

Whittington CSEC – Mining Risk & Minerals Impact Assessment

National Grid Cotswolds Visual Impact Provision (VIP) Project

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1 INTRODUCTION

1.1 Purpose of Report

- 1.1.1 Arcadis Consulting (UK) Ltd. (Arcadis) was instructed by National Grid (“the client”) to undertake a mining risk and minerals impact assessment for the proposed Whittington Cable Sealing End Compound (CSEC) (hereafter referred to as the ‘Proposed Project’). The Proposed Project forms part of the wider Cotswolds Visual Impact Provision (VIP) Project (hereafter referred to as the ‘wider project’), the purpose of which is to underground a section of 400kV overhead electricity transmission lines, to mitigate the visual impact of existing electricity infrastructure through part of the Cotswolds National Landscape (previously known as Area of Outstanding Natural Beauty).
- 1.1.2 The Proposed Project is for the construction of a CSEC at Whittington to facilitate the connection between new underground cables and the existing overhead line (OHL) and the associated permanent access road (and bell-mouth) to the CSEC, in addition to temporary bell-mouths created to support the cable construction along classified roads. The Proposed Project is located within Cotswold District.
- 1.1.3 There are four redline boundaries related to the Whittington CSEC planning application, as shown in Figure 1 in Appendix A, located at approximate central grid reference SO 99147 20917. For the purposes of this report the redline boundaries are named; Whittington A, Whittington B, Whittington C and Whittington CSEC (which incorporates the CSEC location itself).
- 1.1.4 This report provides supporting information for the Proposed Project planning application and demonstrates that the works will likely not give rise to significant environmental effects related to mining risks and mineral impacts.

1.2 Scope and Objectives of Report

- 1.2.1 The objectives of this report are to:
- Provide a desk study-based review of all available information (as described in Section 1.4) related to the Proposed Project redline boundaries;
 - Provide supporting information for the CSEC planning application;
 - Demonstrate that the Proposed Project will not likely give rise to any significant environmental effects relating to mining risks; and
 - Provide a minerals impact assessment for the Proposed Project redline boundary.

1.3 Proposed Project

- 1.3.1 The Proposed Project forms part of the wider Cotswolds VIP Project (the 'wider project'), the purpose of which is to underground a section of 400kV overhead electricity transmission lines, to mitigate the visual impact of existing electricity infrastructure through part of the Cotswolds National Landscape. The wider project is located immediately south of the B4632 and from Breakheart Plantation, runs in a south-westerly direction to the east of Cleeve Common Site of Special Scientific Interest (SSSI), past Wontley, Drypool and Wood Farms, towards Dowdeswell Wood.
- 1.3.2 The wider project will comprise:
- The removal of a section of OHL, including the permanent removal of 16 pylons (18 pylons will be removed in total, however, two will be replaced under Permitted Development).
 - Underground cabling of approximately 7km in length.
 - Two new cable sealing end compounds (CSECs) at each end (north and south) and associated replacement terminal pylons (as mentioned above), to connect the new underground cables to the remaining existing overhead line.
 - Associated temporary works to facilitate construction, including temporary/permanent access junctions and roads, a temporary haul road, construction compounds, material storage and welfare facilities.
 - Ancillary off-site infrastructure (including installation of arcing horns and shunt reactor installation/connection).
- 1.3.3 The majority of the works will be undertaken using Permitted Development rights under Schedule 2 of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended), however, the CSECs require planning permission. The scope of this report is for the Winchcombe CSEC and associated works only (hereafter referred to as the 'Proposed Project').
- 1.3.4 The Proposed Project is for the construction of a CSEC at Whittington to facilitate the connection between new underground cables and the existing OHL and the associated permanent access road (and bell-mouth) to the CSEC, in addition to temporary bell-mouths created to support the cable construction along classified roads. The Proposed Project is located within Cotswold District.
- 1.3.5 The proposed works within the Whittington CSEC redline comprise:
- CSEC infrastructure;
 - Underground cabling from the Whittington CSEC towards the Winchcombe CSEC (note: this is Permitted Development);
 - A permanent access road to the CSEC, including a bell-mouth with Ham Road and a turning area;
 - A hardstanding area where the overhead line meets with the new underground cables;
 - New screening comprising native trees, woodland and scrub planting; and
 - Temporary bell-mouths on three classified roads to facilitate construction.

- 1.3.6 The terminal pylon for the Whittington CSEC is located outside the CSEC redline (and is Permitted Development).

1.4 Sources of Information

- 1.4.1 The following have been resourced to compile the mining risk and minerals impact assessment in this report:
- British Geological Survey (BGS) BritPit records [1]
 - BGS Memoirs [2]
 - BGS Mineral Resource Map for Gloucestershire [3]
 - BGS Geology maps [4, 5]
 - BGS Mineral Resource Report [6]
 - National Library of Scotland (NLS) – Historical Maps [7]
 - The Coal Authority Interactive Map viewer [8]
 - Gloucestershire City Council 07 - Mineral Safeguarding Document [9]
 - Gloucestershire City Council 08 – The Future Supply of Minerals [9]
 - Gloucestershire City Council 09 – Area for Future Aggregate Working [9]
 - Gloucestershire County Council policies interactive map [10].

1.5 Limitations

- 1.5.1 This report has been prepared for the client in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document shall remain the property of Arcadis.
- 1.5.2 A site walkover was undertaken by Arcadis on 21st May 2024 for a visual assessment of potential site constraints identified from desk based sources as part of this report. During the site walkover some areas had restricted access due to dense vegetation which may have obscured potential ground features. These areas were generally located to the south along the A40 main road near the Whittington C redline boundary.
- 1.5.3 This report has been compiled from several desk-based sources that Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others.

- 1.5.4 This report has been written based upon information available at the time of writing as well as a site walkover survey. It was agreed the site walkover survey would be completed in areas where potential site constraints were previously identified only.
- 1.5.5 As part of the assessment process, an initial consultation request was sent to Gloucester County Council in order to obtain their views on the likely mineral resource areas within the Proposed Project boundary and to focus the assessment on the areas of interest for the local authority. Gloucester County Council's response has been incorporated into this report.
- 1.5.6 Full study limitations are presented in Appendix B.

2 SITE SETTING

2.1 Site Location and Description

- 2.1.1 There are four redline boundaries associated with the Whittington CSEC planning application (Figure 1 – Appendix A) and are approximately 4 km southeast of the centre of Cheltenham. The approximate grid reference for the Whittington CSEC redline boundary is SO 99147 20917, for Whittington A: SO 99455 22518, Whittington B: SO 99337 21843 and Whittington C: SP 01007 20551. The nearest central postcode to the redline boundaries is: GL54 4EY [11].
- 2.1.2 The redline boundaries are located within the Cotswolds, a National Landscape (previously known as Area of Outstanding Natural Beauty (AONB)) [12] and are located within Cotswold District in Gloucestershire.
- 2.1.3 The elevation of the site ranges from approximately 190 - 281 m AOD (metres Above Ordnance Datum) [13]. The highest point in the redline boundaries is in the north (Whittington A), with the site sloping downwards from north to south.
- 2.1.4 The site is predominantly agricultural fields with numerous unnamed roads running through the redline boundaries. The A40 runs directly through Whittington C in an east to west orientation. There are two public footpaths which run through the Whittington CSEC redline boundary, one named Cotswold Way and the other unnamed running along the unnamed road towards Middle Colgate Cottage. The Gloucestershire interactive map [10] titles these public footpaths as “Whittington Footpath” 21 and 19 respectively.
- 2.1.5 The Whittington redline boundaries are not located within a Site of Special Scientific Interest (SSSI). The closest SSSI is Puckham Woods, located approximately 1.60 km northeast of the Whittington CSEC redline boundary [14]. An ancient woodland named Dowdesdell Wood is also located approximately 70 m east from the Whittington CSEC redline boundary [14].

2.2 Geology

- 2.2.1 With reference to Figure 2 – Appendix C, there are no superficial deposits within any of the redline boundaries [4, 5].
- 2.2.2 The detailed bedrock geology is shown in Figure 3 – Appendix C and consists of the following [4, 5]:
- Birdlip Limestone Formation (Whittington A, B and CSEC redline boundaries).
 - Whitby Mudstone Formation (Whittington C redline boundary only).

