease in journey distance created by said impact.

Construction Phase

14.5.4. The impacts of the Proposed Scheme during the construction phase, before mitigation is applied, are outlined in Table 14.6.

14.5.5. The construction phase of the Proposed Scheme will have '**Medium Adverse**' effects on the PRow footpath TYL/9/1, other informal footpaths, NCN Route 47, and open country public access land and public forest. This is due either to complete severance of routes, or loss of access to land within the RLB, with alternative routes and areas available to use for the period

of the construction phase. These are assessed as **Medium Adverse** and not **High Adverse** magnitude due to the availability of other routes and areas in the immediate surrounding area.

- 14.5.6. There will also be a **Slight Adverse** impact on PRoW footpath YCC/16/1 and the public forest adjacent to the site, due to the change in ambience caused by the construction of the Proposed Scheme. There is likely to be an increase in usage of the PRoW YCC/16/1 during the construction period, due to the closure of footpath TYL/9/1. However, the increase in noise from construction plant and traffic on site may also deter people from using the route for the duration of the construction period.

Table 14.6 Preliminary construction phase impacts.

Receptor and sensitivity	Impact	Effect	Magnitude	Significance
1 Footpath TYL/9/1 (Medium)	Assumed total severance of footpath TYL/9/1 throughout the construction period due to construction vehicles operating within the RLB during construction.	Users will have to utilise an alternative route. This would likely be PRoW YCC/16/1 to the north-east of PRoW TYL/9/1 that connects to the same paths as TYL/9/1 does in the south and also connects to Blaenllechau Road, but approximately 550m further south-east than TYL/9/1. However, the area has several informal footpaths that are likely to be used by the public as unofficial alternatives during the construction phase.	Medium Adverse	Moderate
2 Footpath YCC/16/1 (Medium)	Footpath YCC/16/1 may see minor disruption through noise and change in ambience of the route during construction from movement construction vehicles and movement of material.	No change in journey length. Users may see an increase in usage of the PRoW during construction due to the closure of footpath TYL/9/1 and increase in noise from construction plant and traffic on site may deter people from using the route for the construction period.	Slight Adverse	Slight
3 Other informal footpaths (Low)	The network of informal footpaths located within the RLB of the Proposed Scheme will be inaccessible during construction due to construction vehicles and plant operating.	Users will have to utilise the paths located around the outside of the Proposed Scheme RLB which may lead to an increase in pedestrian traffic on the surrounding paths and unnamed road to the east of the Proposed Scheme.	Medium Adverse	Slight
4 Open country public access land (Low)	The open country public access land will be directly impacted by the Proposed Scheme, with the areas inside the RLB being closed off from the public during construction of the Proposed Scheme.	Users will not be able to use the open country public access land within the RLB, however this is not the only area of public access open country land in the area and so users will be able to use other accessible land in the area for recreational activities during the period of construction.	Medium Adverse	Slight

Receptor and sensitivity	Impact	Effect	Magnitude	Significance
5 Public forest (Low)	The majority of the public forest located outside of the RLB will not be directly impacted by the Proposed Scheme and impacts will include changes in ambience of the forest, rather than access issues or area closure. The small parts of the public forest that are within the RLB will be closed to the public during construction.	Increased noise levels and decrease in air quality to users of the public forest during construction may deter people from using the forest. Users will not be able to access the small parts of the public forest that are present within the RLB. These areas are not large enough to have a significant impact on users, however.	Medium Adverse	Slight
6 NCN Route 881 (Very High)	No impact anticipated during construction as the route will remain closed as it is at the time of writing.	N/A	No change	Negligible
7 NCN Route 47 (Very High)	Part of the route will be used as the access route to get construction vehicles to site at the beginning of the construction period, and again to get them off site at the end of the construction period.	At the beginning of construction and at the end of construction heavy plant vehicles will be moved to and from site via the NCN Route 47. Heavy plant will not be using the route during the majority of the construction period, as they will be stored and work within the RLB of the Proposed Scheme. Therefore, the effect on the NCN Route 47 will only be very temporary in nature with a couple of short periods of disruption to the route throughout the construction phase.	Medium Adverse	Slight

Operation Phase

- 14.5.7. The impacts of the Proposed Scheme during the operational phase, before mitigation is applied, are outlined in Table 14.7. Moreover, the area will remain accessible to the public during operation.
- 14.5.8. The operation of the Proposed Scheme will have **Negligible** and **Slight** adverse effects on local receptors, all of which are considered to be of **Negligible** significance (or not Significant) in EIA terms.
- 14.5.9. The Proposed Scheme will have a **Slight** adverse impact on receptor TYL/9/1 ('Medium' sensitivity receptor) due to an increase in journey length through the permanent diversion of the footpath around the Receptor Site.
- 14.5.10. The Proposed Scheme will also have a **Slight beneficial** effect on Open country public access land ('Low' sensitivity receptor) and PRoW TYL/9/1 and NCN Route 881 ('very High')

sensitivity receptor) by stabilising material on the valley side and, in the case of the latter, this constitutes a **Moderate** significance (in other words Significant) in EIA terms.

