

Transport, Environment & Design

# Bovey Basin Ball Clay Workings – Central Area Conceptual Site Model

August 2025



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## Revision Schedule

| Revision | Author         | Description                          | Date        |
|----------|----------------|--------------------------------------|-------------|
| 1        | Jamie Howourth | Minor updates to report and drawings | 10-Mar-2025 |
| 2        | Jamie Howourth | Minor updates to report and drawings | 21-Aug-2025 |

# 1. Introduction

## 1.1 Commission

- 1.1.1 Horizon Consulting Engineers Limited (Horizon) was commissioned by Sibelco UK Ltd (Sibelco or “the Client”) to prepare a Conceptual Site Model (CSM) in support of an Environmental Permit application to restore the Bovey Basin Ball Clay Workings, Kingsteignton, TQ12 3PR (“the Site”).
- 1.1.2 This report specifically relates to the Central Area Quarries, located within the wider Bovey Basin Ball Clay Workings. It is proposed to incorporate the continued re-use of mine waste material (i.e. “overburden” and “interburden”) and imported waste soils (“restoration material”) into one permit rather than to have a separate mine waste facility permit and deposit for recovery permit.

## 1.2 Report Context

- 1.2.1 This CSM report has been prepared with reference to Environment Agency (EA) guidance<sup>1</sup> on deposit for recovery activities. The CSM looks to establish background conditions at the Site such that appropriate information is available to develop risk assessments (e.g. Hydrogeological Risk Assessment (HRA), Stability Risk Assessment (SRA)) and engineering design for the Site).
- 1.2.2 A consolidating planning permission has recently been granted by Devon County Council (DCC) for the continued winning and working of permitted mineral reserves, associated development, and progressive restoration of the Site (DCC/4344/2023). Selected drawings showing the restoration plans are included in **Appendix A**.
- 1.2.3 It was agreed on 20 August 2024 (EA Ref: EPR/SP3427SW/P001) that the importation of material to complete the approved restoration would be deemed a recovery activity. The Waste Recovery Plan (WRP)<sup>2</sup> was agreed for the wider Bovey Basin Ball Clay Workings area however this permit application primarily relates to the restoration of the Central Area Quarries, as shown in **Drawing 1205.101 in Appendix B**.
- 1.2.4 It is proposed to vary the permit to include restoration of areas of the Bovey Basin (e.g. Denistone Broadway) at a later date.
- 1.2.5 The permitted development includes an interim restoration strategy at the end of a 15-year period which aligns with the details and timescales associated with Planning Permissions 08/04411/DCC and 11/00371/DCC, requiring restoration of Rixey Park tip by 2029 and White Pit and Heathfield tips by 2042. It is noted that a final overall restoration plan has not been developed given cessation of quarry operations is not expected until approximately 100 years time and therefore Sibelco is currently working towards the interim strategy detailed in the approved scheme. As such, one of the conditions of works being deemed a recovery activity is that only the interim restoration strategy (i.e. the first fifteen years, covering the Central Area Quarries) would be considered recovery at this stage.

## 1.3 Report Structure

- 1.3.1 The remainder of this report is structured as follows:

<sup>1</sup> <https://www.gov.uk/guidance/landfill-operators-environmental-permits/plan-the-environmental-setting-of-your-site#conceptual-site-model> [Accessed 11 November 2024]

<sup>2</sup> Horizon (March 2024). Bovey Basin Ball Clay Workings. Waste Recovery Plan. Ref: HCE1205.WRP.Rev2

- **Section 2** describes the existing Site setting;
- **Section 3** sets out the potential sources and historical use of the Site;
- **Section 4** sets out potential sources from future activity at the Site;
- **Section 5** sets out details relating to identified man-made pathways at the Site;
- **Section 6** sets out the geological setting of the Site taking into account findings of ground investigations and historical observations;
- **Section 7** presents the hydrogeological setting of the Site;
- **Section 8** presents details of the hydrology in the vicinity of the Site;
- **Section 9** presents details of sensitive receptors identified within the vicinity of the Site; and
- **Section 10** summarises the interpretation of the ground model.