- 2.2.3 There are no faults, artificial deposits or landslide deposits located within the Whittington CSEC redline boundary, Whittington A or Whittington B. There are landslide deposits located within the western edge of Whittington C redline boundary, with nearby artificial deposits approximately 60 m south of the boundary as seen in Figure 4 – Appendix C. The landslide deposits are predominantly related to the Whitby Mudstone Formations [5]. No areas of instability were noted within the site during the site walkover.
- 2.2.4 There are no areas of artificial ground mapped within the redline boundaries. However, there is potential for areas of artificial ground to be present the northern part of Whittington CSEC redline boundary due to an historic BritPit located nearby (10 m north) (refer to Section 3.1 for further details).

3 HISTORICAL MINE & QUARRYING ACTIVITIES

3.1 BGS BritPit Records

- 3.1.1 BritPit records provided by the BGS [1] show no historical quarries located within the four redline boundaries. The closest BritPit is Wood Farm approximately 10 m north of the Whittington CSEC redline boundary, with no others within 50 m radius of the redline boundaries as seen in Figure 5 - Appendix D. Further details are listed within Table 1 below.

Table 1 – Summary of Historical BGS BritPit Records [1] located within 10 m of redline boundaries

Name	Quarry Status	Type of Working	Commodity Extracted	Geology Quarried
Wood Farm	Closed	Open Pit/Surface Workings	Limestone	Birdlip Limestone Formation

- 3.1.2 The closest BGS BritPit record (Wood Farm) to the Whittington CSEC redline boundary correlates with the “quarry” location noted from available open-sourced historical OS map information via the National Library of Scotland (NLS) website [7].
- 3.1.3 It is unclear to the extent of the historical quarries or whether they have been infilled from viewing the historical (NLS) maps and BGS BritPit records. However, upon viewing aerial [14] and lidar imagery [15] there is evidence of a circular ground feature which encroaches into the Whittington CSEC redline boundary, thus it is likely a BritPit (known as Wood Farm) extends into the redline boundary.
- 3.1.4 A site walkover was completed in May 2024 to target identified constraints and to confirm if the BritPit encroaches into the redline boundary. A visual assessment within the area of Wood Farm BritPit identified a circular ground depression with limited vegetation compared to the surrounding area, and is shown in Plate 1 below.
- 3.1.5 An inspection of the field immediately south, and adjacent to, the BritPit was also undertaken however, there was limited accessibility due to dense vegetation growth which may have obscured some ground features. Based upon the site walkover survey it is considered likely that the Wood Farm BritPit encroaches within the proposed Whittington CSEC redline boundary in the area of the proposed temporary bellmouth, to the west of the CSEC itself.

- 3.1.6 With reference to the Geophysical Survey Report [17], Figures 35 and 38 appear to confirm the onsite observations and the presence of the BritPit extending south of Ham Road and encroaching into the redline boundary. This will be a constraint on site and will need to be considered during detailed design.
- 3.1.7 Based upon the visual assessment it is believed Wood Farm BritPit has been historically infilled. With reference to the Ground Investigation Factual Report [18] no exploratory holes were undertaken in the area of the Wood Farm BritPit. Therefore, further investigation would be required to ascertain the status of the pit including any areas of instability and the composition of any backfill material. The potential stability of this area would need to be considered for the design of the temporary bellmouth to the west of the CSEC site and associated works in this area.



Plate 1 - Wood Farm BritPit (red dash outline)

3.2 BGS Memoirs

- 3.2.1 BGS Memoirs [2] have provided little information on mining records within the redline boundaries, however they do provide details on mined commodities around the local area (precise locations unknown). The details provided in Table 2 below are extracted from *Mineral statistics of the United Kingdom of Great Britain and Ireland, being part 2 for 1858 (earthy minerals: clays and stones), 1860:*

Table 2 - Extract from BGS Memoirs on commodities extracted around the local area [2]

Name	Commodity Extracted	Usage
Naunton Lane (Fred Thackwell)	"Alluvial Clay"	Bricks for tin plate works
Tillery (J.Williams & Sons)	"Alluvial Clay"	Bricks and tiles
Cleeve Hill	Forest Marble	-
Leckhampton, Dowdeswell (William Shorey)	Cornbrash Limestone	-

3.3 Historical maps

- 3.3.1 Using the National Library of Scotland (NLS) website [7] the available open sourced historical OS maps indicate the closest BritPit [1] (Wood Farm) located approximately 10 m north of the Whittington CSEC redline boundary is noted as a "quarry". Due to the age of the historical maps and the unknown accuracies of the mapping there is low confidence in the true extents of the quarry shown on the maps. A site walkover confirmed that Wood Farm BritPit is likely to encroach within the Whittington CSEC redline boundary. This was confirmed with reference to information provided within the Geophysical Report [17] and will need to be considered during detailed design. Currently there is no ground investigation data for this area [18].
- 3.3.2 Some of the historical maps have limited information due to the scale of the map available for viewing and not all historical maps are covered for the redline boundaries.

3.4 BGS Geology maps

- 3.4.1 With correlation of BGS maps [4, 5] and historical geological maps available on the NLS website [7] the artificial ground south of Whittington C redline boundary can be seen to relate to historical railway tunnel workings. No further information was obtained regarding the landslide deposits.
- 3.4.2 An additional formation located between the Birdlip Limestone Formation and the Whitby Mudstone Formations (approx. 100 m from the Whittington CSEC redline boundary) was noted on the historical geological maps [7] described as the "Cotteswold Sands". "Cotteswold Sands" is now an obsolete term and now relates to the modern geological formation known as the Bridport Sand Formation. The Bridport Sand Formation is overlain with the Birdlip Limestone Formation with an unconformity between the two formations [4]. As the Bridport Sand Formation is not shown on current bedrock geology maps it is possible that the outcrop is thin or even absent and therefore there is limited or no outcrop and thus not mapped on the current geological maps.

3.5 Coal Authority Map viewer & Metalliferous Mining

- 3.5.1 With reference to The Coal Authority interactive map viewer website [8] and the BGS geological maps [4, 5] the redline boundaries are not within a Coal Authority Reporting Area, a Coal Authority Development High Risk Area, an Abandoned Mines Catalogue area or within a historical metalliferous mining area. Therefore, risks from coal mining and metalliferous activities are not anticipated within the redline boundaries.

3.6 Active Quarries

- 3.6.1 With reference to all available information, no active mines or current quarrying operations were noted within the redline boundaries.

3.7 Summary

- 3.7.1 There are no BritPits (historical quarries) recorded within the redline boundaries. The closest BritPit is approximately 10 m north of the Whittington CSEC redline boundary with the main commodity extracted via surface workings from limestone of the Birdlip Limestone Formation. There are no active quarries located within 1 km of the redline boundaries.
- 3.7.2 BGS Memoirs provide little information on site specific records other than local commodities mined.
- 3.7.3 Historical maps generally show many historical quarries correlate with the BGS BritPit records and give an indication of their extent, although their actual extent could not be confirmed without further investigation. Currently no ground investigation data exists for the area of Wood Farm BritPit [18]. Upon viewing aerial and lidar imagery there is evidence of a circular ground feature which encroaches into the Whittington CSEC redline boundary. During the site walkover Wood Farm BritPit was identified and was found to be circular, with a slight ground depression, and limited vegetation. The field immediately south, and adjacent to the BritPit contained some areas of dense vegetation which may have obscured some visual features. Based upon the site walkover information and information provided within the Geophysical Report [17] it appears that the BritPit does encroach onto the proposed Whittington CSEC redline boundary. The presence of this BritPit along with its condition stability and composition of backfill material will need to be considered during detailed design.
- 3.7.4 There are no faults, artificial deposits or landslide deposits located within the Whittington CSEC redline boundary, Whittington A or Whittington B. There are landslide deposits located within the western edge of Whittington C redline boundary with nearby artificial deposits approximately 60 m south of the boundary. The landslide deposits are predominantly related to the Whitby Mudstone Formations. There is a potential risk of further mass movements occurring where steep slopes exist on site but which are also not currently mapped.
- 3.7.5 There is no artificial ground mapped within the redline boundaries however there is a possibility of deposits being present within the northern part of Whittington CSEC redline boundary due to a BritPit (Wood Farm) located close by (10 m north).