- 14.5.11. The Significance of the beneficial impacts of the Proposed Scheme on Open country public access land and PRow TYL/9/1 have been deemed **Slight** and therefore are not significant in EIA terms. In the case of the Open country public access, the assessment matrix in Table 14.4 indicates that a significance of **Negligible** or **Slight** could have been allocated but **Slight** was applied to reflect the benefits of increased ground stability to users of the Open country public access land.
- 14.5.12. Considering the Magnitude of the operational impact of the Proposed Scheme on YCC/16/1 was determined to be **Negligible**, according to the assessment matrix in Table 14.4, the Significance of these effects could be assessed as **Negligible** or **Slight**. However, due to the indirect nature of the effect on the setting and views from the footpath (through the changes in the height of the adjacent topography) and the overlap with effects addressed in the Landscape and Visual chapter (See Section 8), this has been assessed as **Negligible**. Moreover, the area will remain accessible to the public during operation.

Table 14.7 Preliminary operational phase impacts.

Receptor ID and sensitivity	Impact	Effect	Magnitude	Significance
1 Footpath TYL/9/1 (Medium)	Footpath TYL/9/1 will be directly impacted by the Proposed Scheme as the PRow is diverted around the Receptor Site and its associated attenuation pond to the north-west corner.	The journey length along the PRow will increase by about 80m in total. There will also be indirect impacts on the PRow from changes in the topography of the surrounding landscape. This is assessed within the Landscape and Visual Chapter of the ES.	Slight Adverse	Slight
		The new landform at the receptor site will better define the location of the TYL/9/1 PRow footpath (receptor 1) within the landscape, clearly guiding users along the formal route.	Slight Beneficial	Slight
2 Footpath YCC/16/1 (Medium)	Footpath YCC/16/1 will not be directly impacted by the Proposed Scheme during operation.	No change in journey length anticipated during operation of the Proposed Scheme, there will be a change in landscape of the PRow as views of the Receptor Site will be visible, this is assessed within the Landscape and Visual Chapter of the ES.	Negligible Adverse	Negligible
3 Other informal footpaths (Low)	The network of informal footpaths within the confines of the Receptor Site will no longer be present due to deposition of material and landscaping of the area, however the area is assumed to still be accessible to the public post-construction and establishment of vegetation on the receptor site.	The creation of the new landform at the Receptor Site is likely to reduce the accessibility of these areas but will most-likely lead to more people using the adjacent formal PRow instead. However, there will be no change in the journey length for users.	Slight Adverse	Negligible
4 Open country public access land (Low)	The open country public access land will be open to the public once again after construction has finished. No operational impacts anticipated.	Access will be returned to as it was before the landslip occurred in February 2020 and rendered safer through the removal of material from the valley side.	Slight Beneficial	Slight
5 Public forest (Low)	The public forest will be accessible to the public again once construction is completed. No operational impacts anticipated.	Access will be as it was before construction began.	No change	Negligible
6	The risk of future land slips affecting the cycle route will	The route will become safer and its accessibility to users	Slight Beneficial	Moderate

Receptor ID and sensitivity	Impact	Effect	Magnitude	Significance
NCN Route 881 (Very High)	be significantly reduced by the Proposed Scheme.	and to the local community will no longer be at risk.		
7 NCN Route 47 (Very High)	NCN Route 47 will not be directly impacted by the Proposed Scheme during operation.	No change in journey length anticipated during operation of the Proposed Scheme. No significant changes to the visual amenity of the route are predicted, as views to the Proposed Scheme are blocked partially by vegetation.	No change	Negligible
8 Informal footpath running below Llanwonno upper tip (Low)	Repair of the informal footpath running along the tramway.	The area around Old Smokey, at the top of the valley will be reconnected to the bottom of the valley and the Afon Rhondda Fach.	Moderate Beneficial	Slight

14.6. Mitigation, Enhancement and Monitoring

- 14.6.1. Proposed mitigation measures for the construction and operation of the Proposed Scheme are outlined in Table 14.8 and Table 14.9 below. These tables also include opportunities for enhancement to the area.
- 14.6.2. Few mitigation measures were identified. For construction, these consist mainly in liaising with the local PRow officer to identify and arrange appropriate temporary diversions for local PRow and open access land. During construction, users will have to use an alternative route to PRow TYL/9/1 which will be bisected by the Proposed Scheme RLB, to prevent safety risks associated with PCEs interacting with construction operations, such as vehicle movements. Consultation and liaison with Sustrans, RCT and NRW will occur to ensure the impacts on NCN Route 47 are mitigated, through the use of signage and ensuring users are aware of the disruption in advance of when the works.
- 14.6.3. Although some of the CRow open access land will be closed off during construction, there are many alternative places and routes in the local area that the public can access. Formal arrangements will be discussed with the local PRow officer prior to construction.
- 14.6.4. Operational mitigation measures were mostly applied during the design of the Proposed Scheme. As described in Section 5, the design team sought to avoid permanent impacts on local PRow and open access land. However, PRow TYL/9/1 had to be permanently diverted by around the Receptor Site, extending journey length by around 80m. Landscaping will be embedded in the design of the Proposed Scheme to ensure that users can travel safely through the area and that the ambience and setting of the PRow footpath encourages its use, after construction is complete.
- 14.6.5. Once construction is finished the CRow public access land will be reopened to the public and access will return to as it was before the Proposed Scheme was started.