## 2. Site Setting

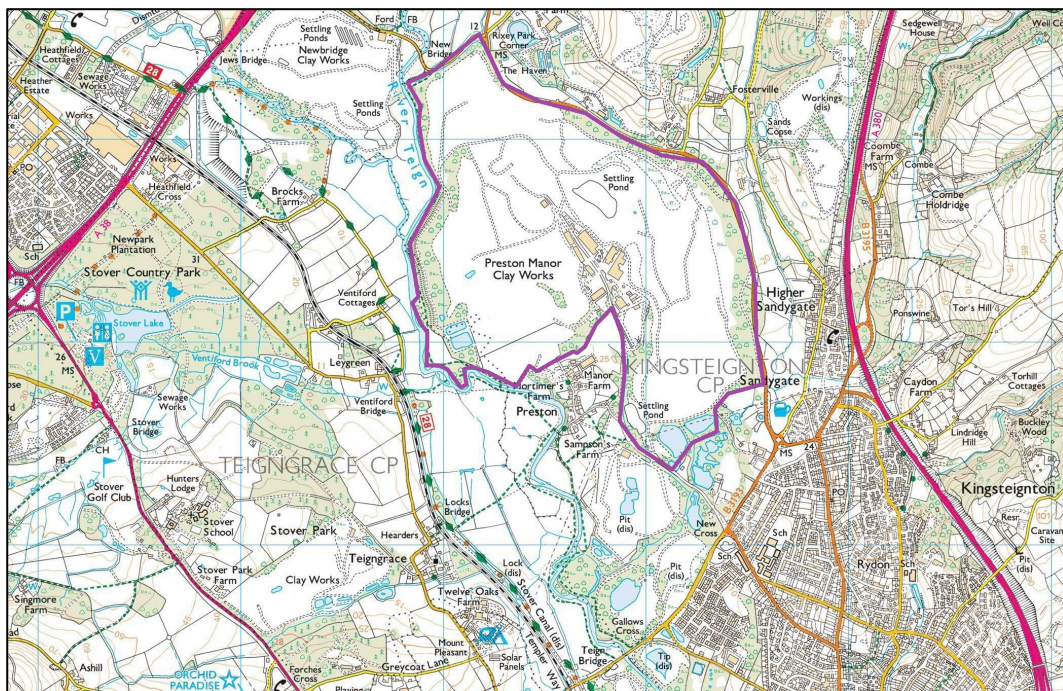
### 2.1 Site Location

2.1.1 The Site, for the purposes of defining the permit boundary, extends circa 219 Ha and comprises five operational areas including the three Central Area Quarries (Southacre, White Pit and John Acres Lane), Preston Manor Works and overburden/interburden tipping areas (Heathfield Tip, Rixey Park Tip, White Pit Tip and Binney Tip). A plan showing these areas is included on Drawing ST18876-011 in **Appendix A**. The permit boundary is the same as the Planning Permission boundary (Ref: DCC/4344/2023) however deposition will only take place within certain areas of the Site (see Environmental Setting & Site Design (ESSD) Report<sup>3</sup>)

2.1.2 The Site is located to the north-west of Kingsteignton and is bound by:

- The B3193 (now referred to as “Clay Pits Way”), Heathfield Landfill and Higher Sandygate to the east;
- Preston Village, Kingsteignton and Denistone Quarry to the south;
- The River Teign with agricultural land beyond to the west; and
- The River Teign with Clay Lane Quarry beyond to the north.

2.1.3 A Site location map is provided as **Figure 2-1** with the approximate Site boundary shown in purple. The scale and complexity of the quarry workings is not well characterised from aerial maps and satellite views. A photosheet which aims to highlight some of the key features of this landscape is included in **Appendix C**.



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**Figure 2-1:** Site Location Plan

<sup>3</sup> Horizon (2025). Bovey Basin Ball Clay Workings – Central Area. Environmental Setting and Site Design Report. Ref: HCE1205.ESSD

2.1.4 The topography of the Site ranges from -46 meters Above Ordnance Datum (m AOD) at the lowest elevation across the three quarries (South Acre Quarry) to 57 m AOD at the east of the Site at Heathfield Tip (adjacent to White Pit Quarry). The general gradient across the Site slopes from the east to south-west.

## 2.2 Extraction, Processing and By-Products

2.2.1 Due to the wide variation of clay characteristics within the complex geology and technical aspects of the final products produced, it is essential that multiple working areas are simultaneously available. This has to be achieved in the short, medium and long term to guarantee continuity of supply. This is a long established and key feature of Ball Clay workings in the Bovey Basin.

2.2.2 At the current rate of extraction, the permitted mineral reserve has a life of around 100 years. Given the long-term nature of the mineral reserve, the consolidating planning permission (DCC/4344/2023) provides a comprehensive scheme of working for the quarries within the Central Area over the next 15 years in three phases, each comprising five years, including the phased restoration of Rixey Park, White Pit and Heathfield Tips. The planning permission includes an interim restoration strategy at the end of the 15-year period which aligns with the details and timescales associated with planning permissions 08/04411/DCC and 11/00371/DCC.

2.2.3 A natural by-product of the extraction activities is overburden and non-target mineral or 'interburden'. Whilst the appropriate blending of materials seeks to minimise the amount of material wastage, due to the sedimentary nature of the deposit, some materials do not meet the stringent specifications required and as such the overburden and interburden is currently deposited within the Rixey Park, White Pit and Heathfield Tips which sit within the Central Area application boundary. Restoration cannot be completed exclusively from overburden and interburden. Additional material is needed to provide a suitable substrate for the establishment of new habitats.

## 2.3 Application Boundaries

2.3.1 The permit boundary is the same as the Site boundary as agreed under planning. The boundary is shown on the Site Location Plan (**Drawing 1205.101**) in **Appendix B**. Note the location of the boundary for the Site's SR2009 No.8 Permit (EPR Ref: YP3996EP/V002) in the south-west corner of the Site.

## 3. Sources: Historical Activity

### 3.1 Site History

- 3.1.1 The Site history has been based on information provided as part of the planning application, anecdotal evidence, professional experience and historical maps.
- 3.1.2 It is understood that ball clay extraction within the area dates back to the 17<sup>th</sup> Century. With the conception of the planning system the area became characterised by a series of planning permissions, reflecting the large number of small independent companies operating their own quarries or mines. As such, the Site benefits from a series of historic planning permissions for mineral extraction. Over the period of these permissions, the quarries have expanded in area. The scale of the existing operation is best characterised by a series of historical aerial images which are shown in **Appendix D**.
- 3.1.3 In terms of operations on-Site, mineral is extracted with a hydraulic excavator selecting specific seams of ball clay and loading into articulated dump trucks. The clay is hauled along established routes to storage bays at Preston Manor Works. Interburden by-product is also excavated and loaded using the same method. Interburden by-product is hauled to tipping areas where the material is placed and compacted in layers by bulldozer. The layers of sand which occur within the mineral deposit are also selectively extracted and hauled to Preston Manor Works for processing. After testing and sampling, most of the clay is shredded and placed in storage bays ready for loading and dispatch. A proportion of the annual tonnage is transferred by road for further processing at the East Golds operation located within a few miles of the Site. A bagging facility, situated within a closed structure, is also located at Preston Manor.
- 3.1.4 Based on the description of the Site history above, contamination may have arisen from quarry operations. This would likely be from plant and machinery (both mobile and fixed). Specifically, fuel spills or oil spills may have occurred however contamination incidents are likely to be small-scale and would be dealt with in accordance with the existing site operational procedures. There have been no known contamination incidents recorded on-Site.
- 3.1.5 **Table 3-1** below summarises key features on-Site and immediately adjacent to the Site from historical mapping.