- 3.7.6 The redline boundaries are not within a Coal Authority Reporting Area, a Coal Authority Development High Risk Area, an Abandoned Mines Catalogue area or within a historical metalliferous mining area. Therefore, risks from coal mining and metalliferous activities are not anticipated within the Whittington redline boundaries.
- 3.7.7 With reference to all available desk study information, no active mines or current quarrying operations were noted within the redline boundaries.

4 MINERAL RESOURCE IMPACT ASSESSMENT

4.1 Introduction

- 4.1.1 The key purpose of this exercise is to determine if the Proposed Project will adversely affect the mineral resource capacity with the redline boundaries, located within the defined Mineral Safeguarding Area (MSA) of the local authority (Gloucestershire).
- 4.1.2 Areas of known extractable resources have been derived from available data provided by the local authorities and BGS materials.

4.2 National Planning Policy Framework

- 4.2.1 Mineral Planning is an important matter for local authorities as mineral resources make an essential contribution to the area and the country's prosperity and quality of life. As such, MSAs have been designated by some local authorities to protect potential mineral resources from sterilisation caused by incompatible developments. An incompatible development is defined as one which prevents future extraction of the mineral resources in that area.
- 4.2.2 The national basis for the development of local planning policies prepared by the local authorities is the National Planning Policy Framework (NPPF) [16], this document includes guidance for local authorities on protecting their mineral resource (pg. 58). A key feature of the NPPF is the production of MSAs so that mineral resources are not needlessly sterilised. A MSA is "an area designated by Mineral Planning Authorities which covers known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development" [16].

4.3 Mineral Safeguarding Areas

- 4.3.1 Mineral safeguarding is defined within Gloucestershire County Council's (GCC) Local Plan [9] *07 Mineral Safeguarding Document* as the, "...means available to avoid the needless sterilisation of primary mineral resources by non-mineral developments. National policy and practice guidance advises this can be achieved through defining MSAs, which identify the location of specific minerals of local and national importance and an appropriate policy framework to assess the significance of the matter and to consider mitigation where appropriate".
- 4.3.2 MSAs also include Mineral Consultation Areas (MCA) and are "designed to ensure that mineral resource safeguarding is appropriately taken into account through the planning system..." in areas nearby to a primary mineral resource [9].

- 4.3.3 Facilitating sufficient supplies of future minerals is essential in achieving sustainable economic growth. However, in doing so a balance needs to be struck between contributing towards meeting the need for minerals both locally and beyond, and ensuring this is undertaken within environmental limits and without generating unacceptable impacts on local communities.

4.4 Local Authority Consultation & Local Plan

- 4.4.1 The Whittington A, Whittington B and Whittington CSEC redline boundaries are entirely within a primary mineral resource area (limestone) whilst Whittington C is located within a MCA. The areas fall under the GCC (local authority) region and as such GCC act as the Mineral Planning Authority (MPA) [3,10].
- 4.4.2 As part of the assessment process, an initial consultation request was originally sent to GCC in 2023 in order to obtain their views on the likely mineral resource areas within the wider project boundary and to focus the assessment on the areas of interest for the local authority.
- 4.4.3 Consultation is an important aspect of the assessment in order to identify local authorities' individual requirements as well as addressing any queries they may have regarding potential mineral extraction within the redline boundaries.
- 4.4.4 GCC's response indicated that, as the wider project is not listed under Table 2 [9] ("List of non-mineral development types for which no mineral resource assessment will be required") a Mineral Resource Assessment will be required in order to demonstrate that the proposal would be in accordance to Policy MS01 of the adopted Mineral Local Plan. Due to the Proposed Project being in a primary mineral resource area and primary MSA, consultation with the local planning authority will be required to gain approval of this mineral resource assessment report prior to commencement of any construction works.
- 4.4.5 Gloucestershire Mineral Resources Safe Guarding interactive map website [10] and GCC - *07 Mineral Safeguarding Document, 08 – The Future Supply of Minerals and 09 – Area for Future Aggregate Working* [9], indicates the redline boundaries are covered under the following policies: MS01 (Non-minerals development within MSAs), MW01 (Aggregate provision) and MW02 (Natural Building Stone).

4.5 Minerals Review

- 4.5.1 With reference to the BGS Mineral Resource Map for Gloucestershire [3], the redline boundaries are within an area whereby Jurassic limestone is located and is deemed to be a primary mineral resource. An extract from the BGS mineral resource map is shown in Plate 2 below.
- 4.5.2 The GCC policies interactive map [10] indicates both Limestone and Sandstone are located in the redline boundaries as a mineral resource, however Plate 2 below and the geology shown in Figure 2 and Figure 3 – Appendix C indicates no sandstone present within the redline boundaries. River Terrace Deposits (related to the Cheltenham Sand & Gravel Superficial Deposits) shown in Plate 2 below show superficial deposits approximately 1.2 km southwest of the Whittington CSEC redline boundary, and thus are adequately beyond the site.

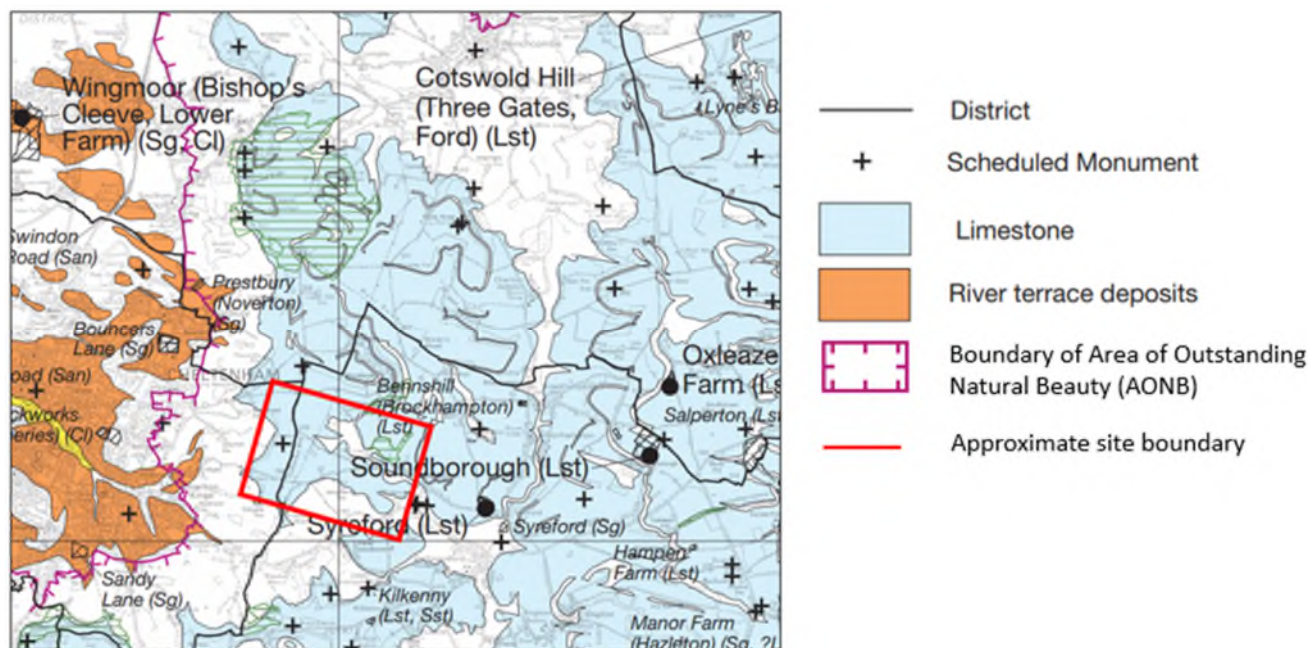


Plate 2 Extract from BGS Gloucestershire Mineral Resources Map, 2005, 1:100,000. (Red outlined roughly defines all the redline boundaries) [3]

- 4.5.3 Local mineral supplies specific to the redline boundaries include limestone historically used for natural building stone. The GCC policies interactive map [10] indicates the area is within an MSA. GCC's *07 Mineral Safeguarding Document*, Table 1 [9], indicates that the MSA for mineral sterilisation assessment for limestone (and sandstone) is extended 500 m.
- 4.5.4 The BGS Mineral Resource Information for Gloucestershire report [6] indicates that the main limestone of importance for crushed aggregate in Gloucestershire is the Carboniferous limestone being "the most important resource", with "almost all crushed rock aggregate quarries...have the capacity to produce building stone". However, the Jurassic limestone is the "the most important source of building stone, which is worked at many quarries in the Cotswolds."
- 4.5.5 There are no active quarries within the redline boundaries and with reference to the BGS Mineral Resource report [6], it states that "Today building stone is often provided from the larger aggregate quarries in the Forest of Dean". Additionally, there are no areas within the redline boundaries designated within the local minerals plan allocation [10] as preferred locations for mineral extraction, with the nearest located approximately 13 km east from the Whittington CSEC redline boundary, named Naunton Quarry. Therefore, the mineral resources within the redline boundaries are found not to be of significant regional importance with low economic value. Depending on the final depths to be excavated for the CSEC construction it is assumed that shallow excavations (up to 1.5 m depth) are likely to only expose poor-quality weathered limestone.
- 4.5.6 Therefore, although the Proposed Project will create some mineral sterilisation, in the scale of the MSA it is considered to create minimal impact to the regional mineral resource.