14.7. Residual Impact Assessment

Construction Phase

- 14.7.1. The impacts of the Proposed Scheme during the construction phase, after mitigation is applied, are outlined in Table 14.8.
- 14.7.2. The residual impacts occurring during the construction phase vary from **Negligible** to **Slight** in significance. The magnitude and significance of the effects on footpath TYL/9/1 have reduced from **Moderate Adverse** and **Moderate** pre-mitigation to **Slight Adverse** and **Slight** respectively, as it is assumed that an alternative route will be identified (in consultation with the local PRow officer) for users to access during the construction phase, therefore reducing the impact. The magnitude of residual impacts on other receptors have remained the same as before mitigation, due to either:
- mitigation measures not significantly reducing the magnitude of impacts on receptors;
 - no feasible mitigation being available; or
 - no mitigation being required.

Operational phase

- 14.7.3. The impacts of the Proposed Scheme during the operational phase, after the application of mitigation measures, are outlined in Table 14.9.
- 14.7.4. No mitigation was proposed for the operational stage of the Proposed Scheme, as these were embedded in the design of the Proposed Scheme. All residual assessments of impacts are as described in the preliminary impact assessment section.

Table 14.8 Construction phase mitigation and Residual Impact Assessment.

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
PCE M1	1 Footpath TYL/9/1 (Medium)	Total severance of footpath will lead to an alternative route having to be used.	Medium Adverse	During construction, appropriate temporary signage should be deployed to identify safe alternative route for users around the RLB of the site. Consultation should be undertaken with the local PRow officer, prior to construction, to inform users of the impact and seek opinion on the provision of a safe alternative route for users. No mitigation proposed to reduce alternative journey length.	Slight Adverse	Slight
	2 Footpath YCC/16/1 (Medium)	Indirect impacts through increased pedestrian traffic and noise levels from construction activities.	Slight Adverse		Slight Adverse	Slight
	3 Other informal footpaths (Low)	Informal paths will be inaccessible during construction. Alternative routes will need to be followed by users.	Medium Adverse		Medium Adverse	Slight
PCE M2	4 Open country public access land (Low)	Open country land within the RLB will be inaccessible during construction. Users will have to use other open access land in the area.	Medium Adverse	Consultation should be undertaken with the local PRow officer prior to construction to inform users of the impact and seek opinion on the provision of safe alternative open access areas.	Medium Adverse	Slight

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
	5 Public forest (Low)	Change in ambience to the public forest adjacent to the Proposed Scheme and inaccessibility to the small amounts of public forest within the RLB	Medium Adverse		Medium Adverse	Slight
N/A	6 NCN Route 881 (Very High)	No impact anticipated during construction as the route will remain closed as it is at the time of writing	No change	No mitigation proposed.	No change	Negligible
PCE M3	7 NCN Route 47 (Very High)	Part of the route will be used as the access route to get construction vehicles to site at the beginning of the construction period, and again to get them off site at the end of the construction period.	Slight	Liaison with Sustrans, RCT and NRW, signage put up along route and surrounding area to ensure that users are aware of when the route will be used by heavy plant vehicles as far in advance as possible.	Slight Adverse	Negligible

Table 14.9 Operation phase mitigation and Residual Impact Assessment.

Ref	Receptor ID and sensitivity	Impact and resulting Effect	Magnitude (pre-mitigation)	Mitigation	Residual magnitude	Residual significance
PCE M4		Permanent diversion of PRoW by approximately 80m around the Receptor Site.	Slight adverse	Provision of a permanent alternative new footpath to replace the PRoW.	Negligible Beneficial	Slight
N/A	1 Footpath TYL/9/1 (Medium)	Indirect impacts on the setting and ambiance of the PRoW from changes in the topography of the surrounding landscape.	Negligible Adverse	No mitigation proposed	Negligible Adverse	Negligible
N/A		Better definition of the location of the TYL/9/1 PRoW footpath within the landscape, clearly guiding users along the formal route.	Slight Beneficial	No mitigation proposed	Slight Beneficial	Slight
N/A	2 Footpath YCC/16/1 (Medium)	No change. Indirect impacts on the setting from of the PRoW from changes in the topography of the surrounding landscape.	Negligible Adverse	No mitigation proposed	Negligible Adverse	Negligible
N/A	3 Other informal footpaths (Low)	The network of informal footpaths will be removed through the placement and landscaping of the Receptor Site. However, users will still have access to the area and to the formal PRoWs.	Slight Adverse	No mitigation proposed.	Slight Adverse	Negligible
N/A	4 Open country public access land	Access will be returned to as it was before the landslips and rendered safer through the removal of material form the valley side.	Slight Beneficial	No mitigation proposed	Slight Beneficial	Slight