| Feature  | Date of OS Map Feature Identified |      | Location                   | Description  |
|--|-----------------------------------|------|----------------------------|--|
|  | First                             | Last |                            |  |
| Preston Manor Clay Works ("The Site")  | 1885                              | 2025 | On-Site                    | The Preston Manor Clay Works started off as an old clay works and has been present on historical mapping since 1880 in the middle of the Site. The Preston Manor site has seen significant expansion and development |
| Abbrook Clay Works   | 1885                              | 2025 | 150 m south and south-east | The works were cleared around 1950 and converted to ponds.   |
| Denistone Clay Works   | 1885                              | 2025 | 200 m south                | The quarry adjacent to the south first appeared on historical maps in from 1855.   |
| Lappathorn Clay Works  | 1885                              | 1960 | On-Site                    | The Lappathorn works first recorded on mapping from 1885 and became incorporated in the central area with some woodland restoration to Lappathorn Cops following 1960.   |
| Kingsteignton Clay Mine / Clay Lane Quarries   | 1885                              | 2024 | 200 north-west             | Kingsteignton Clay Mine first recorded on mapping from 1855, which renamed to New Bridge Ball Clay Mine following 1930 and eventually becoming known as Clay Lane Quarries.  |
| Newcross Quarries and Residential Development  | 1855                              | 2024 | 600 m south-east           | Historical clay works have been re-developed for residential properties.   |
| Heathfield Sand Pit / Heathfield Landfill  | 1963                              | 2024 | 150 m north-east           | Historical former sand pit has been re-developed as a landfill for household waste from the 1970s onwards.   |
| <b>Notes:</b> Publicly available historical mapping (see <b>Drawing 1205.107</b> for location of key historical quarries and features) |                                   |      |                            |  |

**Table 3-1:** Summary of Key Features from Historical Mapping

## 3.2 Other Land Uses

3.2.1 This section of the report looks to identify other land uses relevant to assessing environmental risks associated with the proposed permit.

3.2.2 According to Wardell Armstrong, 2023<sup>4</sup>, there are currently two permitted landfills sites within 2 km of the Site boundary. Detail of which are in **Table 3-2** below:

| Site                     | NGR            | Distance          | General Notes                      | Permit Holder                 |
|--------------------------|----------------|-------------------|------------------------------------|-------------------------------|
| Heathfield Landfill Site | SX 85871 76406 | 0.01 km east      | Waste excluding inert              | Viridor Waste Management Ltd. |
| Bickley Ball             | SX 88300 74000 | 1.80 km southeast | Co-disposal Landfill Site (Closed) | Devon County Council          |

**Table 3-2:** Permitted Landfills within 2km of the Site [Re-produced from the Wardell Armstrong Report]<sup>4</sup>

3.2.3 There are seven historic landfill sites within 2 km of the Site, details of which are in **Table 3-3**. Four of the historic landfills were within 250 m of the Site.

<sup>4</sup> Wardell Armstrong (2023) Bovey Basin Ball Clay Works Central Area. Environmental Statement. Ref: ST18876

| Site           | NGR                  | Distance from the site         | Description  | Underlying Geology                                   | Catchment       |
|----------------|----------------------|--------------------------------|--|--|-----------------|
| Sandygate      | SX<br>86600<br>75500 | 0.11km east                    | The landfill operated between December 1964 and December 1977 and accepted household waste.  | Aller Gravel Formation /Abbrook Clay and Sand Member | Ugbrooke Stream |
| Babcombe Copse | SX<br>86800<br>76200 | 0.22km east                    | The landfill operated between September 1992 and June 2009. Inert landfill site.   | Upper Greensand Formation                            | Ugbrooke Stream |
| Swallows Nest  | SX<br>83800<br>76400 | 0.93km west                    | No information.  | Southacre Clay and Lignite Member/Bovey Formation    | Lower Bovey     |
| Greycoate Lane | SX<br>84600<br>73400 | 1.5km southwest                | The landfill accepted inert waste between 1989 and 1993.   | Bovey Formation                                      | N/A             |
| Western Pipes  | SX<br>83000<br>76200 | 1.5km southwest and 1.6km west | The landfill was licenced between June 1982 and March 1992 and operated between January 1956 and October 1990. It accepted inert waste | Lower Bovey  | Lower Bovey     |

**Table 3-3:** Historic Landfills within 2km of the Site Boundary [Re-produced from the Wardell Armstrong Report]

## 4. Sources: Proposed Activity

### 4.1 Overburden and Interburden

- 4.1.1 The majority of the final landform will be formed from the placement of overburden and interburden material excavated from the quarry voids. This will predominantly comprise naturally occurring clays derived from the bedrock geology that have not met the strict quality requirements for processing.
- 4.1.2 The non-target mineral is excavated alongside the target clays by mechanical means before being transported by dumper trucks onto the tips. Once deposited, the material is compacted using a bulldozer.
- 4.1.3 All overburden and interburden material used for the purposes of the restoration works is required to meet the following waste codes.

| Waste Code | Description                                      |
|------------|--|
| 01 01 02   | Wastes from mineral non-metalliferous excavation |

**Table 4-1:** Waste Codes for Overburden and Interburden Material

### 4.2 Imported Material

- 4.2.1 Restoration cannot be completed using exclusively Site-won materials. Overburden and interburden material is placed in accordance with the approved restored landform, however to complete the restoration and encourage the establishment of the associated habitats, a layer of subsoil and topsoil is required which is not available from on-Site workings.
- 4.2.2 Drawings ST8776-032 to 034 (**Appendix A**) highlight the progressive restoration during Phase 1–3 operations, over a period of 15 years. Following completion of Phases 1-3, the Site will be partially restored, in particular the Rixey Park, White Pit and Heathfield Tips, along with some operational areas within White Pit Quarry and John Acres Lane Quarry where extraction has ceased.
- 4.2.3 From the restoration plan provided in **Appendix A**, a total area for each habitat had been estimated as shown in the table below. Areas include all proposed habitats with the exception of heathland and natural regeneration areas which would likely be created without imported soil. A depth of 30 cm of topsoil and 90 cm of subsoil has been allowed for.
- 4.2.4 There is no specific requirement within the Planning Permission in relation to thicknesses of topsoil and subsoil however taking into account best practice guidance and Sibelco's previous experiences, these thicknesses should be sufficient in completing the approved restoration.