4.6 Mineral Resource Impact Summary

- 4.6.1 In summary, there are no significant impacts to mineral resources within the four redline boundaries for the Proposed Project and as such no mitigation measures are required during construction. Due to the area being in a primary resource area and primary mineral safeguarding area, approval from the local planning authority should be sought, based on this mineral resource assessment, prior to commencement of any construction works.

5 DISCUSSION & POTENTIAL MINING & MINERAL CONSTRAINTS

Based upon all the available information reviewed as part of this report, the following potential project constraints are considered for the four Whittington redline boundaries and are shown in Table 3 below and in Figure 6 - Appendix G.

Table 3 - Potential Mining Constraints

Location	Risk	Immediate Impact	Appendix	Source*
Artificial Ground (unmapped - related to nearby BritPit)	Loose surface materials	Unstable Ground/Ground Movement	D	BGS BritPits
	Contamination	Risk to Human Health		
Historical Mines and Quarries	Loose surface materials / Unknown voids or extent related to both open and underground	Ground movement/collapse	D	BGS BritPits
Mineral Resource Safeguarding Area & Consultation Areas	Mineral sterilisation/Loss of mineral resources	Project time delay	E	GCC Mineral Safeguarding

* BGS = British Geological Survey, GCC = Gloucestershire City Council

5.1 Impact Assessment

- 5.1.1 Based on the potential project constraints, the following 5x5 style risk assessment matrix (Plate 3) has been adopted in Table 4 below. Risks which are designated to be high are considered to be significant for the purposes of assessing the significance of effects to the environment. Recommendations to reduce risks are discussed in Section 6.3 below.



Likelihood that exposure to the hazard will result in harm/damage

Severity of foreseeable consequences	Remote (1)	Unlikely (2)	Possible (3)	Probable (4)	Likely (5)
No Harm/Damage (1)	Low	Low	Low	Low	Low
Minor Harm/Damage (2)	Low	Low	Low	Medium	Medium
Significant Harm/Damage (3)	Low	Low	Medium	High	High
Major Harm/Damage (4)	Low	Medium	High	High	High
Catastrophic Harm/Damage (5)	Medium	High	High	High	High

Plate 2 Arcadis 5x5 style Risk Assessment Matrix.

Table 4 - Risk Register

Ref	Location	Potential Risk	Consequence	Risk Assessment
R1	Artificial Ground (unmapped – related to nearby BritPit)	Loose surface materials	Risk of injury or damage to machinery, structural impacts to the Proposed Project from unstable ground, possible relocation of route to avoid unstable ground	Medium
R2		Contamination	Risk to human health/environment, financial costs for waste disposal, possible relocation of route to avoid contamination	Low
R3	Historical Mines and Quarries	Loose surface materials / unknown voids / unknown extent	Risk of injury or damage to machinery, structural impacts to the Proposed Project from ground movement/collapse (or if found unexpectedly), financial costs, project delays, possible relocation of route to avoid quarries	Medium
R4	Mineral Resource Safeguarding Area & consultation areas	Mineral sterilisation	Minor damage/loss of mineral resources. Project delays due to consultation agreement and possible relocation of route to avoid mineral(s).	Medium

5.2 Other Considerations

- 5.2.1 There are landslide deposits located within the western edge of the Whittington C redline boundary. The landslide deposits are predominantly related to the Whitby Mudstone Formations. There is a potential risk of further mass movements occurring where steep slopes exist on site that are also not currently mapped.

6 CONCLUSIONS

6.1 Historical Mine and Quarrying Activities

- 6.1.1 One BritPit is located approximately 10 m north of the Whittington CSEC redline boundary with limestone from the Birdlip Limestone Formation being historically extracted from the open pit/surface mine. There are no BritPits located within the remaining redline boundaries or within 50 m radius of them and no active quarries are located within 1 km of the red line boundaries.
- 6.1.2 Historical mapping showed many historical quarries which correlate well with the BGS BritPit records, which provided an indication to the extent of the works. Currently no ground investigation data exists for the area of Wood Farm BritPit [18] and therefore its extent could not be confirmed based on this data.
- 6.1.3 Lidar and aerial evidence confirmed a circular ground feature which encroaches into the Whittington CSEC redline boundary. Visual evidence obtained from the site walkover as well as data provided by the Geophysical Survey report [17] confirms that the BritPit does indeed encroach within the redline boundary. Therefore, the potential development constraints provided by this feature comprising ground stability around the pit as well as the type of backfill material will need to be considered during detailed design.
- 6.1.4 There are no faults, artificial deposits or landslide deposits located within the Whittington CSEC redline boundary, Whittington A or Whittington B. There are landslide deposits located within the western edge of Whittington C redline boundary with nearby artificial deposits approximately 60 m south of the boundary. The landslide deposits are predominantly related to the Whitby Mudstone Formations. There is a potential risk of further mass movements (loose surface material, unstable ground or ground movement) occurring where steep slopes exist on site but which are also not currently mapped.
- 6.1.5 There is no artificial ground mapped within the redline boundaries however there is a possibility of the deposits being present within the northern part of the Whittington CSEC redline boundary due to a BritPit located close by (10 m north).
- 6.1.6 The redline boundaries are not within a Coal Authority Reporting Area, a Coal Authority Development High Risk Area, an Abandoned Mines Catalogue area or within a historical metalliferous mining area. Therefore, risks from coal mining and metalliferous activities are not anticipated within the redline boundaries.
- 6.1.7 With reference to all available information, no active mines or current quarrying operations were noted within the redline boundaries.
- 6.1.8 Potential constraints are related to historical mines and quarries and the mineral resource safeguarding plan, with the majority of risks assessed as medium. These could be generally mitigated through designing the scheme through the recommendations suggested below (Section 6.3) to minimize the risks.

6.2 Mineral Resource Impact Assessment

- 6.2.1 The majority of the redline boundaries (excluding Whittington C) are within a MSA with the Jurassic Limestone deemed a primary mineral resource. Despite historical evidence of quarries throughout the site, no active quarries are present.
- 6.2.2 No Mineral Local Plan Allocations (preferred areas of mineral extraction) were identified within the redline boundaries and with the area located within a national landscape, the likelihood of future quarries opening within the redline boundaries are unlikely. Local building stone requirements are often derived from quarries located within the Forest of Dean. It may also be assumed that with such shallow depths to be excavated that only poor-quality weathered limestone will be encountered. As such there were found to be no significant impacts to mineral resources within the redline boundaries from the Proposed Project, with no mitigation measures required during construction. Due to the area being in a primary mineral safeguarding area, consultation with the local planning authority will be required to gain approval of the mineral resource assessment, contained within this report, prior to commencement of any construction works.

Summary

- 6.2.3 Overall, the assessment has identified some residual risks related to historical mining and potential mineral resource sterilisation within the redline boundaries. Depending on the final depths to be excavated for the CSEC construction it is assumed that shallow excavations (up to 1.5 m depth) are likely to only expose poor-quality weathered limestone. Therefore, although the Proposed Project will create some mineral sterilisation, in the scale of the MSA it is considered to create minimal impact to the regional mineral resource. The residual risks within the redline boundaries are not considered to present any significant environmental impacts with respect to mining risk and minerals impacts.

6.3 Recommendations

- 6.3.1 The following recommendations have been based on the above findings within this document for the Proposed Project and are suggested to help mitigate the risks outlined in Table 4 - Risk Register.