	(Low)					
N/A	5 Public forest (Low)	Access will be as before construction began.	No change	No mitigation proposed	No change	Negligible
N/A	6 NCN Route 881 (Very High)	The use of the cycle route will be made safer and more accessible as a result of the Proposed Scheme.	Slight Beneficial	No mitigation required	Slight Beneficial	Moderate
N/A	7 NCN Route 47 (Very High)	The use of the cycle route will be as it was before the Proposed Scheme was implemented.	No change	No mitigation proposed	No change	Negligible
N/A	8 Informal footpath running below Llanwonno upper tip (Low)	Repair of the footpath and tramway, reconnecting the area around Old Smokey, at the top of the valley with the bottom of the valley and the Afon Rhondda Fach.	Moderate Beneficial	No mitigation required	Moderate Beneficial	Slight

14.8. Cumulative Effects

- 14.8.1. Phases 2 and 3 of the Tylorstown project (ref 20/0993/35) are moving material from the Afon Rhondda Fach valley to the riverbank clearing the area of NCN 881 and making it available for reconstruction. The Proposed Scheme alongside Phases 2 and 3 will cumulatively have a beneficial impact on the NCN, through first clearing the cycle route for use followed by ensuring that future slips onto the route are prevented through removal of any potentially unstable material.
- 14.8.2. In addition to this, RCTCBC are currently producing preliminary designs for a new Active Travel Route consisting of a Cycle Route along the Afon Rhondda Fach as well as links from the route to key locations in the area. By stabilising material at the top of the valley, the Proposed Scheme is facilitating these future improvements to local and national cycling networks. Preliminary designs of this Active Travel Route are available in in Volume 2: Plan V2-S14-0002.
- 14.8.3. The temporary deposit and storage of approximately 8,000m³ of material on Station Road (ref 20/1312/08) and approximately 22,000m³ of material on the land across from Oaklands Business Park (ref 20/1313/08) does not interact with any PRowS in the area.
- 14.8.4. The storage of material on the land across from Oaklands Business Park will be on CRoW open country public access land, however, the land will only be temporarily inaccessible and will be inaccessible at a different time to the land within the RLB of the Proposed Scheme. Therefore, the impacts on users will not be significant and loss of access temporary.

14.9. Summary

- 14.9.1. This chapter has assessed the potential effects of the Proposed Scheme on PCE during its construction and operational stages. The Proposed Scheme is expected to have no significant adverse effects on PCE receptors in the local area as well as significant (**Moderate**) and non-significant beneficial effects on local PCE amenities, by increasing the safety and accessibility of the routes in the area, through landscape improvements. These key impacts are summarised below.
- 14.9.2. During construction:
- the greatest impact will be on the PRowS footpath TYL/9/1, the informal footpaths, the CRoW open country public access land and public forest within the RLB. These receptors will be directly impacted by the Proposed Scheme through severance of routes or removal of access to land. The effects of these are considered to be of **Slight** significance and are therefore not considered to be material in the decision-making process;
 - Users will have to utilise alternative route for PRowS TYL/9/1 and the informal footpaths, which will be bisected by the Proposed Scheme RLB to accommodate construction operations such as vehicle movements and landscaping. However, the area has several PRowS and informal footpaths that are likely to be used by the public as alternatives during the construction phase;
 - There is likely to be an increase in usage of the PRowS YCC/16/1 during construction due to the closure of footpath TYL/9/1. However, the increase in noise and disruption from construction plant and traffic on site may also deter people from using the route during the construction period;

- NCN Route 47 will be directly impacted during the construction phase of the Proposed Scheme, but it is only anticipated that the route will be used twice by construction plant vehicles as an access route to get the vehicles to and from the site at the beginning and the end of the construction period; and
- Although some of the CRoW open access land will be closed off during construction there are many alternative places and routes in the local area that the public can access. Once construction is finished the land will be reopened to the public and access will be as it was before the Proposed Scheme was started.

14.9.3. During operation:

- PRow footpath TYL/9/1 will be permanently diverted around the Receptor Site, increasing journey length by approximately 80m to users. However, the Scheme will provide a new, improved and more formalised footpath and therefore there will be a **Negligible Beneficial** effect on the PRow route. There will also be an indirect impact on the PRow, due to the change in setting and views from the footpath as a result of changes to the adjacent topography. Visual impacts are assessed in further detail in the Landscape and Visual chapter (Chapter 8);
- The Scheme will result in a **Moderate Beneficial** effect on the disused tramway/footpath below Llanwonno Upper Tip, through the repair of the footpath and tramway, reconnecting the area around Old Smokey, at the top of the valley with the bottom of the valley and the Afon Rhondda Fach; and
- There will be a beneficial residual impact on both the open country public access land and the NCN Route 881 due to improvements in the local landscape resulting in more stable landforms and thus safer access.