| Proposed Habitats          | Area (m <sup>2</sup> ) | Total Soil Volume (m <sup>3</sup> ) | Total Topsoil Volume (m <sup>3</sup> ) | Total Subsoil Volume (m <sup>3</sup> ) |
|----------------------------|------------------------|-------------------------------------|--|--|
| <i>Phase 1</i>             |                        |                                     |  |  |
| Proposed Neutral Meadow    | 11,328                 | 13,594                              | 3,398                                  | 10,195                                 |
| Proposed Woodland (Closed) | 2,012                  | 2,414                               | 604                                    | 1,811                                  |
| <i>Phase 2</i>             |                        |                                     |  |  |
| Proposed Neutral Meadow    | 4,084                  | 4,901                               | 1,225                                  | 3,676                                  |
| Proposed Neutral Grassland | 18,146                 | 21,775                              | 5,444                                  | 16,331                                 |
| Proposed Pasture           | 63,572                 | 76,286                              | 19,072                                 | 57,215                                 |
| Proposed Woodland (Closed) | 4,450                  | 5,340                               | 1,335                                  | 4,005                                  |
| Proposed Woodland (Open)   | 6,839                  | 21,775                              | 5,444                                  | 16,331                                 |
| <b>Total</b>               | <b>110,431</b>         | <b>146,086</b>                      | <b>36,521</b>                          | <b>109,564</b>                         |

**Table 4-2:** Summary of Required Volumes (First Fifteen Years)

- 4.2.5 Topsoil and subsoil will be brought in using sheeted lorries to Site and checked in accordance with a stringent waste acceptance procedure, as detailed in the EMS<sup>3</sup>.
- 4.2.6 The aim is to adopt appropriate management techniques when using earthmoving equipment to avoid over-compaction (for example if too wet) or loss (for example as dust in dry windy weather) of the imported material.
- 4.2.7 All imported material used for the purposes of the restoration works is required to meet the waste codes set out in the Waste Acceptance Procedures (WAP)<sup>5</sup>.

### 4.3 Properties of the Imported Soil

- 4.3.1 **Table 4-3** below summarises the key parameters associated with the imported soil.

| Parameter          | Discussion   |
|--------------------|--|
| Nature of Material | Waste compliant with EWC codes within the WAP.   |
| Chemistry          | Assumed that all materials will be not hazardous, classified with reference to current technical guidance on the classification of waste, and subsoil will meet the definition of inert waste. With reference to UK.GOV <sup>6</sup> , inert waste is “waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter that it comes into contact with, in a way likely to cause environmental pollution or harm to human health. |
| Compaction         | It is assumed that the subsoil will be compacted by the action of trafficking by plant required to bring the material into the required location and to spread it into reasonably uniform layers.  |

<sup>5</sup> Horizon (2025). Bovey Basin Ball Clay Workings – Central Area. Waste Acceptance Procedures. Ref: HCE1205.WAP

<sup>6</sup> Landfill operators: environmental permits - Landfills for inert waste - Guidance - GOV.UK (www.gov.uk) [Accessed 23 October 2024]

**Table 4-3:** Subsoil Properties

## 4.4 Sources of Pollution

- 4.4.1 Based on the restoration proposals and the properties of the imported material to be used, the potential for contamination is considered to be low. Imported material is to be inert with stringent waste acceptance procedures and therefore will have limited potential for leachate or landfill gas to be generated.

## 4.5 Post-Restoration Management

- 4.5.1 No long-term management measures (e.g. leachate control) are planned. Soils imported for restoration purposes will be restricted to materials that are inert with a low level of contamination based on rigorous Site-specific pre-acceptance and on-Site inspection procedures.

## 5. Pathways: Man-Made Subsurface Pathways

### 5.1 Boreholes

5.1.1 Boreholes on-Site are not considered to be significant pathway for contamination. Existing boreholes are currently sealed with lockable covers. These boreholes were drilled for the purposes of determining the thickness and depth of sand lenses and clay within the Bovey Formation and are not actively monitored for groundwater quality. For the boreholes situated within the quarry these will be decommissioned prior to any quarrying that is to be undertaken in close proximity. Perimeter boreholes are to remain to monitor long term groundwater levels.

### 5.2 Shafts and Adits

5.2.1 Historically, mining of the ball clay within the Bovey Basin would have been carried out both underground and above ground. However, all underground mining in the area has currently ceased with deposits now exclusively extracted in opencast quarries as this is the safest and most efficient method of working the deposits.

5.2.2 Horizon has reviewed historical maps showing previous adits and shafts in the area. There are no known historical shafts or adits within the Central Area Quarries that have not already been quarried out under opencast quarrying activities.

## 6. Pathways and Receptors: Geology

### 6.1 Preamble

6.1.1 Due to wide-scale quarrying of the Site, the existing surface geology to date may not match what is described within geological mapping. A drawing titled “Schematic Hydrogeological Conceptual Site Model” is presented in **Appendix A** and was produced by Wardell Armstrong as part of a Controlled Waters Risk Assessment<sup>7</sup> submitted as part of the planning application. The drawing shows existing surface geology since quarrying activities began.

### 6.2 Regional Setting

6.2.1 The Site lies within what is known geologically as “the Bovey Basin”. The Bovey Basin extends from Bovey Tracey, approximately 4 km north-west of the Site, to Newton Abbot 3 km south of the Site. The basin contains deposited sediments from the Paleogene age, namely clay, silt, sand, gravel and lignite. The deposited sediments make up the Bovey Formation and include the clay layers targeted by quarrying activities of which the area is renowned for.

6.2.2 Based on information from the British Geological Survey<sup>8</sup>, the deposits are described as “*kaolinitic clays, sandy and silty clays, silts, lignites and sands and in some area with outcrop of lignites, brown and black carbonaceous clays, with subordinate grey to greyish brown silty clays and rare sands*”.

6.2.3 A number of other bedrock units outcrop within close proximity to the Site:

- The Aller Gravel Formation: of similar geological age to the Bovey Formation. Outcrops 160 m east of the Site and directly underlies the Bovey Formation. Up to 25 m thick and comprises gravels with lenses of clay, silt and sand; and
- The Upper Greensand Formation: of Cretaceous age and uncomfomably underlies the Aller Gravel Formation. Up to 75 m thick and comprises sand and sandstone with lenses of silty sand. Located 240 m east of the Site.