Artificial Ground / Historical Mines & Quarries

- 6.3.2 Based upon current information, the Wood Farm BritPit encroaches within the Whittington CSEC redline boundary. No ground investigation data exists for this area and therefore, the potential development constraints provided by this feature such as ground stability around the pit as well as the type of backfill material will need to be considered during detailed design.

Mineral Resource Safeguarding Area

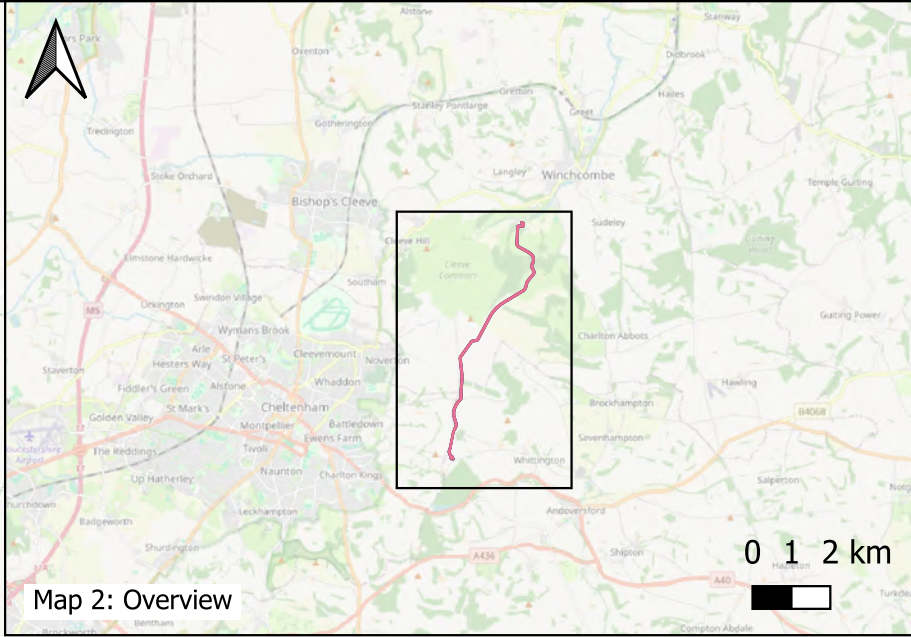
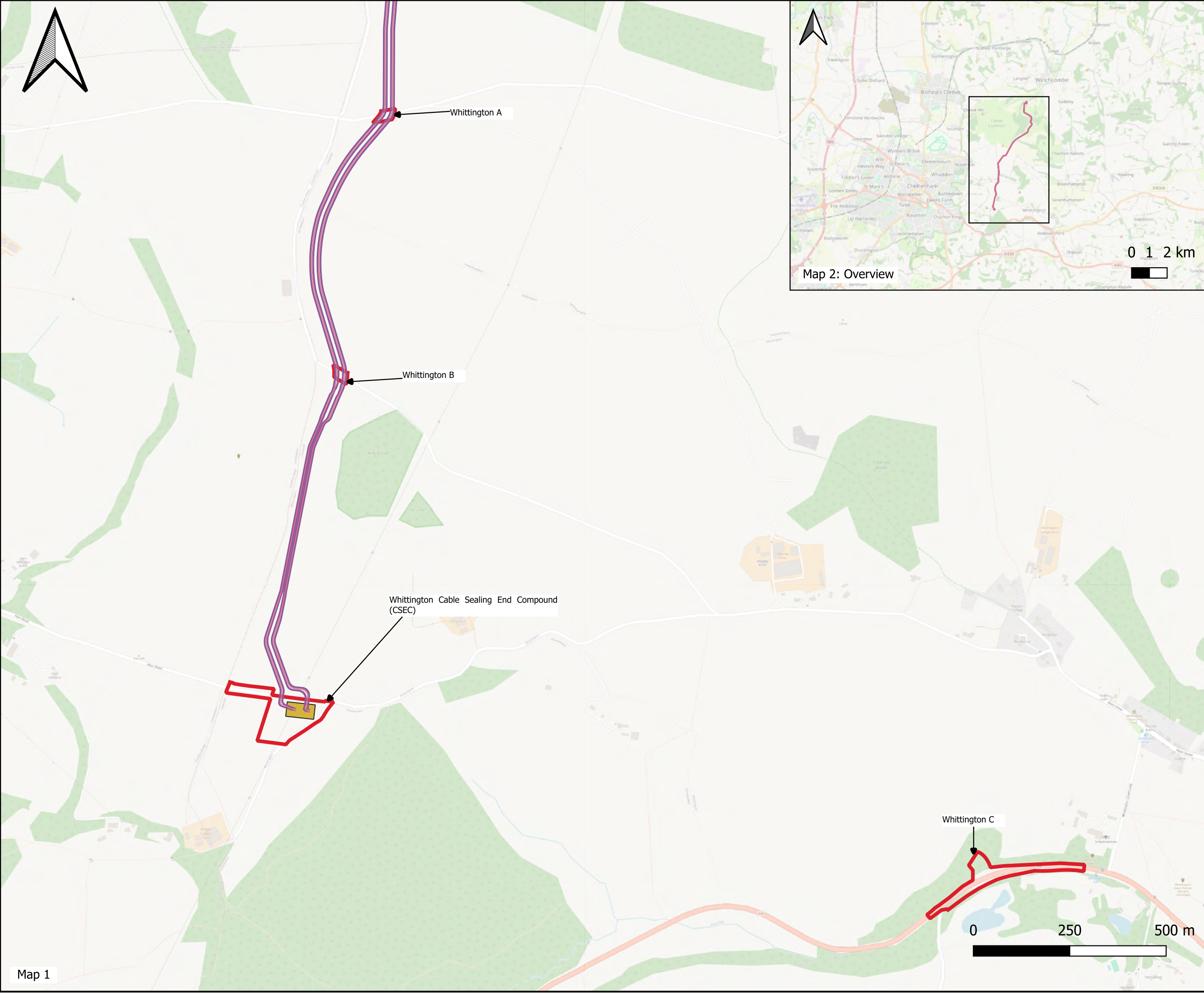
- 6.3.3 The local planning authority will need to be consulted with regards to agreement to the mineral resource assessment within this report prior to commencement of any construction works (R4).

7 REFERENCES

1. British Geological Society (BGS), 2023 BritPit Records, licence no. [BGS#2023/064].
2. British Geological Society (BGS), BGS Publication Viewer – Publications from 1835 to present, <https://webapps.bgs.ac.uk/data/publications/pubs.cfc?method=viewHome>, accessed August 2023.
3. British Geological Society (BGS), 2006, Mineral Resources Map for Gloucestershire, 1:100,000.
4. British Geological Society (BGS), 2000, Moreton-in-Marsh, Solid and Drift Geological map, 1:50,000, Sheet 217.
5. British Geological Society (BGS), GeoIndex Onshore. <https://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed August 2023.
6. British Geological Society (BGS), 2006, Mineral Resource Information in Support of National, Regional and Local Planning for Gloucestershire, CR/05/105N.
7. National Library of Scotland (NLS), Georeferenced Maps (Historical maps), <https://maps.nls.uk/geo/explore/side-by-side/#zoom=16.0&lat=51.92505&lon=-1.01500&layers=193&right=BingHyb>, accessed August & December 2023.
8. The Coal Authority, Interactive Map Viewer, <https://mapapps2.bgs.ac.uk/coalauthority/home.html>, accessed August & December 2023.
9. Gloucestershire City Council, 07 - Mineral Safeguarding Document, 08 – The Future Supply of Minerals and 09 – Area for Future Aggregate Working accessed via website: <https://www.gloucestershire.gov.uk/media/2119864/section-7-to-9-mineral-safeguarding-the-future-supply-of-minerals-and-areas-for-future-aggregate-working.pdf>, August 2023.
10. Gloucestershire County Council, Policies (Proposals), Interactive Map, <https://maps.gloucestershire.gov.uk/MapThatPublic/Default.aspx>, accessed August & December 2023.
11. Grid Reference Finder, <https://gridreferencefinder.com/>, accessed April 2024.
12. Landscapes for life, <https://landscapesforlife.org.uk/about-aonbs/aonbs/overview>, accessed August 2023.
13. Elevation finder in UK, <https://routecalculator.co.uk/elevation>, accessed April 2024.
14. Arcadis, Smart Atlas – Cotswolds VIP, <https://uk.gis.arcadis.com/portal/apps/webappviewer/index.html>, accessed, April 2024
15. LIDAR Finder, <https://www.lidarfinder.com/>, April 2024
16. Ministry of Housing, 2018, National Planning Policy Framework (NPPF), updated December 2023.
17. Magnitude Surveys, Geophysical Report, Report Reference: MSSP1587, January 2024.
18. Geotechnics, Ground Investigation Factual Report, PC238594, August 2023

Appendix A

Figure 1 – Site Location Plan



Legend

- Site Boundary
- Proposed Cable Route
- Cable Sealing End Compound (CSEC)

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Title: Site Location Plan

Site: Cotswolds VIP - Whittington CSEC

Client: National Grid

Project: 30167905

Figure 1

Date: 20/05/24
Drawn By: S.Frith
DRG No: Figure 1



Appendix B

Study Limitations

IMPORTANT. This appendix should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

1 This report has been prepared by Arcadis Consulting (UK) Limited ('Arcadis'), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with National Grid (the 'Client'). Arcadis does not accept responsibility for any matters outside the agreed scope.