15. Cumulative Effects

15.1. Introduction

- 15.1.1. Cumulative effects refer to the collective influence of the Proposed Scheme and any other developments in the area, proposed or existing, on an aspect of the environment, including anthropogenic receptors. Each technical chapter of this Environmental Statement (ES) has assessed the cumulative effects considering the impacts from both the Proposed Scheme and any other developments in the area. These are known as inter-project effects. In comparison, this chapter assesses the cumulative effects on a single receptor from the impacts of multiple environmental topics caused only by the Proposed Scheme. These are known as intra-cumulative effects. The assessment of both inter- and intra-project effects is defined in more detail in Section 15.3.
- 15.1.2. When considered in isolation, as individual environmental topics, the environmental effects of the Proposed Scheme on a receptor may not be significant. However, where individual effects are considered in combination, the resulting cumulative effect may be significant. For example, residents in a community located within close proximity of a construction site may be adversely affected by changes to noise levels, air quality and visual aesthetics which, as assessed individually in the ES, are not significant. However, when considered together these could cause a significant effect on that community that would not be picked up without a separate cumulative assessment.
- 15.1.3. It should be noted, however, that certain environmental topics are closely linked, for example, biodiversity and landscape. As such, as part of the iterative nature of Environmental Impact Assessment (EIA) and design development, multiple impacts may already have been considered.
- 15.1.4. This chapter aims to highlight the combined intra-project effect of impacts across all technical disciplines. It should be read in conjunction with the individual environmental topic chapters which address the potential from cumulative effects resulting from inter-project effects. It does not attempt to reiterate all effects on receptors as detailed in each of the topic chapters; instead it identifies where multiple effects on a receptor may combine to create an effect which is more significant.

Study Area

- 15.1.5. The study area for the assessment of environmental impacts is set for each individual technical discipline with reference to best practice guidance unique to each. As such, there is not always a common study area boundary across topics with those used ranging from a distance of 2km to within the confines of the development site. The assessment of intra-project cumulative effects therefore brings together all impacts identified on a receptor across the specialist topic chapters, regardless of the study area extent applied.

15.2. Legislation, Policy and Guidance

- 15.2.1. The assessment of cumulative effects is required within EIA through the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Schedule 4, Paragraph 5 of the Regulations states that an Environmental Statement should include a description of the likely significant effects of the development resulting from, among other items, *“the cumulation of effects with other existing and/or approved projects, taking into account any*

existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources”.

15.2.2. This chapter has been prepared in line with the following relevant legislation and guidance:

- Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017⁸⁹;
- Institute of Environmental Management and Assessment (IEMA) Outlook Journal, Volume 7: ‘Demystifying cumulative effects’ 2020⁹⁰;
- Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal LA104 ‘Environmental assessment and monitoring’ 2020⁹¹; and
- ‘Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions’ 1999⁹².

15.3. Assessment Methodology

Methodology

Types of Impact

- 15.3.1. **Intra-project cumulative effects:** a resource or receptor is affected by impacts from a single project and those impacts act together to create a combined impact greater than the individual components.
- 15.3.2. **Inter-project cumulative effects:** a resource or receptor is affected by impacts from multiple projects at the same time and those impacts act together to create a combined impact greater than the individual components.
- 15.3.3. **Additive effects:** impacts from the same or different projects affect a resource or receptor in a similar way at the same time creating an ‘in combination’ impact.
- 15.3.4. **Synergistic effects:** different types of impacts from either the same or different projects affect a resource or receptor and interact to create a new, separate impact whilst also increasing their significance.

Impact Identification and Assessment

- 15.3.5. The cumulative impacts of the Proposed Scheme have been identified by cross referencing the individual receptors (or categories of receptors) affected and their residual impacts within each topic chapter. Therefore, any mitigation proposed is taken into account in the assessment of cumulative effects.

⁸⁹ Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Available online at: <https://www.legislation.gov.uk/wsi/2017/567/contents/made>

⁹⁰ IEMA Outlook journal, July 2020. Volume 7: Demystifying cumulative effects. Available online at: <https://www.iema.net/recognition/eia-quality-mark/impact-assessment-outlook-journal>

⁹¹ Highways England, 2020. Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal LA104 ‘Environmental assessment and monitoring’. Available online at: <https://www.standardsforhighways.co.uk/dmrbs/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a>

⁹² European Commission, 1999. Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Available online at: <https://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf>

- 15.3.6. The receptors and impacts were combined using a matrix (Table 15.1), whereby receptors were listed against topic chapters and a mark placed in the matrix where an impact (beneficial or adverse) had been identified. The matrix was then evaluated to identify where multiple impacts apply to a receptor.
- 15.3.7. As some topic chapters use different scales of significance, reporting in the matrix has been simplified to the scale detailed in Table 15.2.

Table 15.1 Impact significance scale used in the matrix of cumulative effects.

Symbol	Description
•	Positive effect
O	Negative effect
/	No effect or Neutral effect
-	Not applicable or receptor not assessed

Determining the significance of Cumulative Effects

- 15.3.8. Where multiple impacts are identified on the same receptor there is potential for the combined significance of effects to be greater than the significance on its own. There is also potential for a receptor to be affected adversely under one topic but have beneficial effects under another. In such cases, a balance between the two has been established based on professional judgement.
- 15.3.9. The significance of cumulative effects is determined by the extent to which the impacts can be accommodated by the receptor.
- 15.3.10. In determining significance, the following factors were considered:
- the receptors affected;
 - how the activity or activities will affect the condition of the receptor/resource;
 - the probability of such effects occurring; and
 - what capacity the receptor/resource has to absorb further effects before the change becomes irreversible.
- 15.3.11. Where cumulative effects were identified, their significance has been assessed against the framework outlined in Table 15.2.

Table 15.2 Framework for determining the significance of cumulative effects.