### 6.3 Bedrock Geology

6.3.1 The encountered geology within individual quarries and tips on Site is shown on a Drawing ST18876/06/003 in **Appendix A**. A breakdown of the geology encountered within boreholes carried out in the area is re-produced from the Wardell Armstrong report in **Appendix E**. Borehole locations are shown on Drawing ST18876/06/006 included **Appendix A**.

6.3.2 Three sub-formations of the Bovey Formation are as follows: the Abbrook Clay and Sand Member; the Southacre Clay and Lignite Member (lower members of Bovey Formation); and the Bovey Formation (undifferentiated). Across the eastern and central areas of the Site, the Abbrook Clay and Sand Member outcrops, with a thickness of between 30 m and 67 m. This has been targeted by quarrying activity.

6.3.3 The Abbrook Clay and Sand Member is characterised by grey (sometimes silty) clays and sand with rare occurrences of lignite. The thickness of this geological unity varies across the Site varying from

<sup>7</sup> Wardell Armstrong (2023). Bovey Basin Ball Clay Workings Central Area. Controlled Waters Receptor Assessment. Ref: ST20466 R001 V1.1

<sup>8</sup> [www.bgs.ac.uk](http://www.bgs.ac.uk) [Accessed 08 October 2024]

26 m to 82 m. A study undertaken by MCG Consultancy Services<sup>9</sup>, including the drilling of eight boreholes and review of 14 boreholes concentrated around the White Pit Quarry area (in the east of Site), concluded a significant sand lens is present within the Abbrook Clay and Sand Member, between clay horizons (the upper of which has been extracted within the White Pit Quarry). The sand lens was reported to be between 5 m and 11 m thick within the White Pit Quarry area of the Site.

6.3.4 The Abbrook Clay and Sand Member is overlain by the Southacre Clay and Lignite Member which outcrops through the middle of the Site, orientated roughly north-west to south-east and is estimated to be between 30 m and 67 m in thickness. The Southacre Clay and Lignite Member is characterised by predominantly brown to black clays with lignite, and less often grey silty clays.

6.3.5 Undifferentiated Bovey Formation overlies the Southacre Clay and Lignite Member in the west of the Site and is reported to be between 10 m and 45 m thick.

## 6.4 Superficial Geology

6.4.1 According to 1:50,000 scale BGS Superficial Geology mapping, the only mapped superficial deposits are alluvial deposits. The alluvium in the west of the Site, within South Acre Quarry, Rixey Park Tip and Binney Tip areas, is associated with the River Teign (described as clay, silt, sand and gravel), and alluvium deposits in the south / south-east of the Site within Heathfield Tip area, is associated with Ugbrooke Stream. Superficial Geology is shown on Drawing ST18876/06/005 in **Appendix A**.

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<sup>9</sup> MCG Consultancy Services Ltd, Southacre, White Pit and John Acres Lane ROMP Submission, May 2007, Report Ref: M0602/R61F

## 7. Pathways and Receptors: Hydrogeology

### 7.1 Aquifer Characteristics

- 7.1.1 According to MAGIC mapping, the Site is not situated in a Drinking Water Safeguard Zone, a groundwater Source Protection Zone (SPZ), or a Nitrate Vulnerable Zone (groundwater). This includes all quarries, tips, and the Preston Manor Processing Plant.<sup>10</sup>
- 7.1.2 In terms of aquifer classification, the Aller Gravel Formation, the Abbrook Clay and Sand Member and the Bovey Formation are classified as a Secondary A aquifer, defined as “*permeable strata capable of supporting supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers*”, and the Southacre Clay and Lignite Member as unproductive strata, defined as being “*largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.*”
- 7.1.3 The alluvium is classified as a Secondary A aquifer, which is based on the likelihood that alluvium deposits within the area will supply baseflow to the River Teign.

### 7.2 Groundwater Levels & Flow

- 7.2.1 Due to the topography of the Site, it is anticipated that regionally, groundwater flow is towards the south and south-east towards Teignmouth into the English Channel. Given the size of the Site there may be a divide in hydrogeological conditions between the east and west.
- 7.2.2 Groundwater within the Bovey Formation is mostly found in isolated sand layers and lenses. Artesian groundwater is also common at the Site as a result of exposure of sand lens at the surface from quarrying activities. Artesian groundwater has also been recorded during borehole investigations.
- 7.2.3 Alluvial units in connection with the River Teign may contain significant amounts of groundwater but these are not intercepted by mineral workings and there is no significant inflow to the pits from the river, through these units.
- 7.2.4 The underlying Aller Gravel and Upper Greensand layers make up the primary aquifer units, which are found at depth. The top of the Aller Gravel Formation is situated around 80 metres below White Pit Quarry’s base.
- 7.2.5 In the White Pit area, the groundwater flow direction in the Aller Gravel Formation and Upper Greensand Formation aquifer is towards the south. This is likely to be similar all over the basin, with groundwater flowing towards discharge zones nearer the coast.
- 7.2.6 Groundwater elevations measured in on-Site monitoring boreholes since 2018 range from -15.65 to -2.58 metres Above Ordnance Datum (m AOD), with an average of -7.53 m AOD reported in all boreholes. Prior to 2018, there was a steady increase in groundwater elevations; an average of 5.30 metres above mean sea level was measured between June 2005 and April 2016.

<sup>10</sup> [www.magic.defra.gov.uk](http://www.magic.defra.gov.uk) [Accessed 10 May 2024]

## 7.3 Groundwater Quality

- 7.3.1 Groundwater quality data is described within the White Pit inflow report in 2001 (laboratory certificate is not available), they show that the unit contained elevated concentrations above Drinking Water Standards for iron (1.34 mg/l), ammonia (2.15 mg/l) and manganese (1.95 mg/l). The elevated iron and manganese are typical of waters sourced from sand aquifers, especially the Greensand, however the source of the ammonia was unknown. Otherwise, the water was low in total and dissolved metals.<sup>11</sup>
- 7.3.2 No active groundwater chemical testing is currently undertaken within the boreholes on-Site.
- 7.3.3 The Site is located entirely within the Teign, Avon, Dart and Erme groundwater body (ID: GB40802G800700), which in 2019 was recorded to have 'Good' quantitative status, 'Poor' chemical and an overall 'Poor' WFD status. The reasons for not achieving good status are due to failures in classification elements: Trend Assessment, Chemical Dependent Surface Water Body Status, and Chemical Drinking Water Protected Area. These failures were attributed to diffuse source pollution from abandoned mines, poor livestock management activities, and poor nutrient management activities.