2 This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing. The contents of this report may not be used or relied upon by any person other than this party without the express written consent and authorisation of Arcadis.

3 Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Arcadis is unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.

4 All work carried out in preparing this report has used, and is based on, Arcadis' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice, pending changes in legislation, of which Arcadis is aware, have been considered. Following delivery of the report, Arcadis has no obligation to advise the Client or any other party of such changes or their repercussions.

5 This report is only valid when used in its entirety. Any information or advice included in the report should not be relied upon until considered in the context of the whole report.

6 Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties. Arcadis has taken reasonable steps to ensure that the information sources used for this assessment provided accurate information and has therefore assumed this to be the case.

7 This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received.

8 This report refers, within the limitations stated, to the condition of the Site at the time of the inspection. No warranty is given as to the possibility of changes in the condition of the Site since the time of the investigation.

9 The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does not provide specialist legal or other professional advice. The advice of other professionals may be required.

10 Where intrusive investigation techniques have been employed they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases the investigation is further limited by Site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the Site have not been investigated.

11 If below ground intrusive investigations have been conducted as part of the scope, safe location of exploratory holes has been carried out with reference to the Arcadis ground disturbances procedure. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.

12 Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issues.

13 Unless otherwise stated, an inspection of the Site has not been undertaken and there may be conditions present at the Site which have not been identified within the scope of this assessment.

14 Unless otherwise stated, samples from the Site (soil, groundwater, building fabric or other samples) have not been obtained.

15 Arcadis has relied upon the accuracy of documents, oral information and other material and information provided by the Client and others, and Arcadis assumes no liability for the accuracy of such data, although in the event of apparent conflicts in information, Arcadis would highlight this and seek to resolve.

16 Unless otherwise stated, the scope of works has not included an environmental compliance review, health and safety compliance review, hazardous building materials assessment, interviews or contacting Local Authority, requests for information to the petroleum officer, sampling or analyses of soil, ground water, surface water, air or hazardous building materials or a chain of title review.

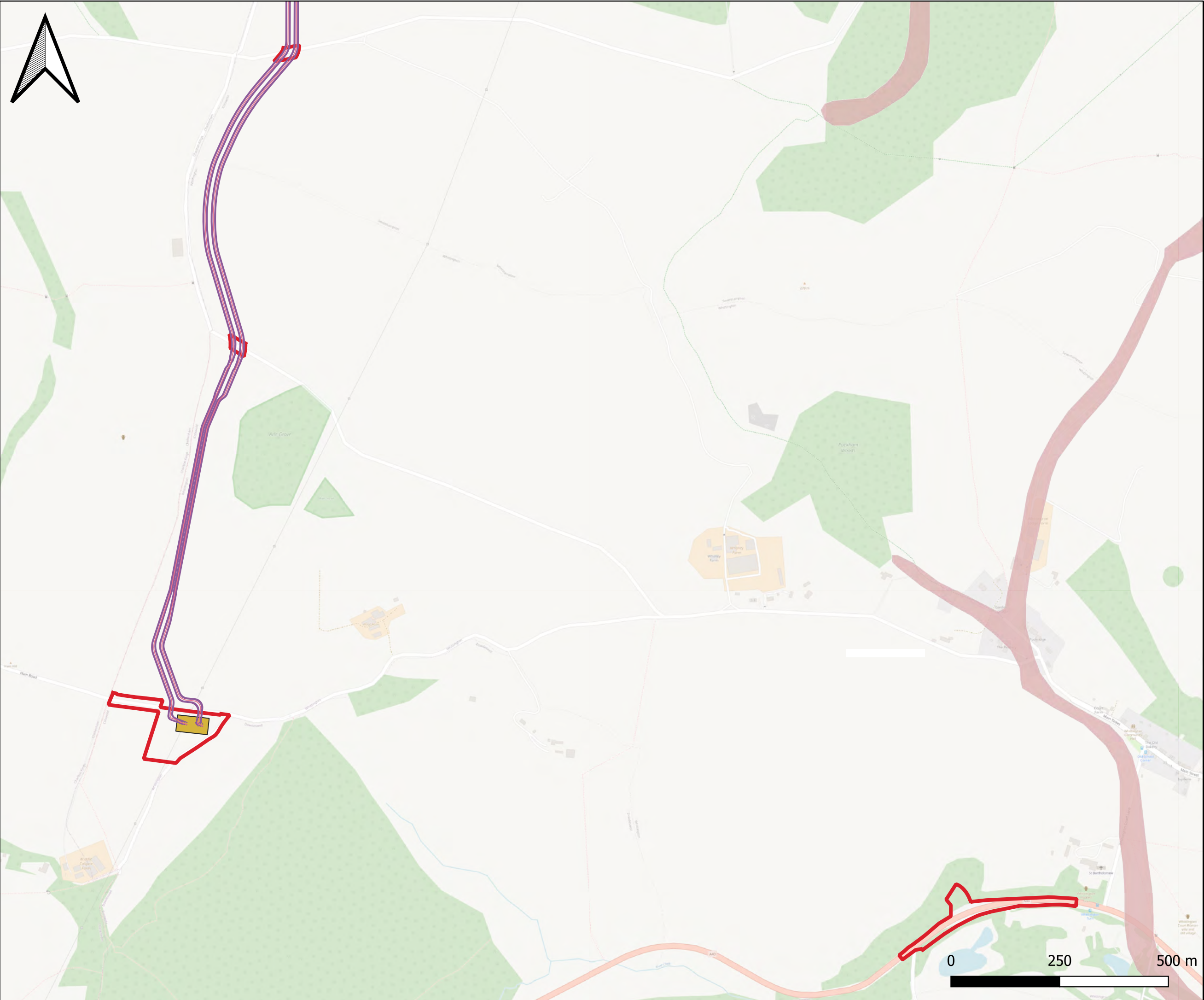
17 Unless otherwise stated, this assessment has considered the ongoing use of the Site and has not been prepared for the purposes of redevelopment which may act as a trigger for Site investigation and remediation works not needed for ongoing use.