Significance	Effect
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Effects that may become a key decision-making issue.
Moderate	Effects that are unlikely to be issues on whether the project design should be selected. Future work may be necessary to improve on current performance.
Minor	Effects that are locally significant.
Not significant	Effects that are beyond the current forecasting ability or are within the ability of the resource/receptor to adapt to such change.

Limitations and Assumptions

- 15.3.12. The interaction of impacts on a receptor/resource can be complex and subjective, making the prediction and assessment of cumulative effects difficult. This is further complicated when final details of certain elements of the Proposed Scheme or other proposed developments are not known. The assessment of cumulative effects is therefore based on all agreed parameters and known details at the time of publication, but effects may be subject to change as the Proposed Scheme progresses. However, where final details are not known, a worst case has been assumed. Assessments also will require a level of professional judgement.
- 15.3.13. The study area for the assessment of environmental effects is set by best practice guidance for the individual topic areas covered in the ES. As such no common boundary was used to carry out the cumulative assessment and only the study areas assessed within the technical chapters themselves were considered.

15.4. Assessment of Effects

- 15.4.1. As stated in Section 15.1, this chapter only assesses the intra-project cumulative effects, however, these effects have been broken down into those associated with the construction and operational phases of the Proposed Scheme. Only effects that are of a **Moderate** level or higher are considered. Negligible and minor impacts have not been brought forward to the intra-project cumulative impact assessment.

Potential for Construction Related Intra-Project Effects

- 15.4.2. The assessments made within the technical chapters of the ES did not identify any moderately adverse residual impacts for during the construction phase of the Proposed Scheme. Therefore, there are no construction phase impacts assessed within this chapter. Additionally, as works progress across the Proposed Scheme, the magnitude of different impacts will vary, as different stages of construction works will generate variable impact magnitudes. However, these impacts will be temporary and transient in nature.

Potential for Operational Related Intra-Project Effects

- 15.4.3. The Proposed Scheme will introduce a new landform on the hillside behind Old Smokey. Table 15.3 sets out the receptors that are likely to be sensitive to operational phase effects. The residual effect column identifies effects from the technical assessment chapters that cause

greater than negligible effects and identify whether there are any individual impacts that could combine as an effect upon a given receptor. Table 15.4 below provides a summary of the interactions between identified effects of the Scheme and where these combine to produce cumulative effects.

Table 15.3 Operational phase receptors and residual/ cumulative effects

Receptor(s)	Residual Effect	Potential for Cumulative Effect
Tylor's Newydd Tip heritage asset	Moderate indirect visual impact from the Receptor Site and resurfacing of Tramway (TT03)	No potential for cumulative effects.
Welfare Hall, Tylorstown Grade II Listed Building		
Viewpoint 5 – from PRow TYL 9/1 Blaenllechau Road	Moderate adverse impact through loss of the visual amenity for the receptor with the direct intrusion of large embankments at the Receptor Site.	
Viewpoint 6 – from PRow TYL 9/1 south east of the Old Smokey	Moderate adverse impact through loss of the visual amenity for the receptor with the direct intrusion of large embankments at the Receptor Site.	
Afon Rhondda Fach – source to confluence Rhondda	Moderate beneficial impact from a permanent reduction in the amount of pollutants and sediment reaching the Afon Rhondda Fach by increasing length of pathway between the source of potential contamination (colliery material) and the receptor.	
Old Smokey SINC and Priority Habitats	Moderate beneficial impact	
Reptiles	Moderate beneficial through the restoration and regeneration	

Table 15.4 Matrix of intra- project cumulative effects

Environment al Receptor	Air Quality	Cultural Heritage	Landscape and Visual Effects	Biodiversity and Nature Conservation	Geology, Soils and Waste	Water Environment and Flood Risk	Noise	Major accidents and Disasters	Pedestrians, Cyclists and Equestrians	Significance
Tylor's Newydd Tip heritage asset	/	O	O	/	/	/	/	/	/	No cumulative effects
Welfare Hall, Tylorstown Grade II Listed Building	/	O	O	/	/	/	/	/	/	No cumulative effects
Viewpoint 5 – from PRow TYL 9/1 Blaenllechau Road	/	/	O	/	/	/	/	/	O	No cumulative effects
Viewpoint 6 – from PRow TYL 9/1 south east of the Old Smokey	/	/	O	/	/	/	/	/	O	No cumulative effects
Afon Rhondda Fach – source to confluence Rhondda	/	/	/	/	/	•	/	/	/	No cumulative effects
Old Smokey SINC and Priority Habitats	/	/	/	•	/	/	/	/	/	No cumulative effects
Reptiles	/	/	/	•	/	/	/	/	/	No cumulative effects

O : Negative effect • : Positive effect / : No effects or neutral effects - : Not applicable or Receptors not assessed

15.5. Summary

- 15.5.1. During the construction phase, no receptors are expected to be impacted by any cumulative impacts.
- 15.5.2. During the operational phase, the main adverse impacts will be on the landscape and the cultural heritage of the area, but these impacts will reduce over time and will not cause any cumulative impacts during the operational phase of the Proposed Scheme.
- 15.5.3. The Proposed Scheme will overall have a beneficial impact on the area for biodiversity and public access, as well as for the long-term record/preservation of known heritage features, but most importantly the Proposed Scheme will reduce the likelihood of future slips impacting residents of Tylorstown, recreational users of the Rhondda Fach Leisure Centre and the open access land/public footpaths.