## 7.4 Private Water Supplies and Abstractions

- 7.4.1 A detailed summary of the private water supplies and licensed abstractions is included within the Wardell Armstrong report<sup>4</sup> and reproduced in **Table 7-1** and **Table 7-2** below and are also shown on Drawing ST18876/06/002 in **Appendix A**.

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<sup>11</sup> WBB (May 2006). White Pit inflow. Investigation, findings and mitigation measures. Ref: M0201/14/R37F1

| ID | Grid Reference    | Distance from Site | Source                             | Catchment   | Bedrock Geology                   | Quantity Abstracted (m <sup>3</sup> /d) |
|----|-------------------|--------------------|------------------------------------|---|-----------------------------------|---|
| P1 | SX 85260<br>76630 | 120 m north-east   | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | Abbrook Clay and Sand Member      | 1                                       |
| P2 | SX 85260<br>76630 | 120 m north-east   | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | Abbrook Clay and Sand Member      | 5                                       |
| P3 | SX 87580<br>74910 | 960 m east         | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | Ugbrooke Sandstone Formation      | 1                                       |
| P4 | SX 86730<br>76950 | 1.14 km north-east | Unknown (single domestic dwelling) | Teign, Avon, Dart and Erme groundwater                                  | Ugbrooke Sandstone Formation      | 1                                       |
| P5 | SX 85400<br>73390 | 1.20 km south-west | Groundwater                        | Teign, Avon, Dart and Erme groundwater or Ugbrooke Stream surface water | Bovey Formation                   | 1                                       |
| P6 | SX 87480<br>76550 | 1.29 km east       | Groundwater                        | Permian Aquifers in Central Devon groundwater                           | Ugbrooke Sandstone Formation      | 1                                       |
| P7 | SX 87730<br>77160 | 1.90 km east       | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | Luxton Nodule Limestone Formation | 2                                       |
| P8 | SX 87880<br>77110 | 1.96 km east       | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | East Ogwell Limestone Formation   | 1                                       |
| P9 | SX 84740<br>72890 | 2.0 km south-west  | Groundwater                        | Teign, Avon, Dart and Erme groundwater                                  | Bovey Formation.                  | 1                                       |

**Table 7-1:** Summary of Private Water Supplies [Re-produced from Wardell Armstrong report]<sup>4</sup>

| ID | Grid Reference    | Distance from Site | Source                               | Catchment                              | Purpose                      | Quantity Abstracted (m <sup>3</sup> /y) |
|----|-------------------|--------------------|--------------------------------------|--|------------------------------|---|
| A1 | SX 84600<br>75800 | 350 m east         | Surface Water – River Bovey          | Lower Bovey                            | Process Water                | 4,546                                   |
| A2 | SX 85200<br>74800 | 30 m south         | Surface Water – River Teign          | Teign (lower)                          | Process Water                | 4,546                                   |
| A3 | SX 86300<br>74700 | On-Site            | Surface Water – Ugbrooke Stream      | Ugbrooke Stream                        | Golf Course Spray Irrigation | 2,160                                   |
|    | SX 86430<br>75900 | 10 m south         |                                      |  |                              |   |
| A4 | SX 86400<br>75900 | 90 m east          | Surface Water – Ugbrooke Stream      | Ugbrooke Stream                        | Golf Course Spray Irrigation | 2,273                                   |
| A5 | SX 86500<br>72700 | 1.68 south         | Groundwater – seepage fed excavation | Teign, Avon, Dart and Erme groundwater | Bovey Formation              | 1,230                                   |

**Table 7-2:** Summary of Surface Water Abstractions [Re-produced from Wardell Armstrong report]<sup>4</sup>

7.4.2 A summary of active groundwater abstractions and discharge consents licensed to Sibelco is included in **Appendix F** and also shown on the Waters Features Plan in **Appendix B**. The majority of the abstractions relate to using submersible pumps to dewater the quarry. In addition, Sibelco also holds an abstraction license for dust suppression, mineral washing and material conveying.

## 8. Pathways and Receptors: Hydrology

### 8.1 Rainfall

8.1.1 Estimates of average monthly rainfall have been obtained from the Meteorological Office UK Climate Averages at Climate Station ‘Yarner Wood (Aura)’ between 1991 – 2020 located at National Grid reference (NGR) SX 78618 78937, approximately 8.15km northwest from the centre of the Site<sup>12</sup>. The annual average is estimated to be 1,439 mm which is 24% higher than the annual average for the UK during that time period.

### 8.2 Surface Water

8.2.1 The River Teign, a main river, flows southwards adjacent to the western boundary. The river continues to flow generally southwards and eastwards to discharge to the English Channel at Teignmouth approximately 8 km to the east of the Site. Two further Main Rivers, the River Bovey and Ventiford Brook flow eastwards towards the Site to form a confluence with the River Teign adjacent to the western Site boundary.<sup>13</sup>

8.2.2 The Site lies within the catchment of the River Teign. The River Bovey joins the Teign just to the west of Southacre. The Ugbrooke Stream, a tributary of the River Teign, flows in a general southerly direction, adjacent to the eastern margin of White Pit and John Acre’s Lane Quarries before meeting the River Teign approximately 1 km beyond the southern boundary of the Site.

8.2.3 The Ugbrooke Stream, an Ordinary Watercourse, flows southwards to the east of the B3193 before diverting south-westwards to flow adjacent to the southern Site boundary. The watercourse then diverts southwards to flow between a network of ponds to the south of the Site. The watercourse ultimately joins the River Teign approximately 1 km to the south of the Site.

8.2.4 There are several lagoons within the Site area, with a lagoon in the north-western corner of the Site adjacent to the Rixey Park Tip, two lagoons to the south-west of the South Acre Quarry at the western Site boundary and three lagoons to the south of the John Acres Quarry adjacent to the southern Site boundary. These are shown on Drawing ST18876/06/001 in **Appendix A**.