Appendix C

Figure 2 – Superficial Deposits

Figure 3 – Bedrock Geology

Figure 4 – Additional Geological Features



Legend

Site Boundary

Proposed Cable Route

Cable Sealing End Compound (CSEC)

Alluvium

Cheltenham Sand & Gravel

Head

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Superficial Deposits

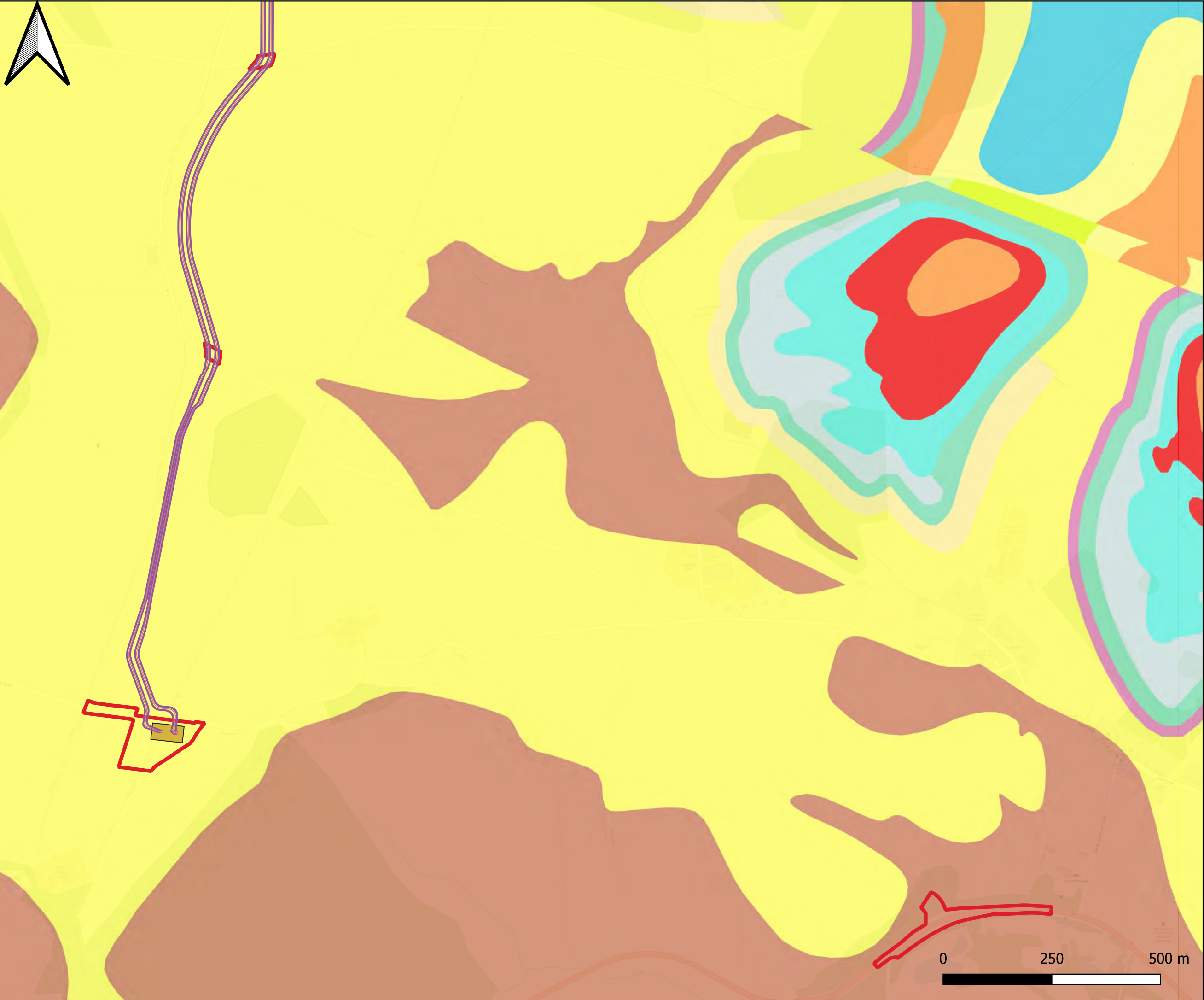
Site:
Cotswolds VIP - Whittington CSEC

Client:
National Grid

Project:
30167905

Figure 2

Date: 20/05/24
Drawn By: S.Frith
DRG No.: Figure 2



Legend

-  Site Boundary
-  Proposed Cable Route
-  Cable Sealing End Compound (CSEC)
-  Whitby Mudstone Formation
-  Birdlip Limestone Formation

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Bedrock Geology

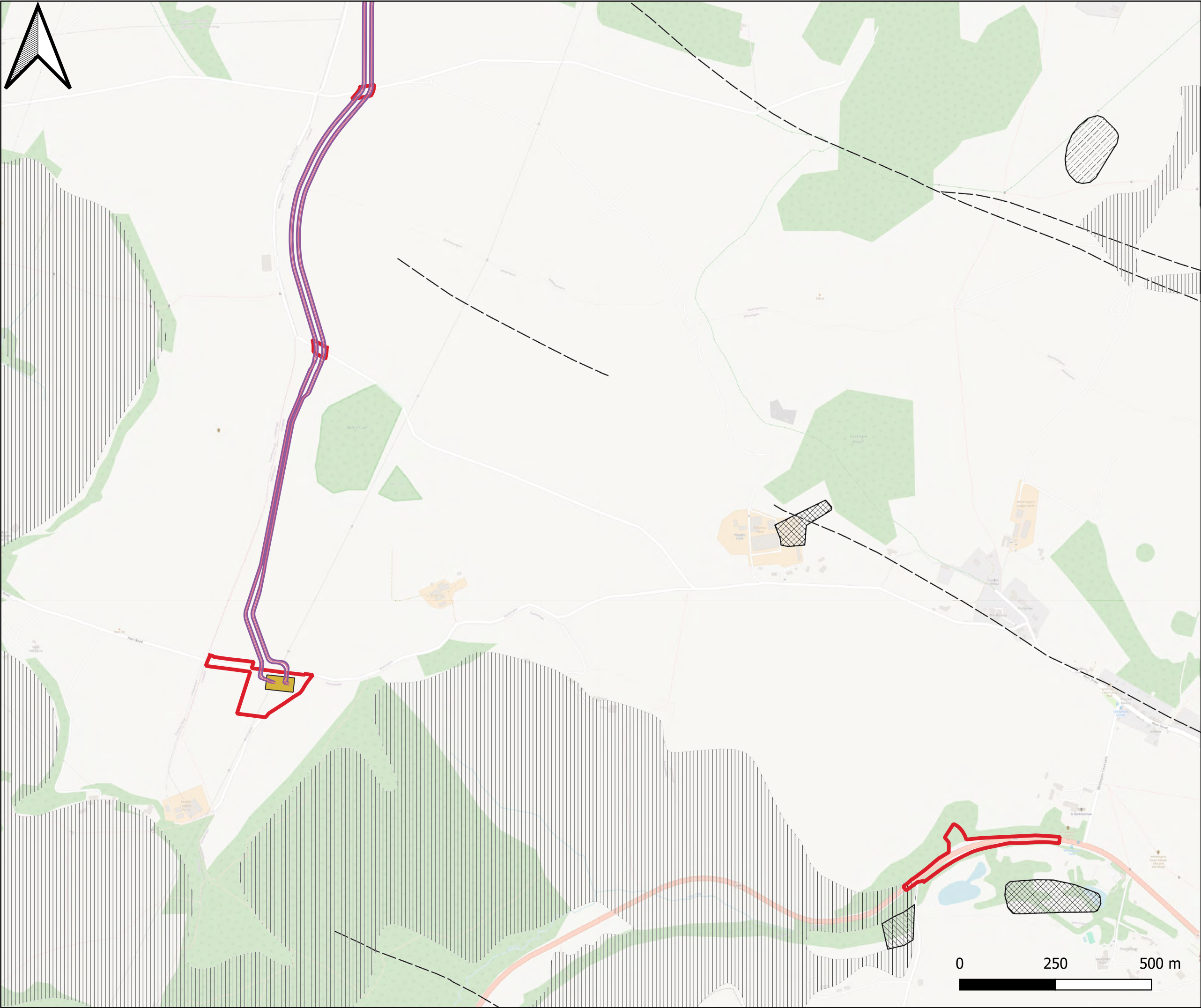
Site:
Cotswolds VIP - Whittington CSEC

Client:
National Grid

Project: 30167905	Figure 3
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Date:20/05/24
Drawn By: S.Frith
DRG No: Figure 3





Legend

Site Boundary

Proposed Cable Route

Cable Sealing End Compound (CSEC)

Mass Movement Deposits

Landslide Deposits – Unknown/Unclassified Entry

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Title: Additional Geological Features