Part Three Summary and Conclusions

16. Summary and Conclusions

16.1. Introduction

- 16.1.1. This chapter provides a summary of the environmental topics with significant residual construction or operational effects associated with the Proposed Scheme under each of the individual environmental topic assessments. Significant effects are those that are rated as **Moderate** or higher.
- 16.1.2. This chapter also draws overall conclusions for the environmental implications of the Proposed Scheme based on the identified residual effects.

16.2. Summary of Residual Effects

Air Quality

- 16.2.1. The mitigation measures outlined within this report have been considered effective at reducing the magnitude of dust and traffic emissions and, therefore, no significant residual effects are expected on nearby human or ecological receptors.

Cultural Heritage

- 16.2.2. The cultural heritage assessment has identified that six receptors will be subject to significant residual effects, after the consideration of mitigation measures.
- 16.2.3. The Rhondda Fach Eastern Enclosed Valley sides (HLCA023) and Rhondda Uplands (HLCA 030) will be directly by the Proposed Scheme, resulting in a 3.05% and 0.4% absolute loss of HLCA respectively and relative loss of HLCA key elements. This constitutes a **Moderate** significant adverse effect.
- 16.2.4. Indirect visual effects on the Tylor's Newydd Tips Group Site (GGAT07879m) as a result of the removal of a substantial part of RH01 Llanwonno Upper Tip (TT01), the widening of Tramway (TT03) and the new Receptor Site will result in a Severe significant adverse effect. RH02 'Old Smokey' tip and Welfare Hall, Tylorstown (LB18284). This will also have a **Moderate** significant adverse effect on RH02 'Old Smokey' tip and Welfare Hall, Tylorstown (LB18284).
- 16.2.5. The Scheme will also have **Moderate** indirect physical and non-physical (visual) effects on nearby receptors such as the Rhondda Fach Eastern Enclosed Valley sides (HLCA023) and Wattstown (HLCA018).

Landscape and Visual

- 16.2.6. The proposed Scheme was found to have a **Moderate** and significant adverse effect on the Hillside and Scarp Slopes Mosaic Valley East landscape receptor during construction. The implementation of mitigation measures such as sensitive landscaping and re-vegetation of the Receptor Site will not fully mitigate these effects at Year 1 of operation. However, by Year 15, the significance of this effect will be reduced to **Slight Adverse**.
- 16.2.7. In summary, following the maturation of the proposed landscape mitigation measures, no significant adverse effects are anticipated for local landscape receptors.

- 16.2.8. In terms of visual impacts, the Proposed Scheme will have significant adverse effects (from **Moderate** to **Very Major** adverse) on all viewpoints considered in the assessment, during construction.
- 16.2.9. During operation, the Proposed Scheme will have a **Moderate** adverse effect on views from Heol Tir Gwaidd, Penrhys (residential) at Year 1 but this will reduce to a **Slight**, and therefore no longer significant, adverse effect by Year 15. The Scheme will also have a significant adverse effect on views from PRoW TYL 9/1, with a significance of **Major** at Year 1 reducing to **Moderate** by Year 15.

Biodiversity

- 16.2.10. Desk studies and field surveys have shown the site to be located within a highly valued nature conservation area in terms of designations and SINC designation and Priority habitats. The Proposed development encompasses the Tylorstown Slopes SINC designated for its extensive mosaic ffridd habitat.
- 16.2.11. The Scheme will cause damage to and the loss of priority habitats such as Semi-natural broadleaved woodland, unimproved acid grassland and dry-heath. Damage to these will be minimised and mitigated through the implementation of Ecological Method Statement and Mitigation Strategy. Turf translocation and topsoil re-instatement for habitats of higher biodiversity value will mitigate against the long-term loss of habitat on the site, reducing the effects to a **Slight** significance.
- 16.2.12. Potential impacts on species during site clearance will also be mitigated through the implementation of the Ecological Method Statement and Mitigation Strategy, including a site clearance method statement for the protection of reptiles and amphibians.
- 16.2.13. With the implementation of the mitigation and enhancement measures, such as the creation of micro-climates in the final landform and the implementation of a five-year Aftercare Plan, the long-term result will be an increase in the diversity of habitats and species present on the site, resulting in a beneficial effect of **Moderate** Significance.

Geology, Soils and Waste

- 16.2.14. The assessment has identified that, provided the correct procedures and guidance are followed, and appropriate techniques are adopted during construction and operation, the potential adverse effects on local geological receptors, local waste management facilities and regional mineral resources can be limited to a **Slight** or **Negligible** significance.

Water Environment & Flood risk

- 16.2.15. The assessment has identified that, provided appropriate mitigation measures are implemented, such as the use of pollution prevention measures and best-practice working methods, adverse effects on water environment & flood risk receptors will be limited to a **Slight** or **Negligible** significance during construction.
- 16.2.16. Potential operational adverse impacts on water environment & flood risk receptors will be mitigated through the provision of a partially vegetated drainage system and vegetated capping for the colliery material at the Receptor Site, limiting the significance of these effects to **Slight** or **Negligible** (or not significant).
- 16.2.17. The stabilisation of valley side to prevent future slips and the moving of colliery material further away from sensitive waterbodies will also provide a **Moderate**, and therefore significant, beneficial effect to the water environment.