8.2.5 The Stover Canal runs north-south approximately 200 m west of the Site at its closest point. The Canal is not actively used however public access along the historic tow path is provided for recreation purposes.

### 8.3 Flood Risk Assessment

8.3.1 A Flood Risk Assessment was carried out by Wardell Armstrong to accompany the Central Area application in September 2023<sup>13</sup>. The report concludes that the risk of flooding to the development from fluvial, surface water, groundwater, sewers and artificial sources is considered to be Low or Very Low.

8.3.2 The continued mineral extraction will generally take place in existing operational areas of the quarry and there will be only a small increase in the footprint during the third phase of work. Any increases

<sup>12</sup> <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gbvrg6vzc> [Accessed 05 September 2024]

<sup>13</sup> Wardell Armstrong (2023) Bovey Basin Ball Clay Works Central Area. Flood Risk Assessment. Ref: ST18876

in impermeable area during this phase will be offset by the progressive restoration works at the Site which will infill and revegetate large areas.

- 8.3.3 All surface water runoff within the development will continue to be retained at the base of the voids. Water from the sumps will continue to be pumped to settlement lagoons and discharged in accordance with the existing discharge permits. There will therefore be no increase in the risk of fluvial or surface water flooding as a result of the proposed import of materials for the purposes of restoration.

## 8.4 Licensed Discharge Consents

- 8.4.1 As discussed in Section 7.4, abstracted water from the quarry voids is discharged via settlement lagoons under licensed discharge consents. Water abstracted from Southacre is discharged via license NRA-SW-5677 to the River Teign and water abstracted from White Pit and John Acres Lane is discharged to the Ugbrooke Stream via license NRA-SW-5678. The two discharge consents have limits on suspended solids however chemical testing for determinands is not required to be carried out.

## 8.5 Surface Water Quality

- 8.5.1 Surface water quality data has been summarised within the Wardell Armstrong report<sup>4</sup> based on two monitoring stations – one upstream monitoring station located on the River Teign; and one downstream monitoring station located on the River Teign.
- 8.5.2 The upstream and downstream river quality monitoring stations showed exceedances of the Environmental Quality Standards (EQS) for dissolved lead, copper and zinc. Comparing monitoring from the same time period in upstream and downstream stations showed an increase in dissolved lead and copper concentrations downstream, and a decrease in dissolved zinc downstream (between an approximate period of April 2019 and July 2021). Full results have been tabulated within the Wardell Armstrong report<sup>4</sup>, and re-produced in **Appendix G**.

## 9. Receptors: Amenity, Habitats and Heritage

### 9.1 Summary of Sensitive Receptors

9.1.1 Potential receptors identified within the vicinity of the Site, that may be affected by the works, have been summarised in **Table 9-1** below and shown on **Drawing 1205.102 (Appendix B)**:

| Receptor  | Location                                 | Details  |
|---|--|--|
| <b>Surface Water</b>  |  |  |
| River Teign   | Located adjacent to the west of the Site | The River Teign has numerous footpaths that run along the river along the boundary of the Site.  |
| Ugbrooke Stream   | Adjacent to the south of the Site        | Stream runs north-east to south-west along the southern boundary of the Site.  |
| Abbrook Ponds   | 35 m south                               | The ponds are used for fishing and are fed by the Ugbrooke Stream.   |
| Stover Canal  | 200 m west                               | Not actively used as a canal. Managed by Stover Canal Heritage Trust.  |
| <b>Nature &amp; Heritage Conservation</b>                     |  |  |
| Proposed restoration habitats and existing deciduous woodland | On-Site                                  | Proposed habitats include wildflower meadows, woodland and grassland.  |
| John Acres Strip pCWS   | On-Site                                  | Medium-low diversity grassland grading to high quality grassland at the northern tip.  |
| Lappathorn Cope UWS   | On-Site                                  | Broadleaved woodland.  |
| Bovey/Teign Confluence CWS                                    | Adjacent to the west                     | Riverine tree cover, tall herb communities, exposed riverine sediment, beetle, bat and otter interest;                                 |
| Abrook Pond and Woodland CWS                                  | Adjacent to the south                    | Pond with broadleaved woodland, wet woodland, scrub and small area of unimproved neutral grassland                                     |
| Ugbrooke Stream Meadow pCWS                                   | Adjacent to the south-east               | Wet woodland and species-rich wet meadow   |
| Southacre Clay Pits SSSI                                      | On-Site                                  | Geological importance for interpreting conditions of the late Palaeogene within the Bovey Basin. Not accessible to the general public. |
| Stover Trail (Stover Canal)                                   | 200 m west                               | Footpath and cycleway that runs along historic canal   |
| Brocks Farm SSSI  | 700 m west                               | Biological importance as this herb-rich field supports a grassland community   |
| Chudleigh Knighton Heath SSSI                                 | 930 m north-west                         | Biological importance as it is an example of lowland Devon heathland.  |
| Stover Park SSSI  | 0.96 km west                             | 200-year-old lake, rich in invertebrates and rare species.   |
| Stover LNR  | 1.3 km west                              | Local nature reserve for wildlife and heritage trails.   |
| Chudleigh Caves and Woods SSSI & SAC                          | 1.2 km northeast                         | Limestone cave system and semi-natural woodland.   |
| <b>General Public, Buildings and Community</b>                |  |  |
| Allotments  | Adjacent to the south                    | Adjacent to the Abbrook fishing ponds to the south of the Site.  |
| Abrook Farm Sports Centre                                     | 50 m south                               | A sports hub consisting of a bowls pitch, football pitches and buildings is present to the south.                                      |
| Residential - Preston village                                 | 150 m south-west                         | Small village of Preston with farmsteads is located in close proximity to the Site.  |
| Residential – Kingsteignton town                              | 250 m south                              | Main residential properties are located approximately 250 m south of the Site.   |

|                                 |                  |   |
|---------------------------------|------------------|---|
| Residential – Sandygate village | 250 m south-east | The village of Sandygate is located in close proximity to the Site. |
| Kingsteignton Swimming Pool     | 325 m south      | Outdoor swimming pool   |
| Five Lanes Playing Fields       | 350 m south      | Football pitches  |
| Teign School                    | 500 m south      | Secondary school grounds with playing fields                        |
| Nursery / Kingsteignton School  | 550 m south      | Early years and primary school with outdoor play areas.             |