Site: Cotswolds VIP - Whittington CSEC

Client: National Grid

Project: 30167905

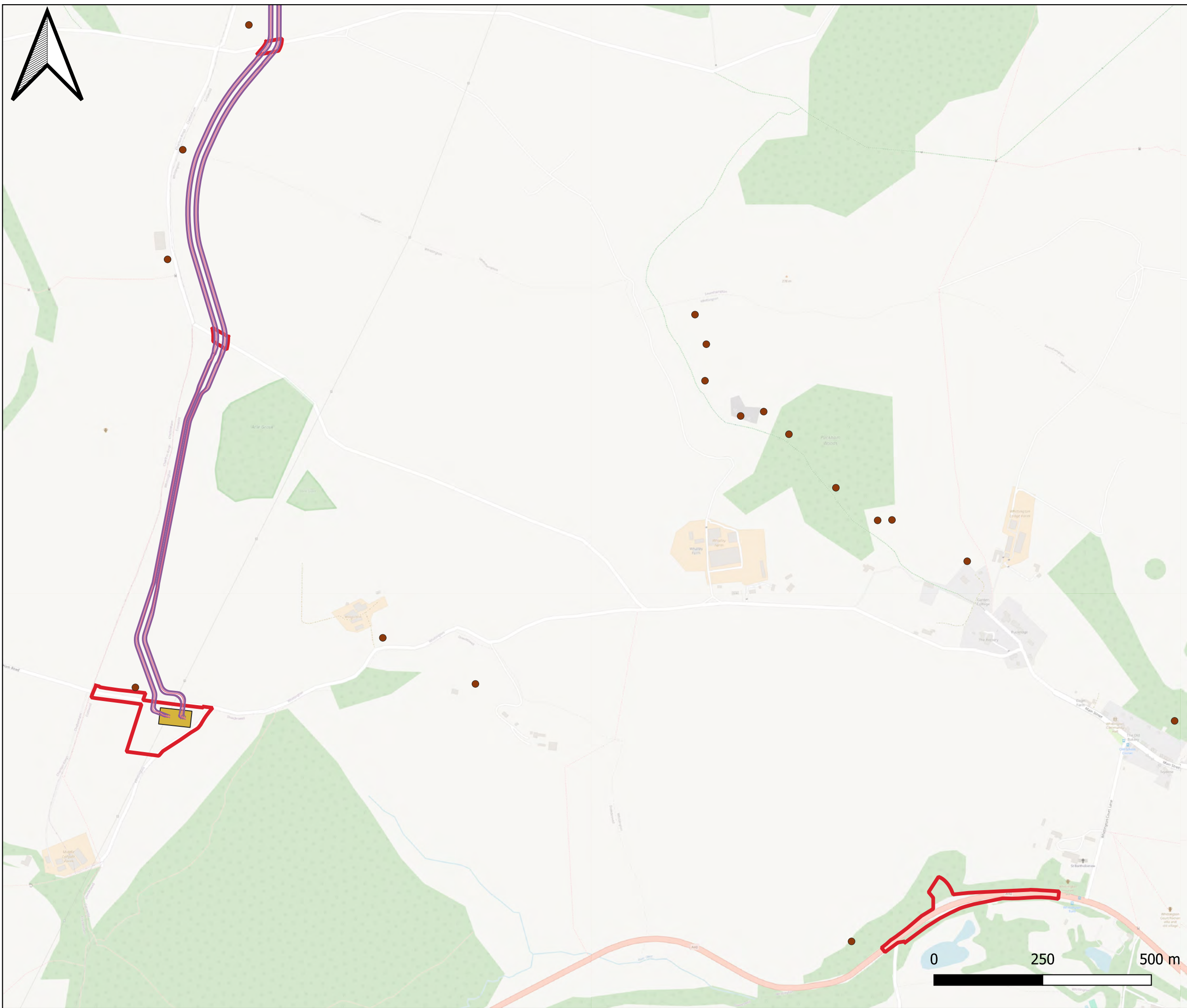
Figure 4

Date: 20/05/24
Drawn By: S.Frith
DRG No: Figure 4



Appendix D

Figure 5 – BritPit Records



Legend

- Site Boundary
- Proposed Cable Route
- Cable Sealing End Compound (CSEC)
- BritPits (BGS)

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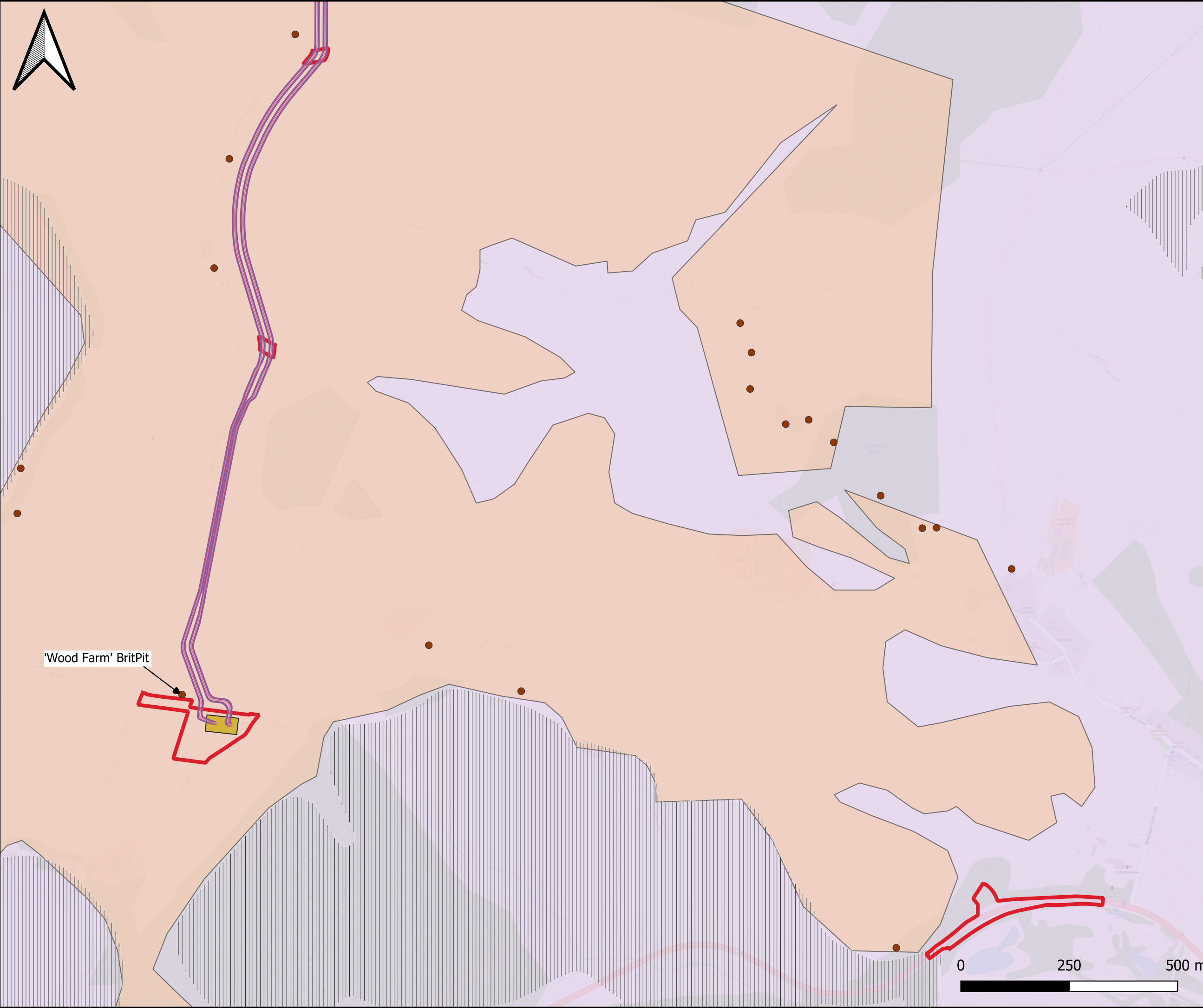
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Title: BritPit Records	
Site: Cotswolds VIP - Whittington CSEC	
Client: National Grid	
Project: 30167905	Figure 5
Date: 20/05/2024 Drawn By: S.Frith DRG No: Figure 5	

Appendix E

Figure 6 – Constraints Summary



Legend

Site Boundary

Proposed Cable Route

Cable

Sealing

End

Compound (CSEC)

Primary Mineral Resource Area - Limestone

Adopted Mineral Safeguarded - Consultation Area

BGS BritPits

Mass Movement Deposits

Landslide Deposits – Unknown/Unclassified Entry

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Title:

Constraints summary for Whittington CSEC site boundary

Site:

Cotswolds VIP - Whittington CSEC

Client:

National Grid

Project:

30167905

Figure 6

Date:

22/05/24

Drawn By:

S.Frith

DRG No:

Figure 6

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