Noise and Vibration

- 16.2.18. BS 5228-1:A1:2014, the approved code of practice for the purpose of giving guidance on appropriate methods for minimising noise from construction sites, suggests a limit of 55 dB $L_{Aeq,1h}$ (free-field) for daytime construction noise for earth moving activities likely to occur for a period in excess of six months. This limit is not exceeded at any residential receptor around the proposed Scheme and it is marginally exceeded, occasionally, at Rhondda Fach Leisure Centre (a non-residential receptor). Consequently, noise adverse effects during construction are considered to be **Negligible**.
- 16.2.19. Construction vibration and operational noise and vibration effects were scoped out of this assessment these are very unlikely to occur.

Major Accidents and Disasters

- 16.2.20. The Proposed Scheme will reduce the risk of major accidents and/or disasters by moving colliery material, currently at risk of slipping in the future. The material is being moved from the Llanwonno Upper Tip site, which lies within a development high risk area and on the side of the Afon Rhondda Fach valley, to the Receptor Site, which lies outside of the development high risk area, in a flatter location. This will protect key receptors (such as the Afon Rhondda Fach, Rhondda Fach Leisure Centre, NCN Route 881 and Residents of Tylorstown) against the impacts of future slips.
- 16.2.21. No other risk of Major Accidents and Disasters were identified to be of sufficient likelihood or severity to be considered further in this assessment.

Pedestrians, Cyclists and Equestrians

- 16.2.22. The Proposed Scheme is expected to have no significant adverse effects on PCE receptors in the local area, both during construction and operation. This includes the temporary and permanent diversion of a PRoW footpath running through the Receptor Site area.
- 16.2.23. The Proposed scheme will also have significant (**Moderate**) and non-significant beneficial effects on local PCE amenities, by increasing the safety and accessibility of the routes in the area and through landscape improvements.

Intra- project cumulative effects

- 16.2.24. The assessment of intra- project cumulative effects has determined that there will be no cumulative effects on any of the receptors impacted by the Proposed Scheme during both the construction and operation phases.
- 16.2.25. It identified that the Proposed Scheme would have an overall beneficial impact to the area for biodiversity, public access and cultural heritage.

16.3. Schedule of Mitigation

- 16.3.1. A variety of mitigation measures have been identified to minimise the likely significant effects of the Proposed Scheme for each of the topic assessments. These are discussed in the relevant topic chapters.
- 16.3.2. A Mitigation Schedule has been compiled which brings together all of the proposed measures. This is provided in Volume 3: Appendix 16.1 of this Environmental Statement. A set of companion plans that illustrate the mitigation measures and their locations is provided in Volume 2: Plan V2-S16-0001 to 0003.

16.4. Conclusions

- 16.4.1. The Proposed Scheme has been proposed by Rhondda Cynon Taf County Borough Council (RCTCBC) to stabilise colliery material currently located within Llanwonno Tip, on the slope of the Afon Rhondda Fach valley, to prevent future landslips such as the one that occurred in February 2020. To achieve this, approximately 195,000m³ of colliery material will be removed from Llanwonno Tip, the majority of which will be transported to a Receptor Site adjacent to old Smokey to be landscaped into a new stable landform. The remainder of the material will be used to fill in the slip scar at Llanwonno Tip. New drainage arrangements will be provided to manage surface water drainage at the tip and the Receptor Site.
- 16.4.2. The Proposed Scheme, as a “major development” (as it exceeds 1ha in area), will be subject to the Pre- Application Consultation (PAC) process. This Environmental Statement (ES) will be subject to statutory and public stakeholder review and consultation as part of the PAC process prior to submission for full planning application.
- 16.4.3. The Proposed Scheme design has been shaped by consultation with RCTCBC and the authors of the environmental assessments within this ES. As such the design includes embedded mitigation to reduce the environmental effects of the construction and operation of the Proposed Scheme. This includes landscape design, drainage design, topsoil and vegetation management and construction management practices.
- 16.4.4. There will be significant adverse effects associated with the construction phase of the scheme, however, these will be temporary in nature and managed through mitigation and best practice working methods which will be detailed in a future Construction Environmental Management Plan (CEMP).
- 16.4.5. The overriding significant effect of the Scheme is the beneficial effect that stabilising the colliery material will have on reducing the risk of future slips or other major accidents and disasters. As a result, this also reduces risks posed to the water environment and public rights of way, amongst others.
- 16.4.6. There will, however, be significant adverse effects associated with the operational phase of the Proposed Scheme, most of which are related to landscape and visual impacts. These effects will be subject to consultation during the PAC process, and potentially future revision based on the outcomes of the pre-application discussion and feedback. Where any uncertainty exists for any given topic, a ‘worst case’ has been assumed and assessed. As such this creates opportunities to refine the Proposed Scheme design and mitigation following the PAC process.

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