**Table 9-1:** Sensitive Receptors

## 9.2 Statutory Sites

- 9.2.1 According to DEFRA's Magic Maps interactive mapping, there are no National Nature Reserves (NNR), Special Protection Areas (SPA), Areas of Outstanding Natural Beauty (AONB), National Parks or Ramsar Sites within a 2 km radius of the Site.
- 9.2.1 MAGIC interactive mapping identifies two Local Nature Reserve (LNR), Stover and Jetty Marsh within 2 km of the Site, (details provided in **Table 9-1**).
- 9.2.2 According to MAGIC interactive mapping, there are five SSSI sites, (Southacre Clay Pits, Chudleigh Knighton Heath, Brocks Farm, Stover Park and Chudleigh Caves & Woods) within 2 km of the Site. Chudleigh Caves and Woods is also an SAC.
- 9.2.3 The Southacre Clay Pits Site of Special Scientific Interest (SSSI) is located in the west of the Site and is designated for its geological interest. The SSSI status for this area is considered to be temporary given the requirement to restore the Site pre-dates the designation (designated in March 1995) and given the SSSI is entirely within a permitted minerals site, this would not be a constraint on the development. Sibelco's activities help manage the active faces, maintaining their condition and preserving their visibility whilst the quarries are still active.
- 9.2.4 Listed buildings within a 500 m radius of the Site are summarised in **Table 9-2** below. **Table 9-2** has been developed based on information from Historic England<sup>14</sup>.

| List Entry No. | Name                              | NGR            | Date First Listed |
|----------------|-----------------------------------|----------------|-------------------|
| 1317369        | New Bridge, Clay Lane,            | SX 84888 76424 | 27-Apr-1987       |
| 1425244        | Milestone AT SX 859 749 (On-Site) | SX 85899 74822 | 27-Apr-1987       |
| 1097085        | Milestone AT SX 852 764           | SX 85216 76427 | 27-Apr-1987       |
| 1165596        | Manor Cottage                     | SX 85678 74770 | 27-Apr-1987       |
| 1334279        | Brunell Cottage                   | SX 85795 74694 | 27-Apr-1987       |
| 1165576        | Moorview                          | SX 85704 74640 | 27-Apr-1987       |
| 1097057        | Sampson's farm Restaurant         | SX 85653 74608 | 20-Jun-1977       |
| 1166261        | Brocks Farmhouse                  | SX 84357 75710 | 02-Jul-1986       |
| 1166267        | Ley Green Farmhouse               | SX 84692 74861 | 02-Jul-1986       |
| 1334125        | Ley Green Cottage                 | SX 84614 74856 | 02-Jul-1986       |
| 1165638        | 2 and 4, Sandygate                | SX 86761 74685 | 22-Aug-1955       |
| 1097059        | The Sandygate Inn                 | SX 86776 74703 | 22-Aug-1955       |
| 1317450        | Milestone AT SX 868 746           | SX 86868 74577 | 27-Apr-1987       |
| 1097082        | Forsterville Cottages             | SX 86399 76210 | 27-Apr-1987       |
| 1317447        | Forsterville Lodge                | SX 86505 76166 | 27-Apr-1987       |

**Table 9-2:** Summary of Listed Buildings.

<sup>14</sup> [www.historicengland.org.uk](http://www.historicengland.org.uk) [Accessed 10 May 2024]

9.2.1 No scheduled ancient monuments were identified within a 2 km radius of the Site with reference to Historic England website<sup>14</sup>

### 9.3 Non Statutory Sites

9.3.1 Five non-statutory designated sites are located within the Site: Abbrook Pond and Woodland County Wildlife Site (CWS); Bovey/Teign Confluence CWS; John Acres Strip potential County Wildlife Site (pCWS); Ugbrooke Stream Meadow pCWS; and Lappathorn Copse Unconfirmed Wildlife Site (UWS).

### 9.4 Ecology

9.4.1 In addition to publicly available sources (i.e data available from DEFRA's Magic Maps service), Horizon has obtained a nature and heritage screening report from the Environment Agency which provides any additional protected areas or habitats which are sometimes not publicly available. The screening report, included in **Appendix H**, identifies the River Teign, River Bovey and some of its tributaries as migratory routes for protected species. Deciduous Woodland is also sporadically recorded across the Site however this data is considered to be inaccurate as the majority of the hatched areas shown on **Appendix H** are open quarry workings.

9.4.2 Chapter 7 of the Environmental Statement<sup>4</sup> details the risk to ecological receptors as part of the now approved restoration. The risk assessment findings were that the restoration scheme would have a beneficial effect on habitat/species and therefore no adverse cumulative effects are anticipated as a result of the scheme and continued working of the nearby quarries.

### 9.5 Dust

9.5.1 A condition of the Planning Permission for the continued working and restoration of the Central Area is that an up-to-date Dust Management Plan is to be completed and agreed by the local authority. It is assumed that the updated DMP will meet the requirements of the Environment Agency associated with the Environmental Permit.

### 9.6 Risk Assessment

9.6.1 A standalone Environmental Risk Assessment has not been prepared for this project however a summary risk assessment table based on a generic risk assessment for a Standard Rules SR2015 No.39 Environmental Permit is included in **Appendix I**. Risk assessment reports relating to specific receptors as a result of the CSM result are set out in the ESSD report<sup>3</sup>.

9.6.2 The following potential pathways have been identified in relation to sensitive receptors:

- Air transport then inhalation (particulate matter).
- Mud and waste on roads tracked on tyres and vehicles entering and leaving the Site and from loads which are not properly contained;
- Noise through the air and vibration through the ground;
- Flood waters washing contaminated waste off-Site;
- Direct physical contact (trespassers);
- Direct run-off from Site across ground surface, via surface water drains, ditches etc;

- Indirect run-off from Site via the soil layer;
- Transport through soil/groundwater then extraction at borehole; and
- Direct contact or ingestion.

9.6.3 Reference should be made to the risk assessment for an assessment of actual or possible hazards along with

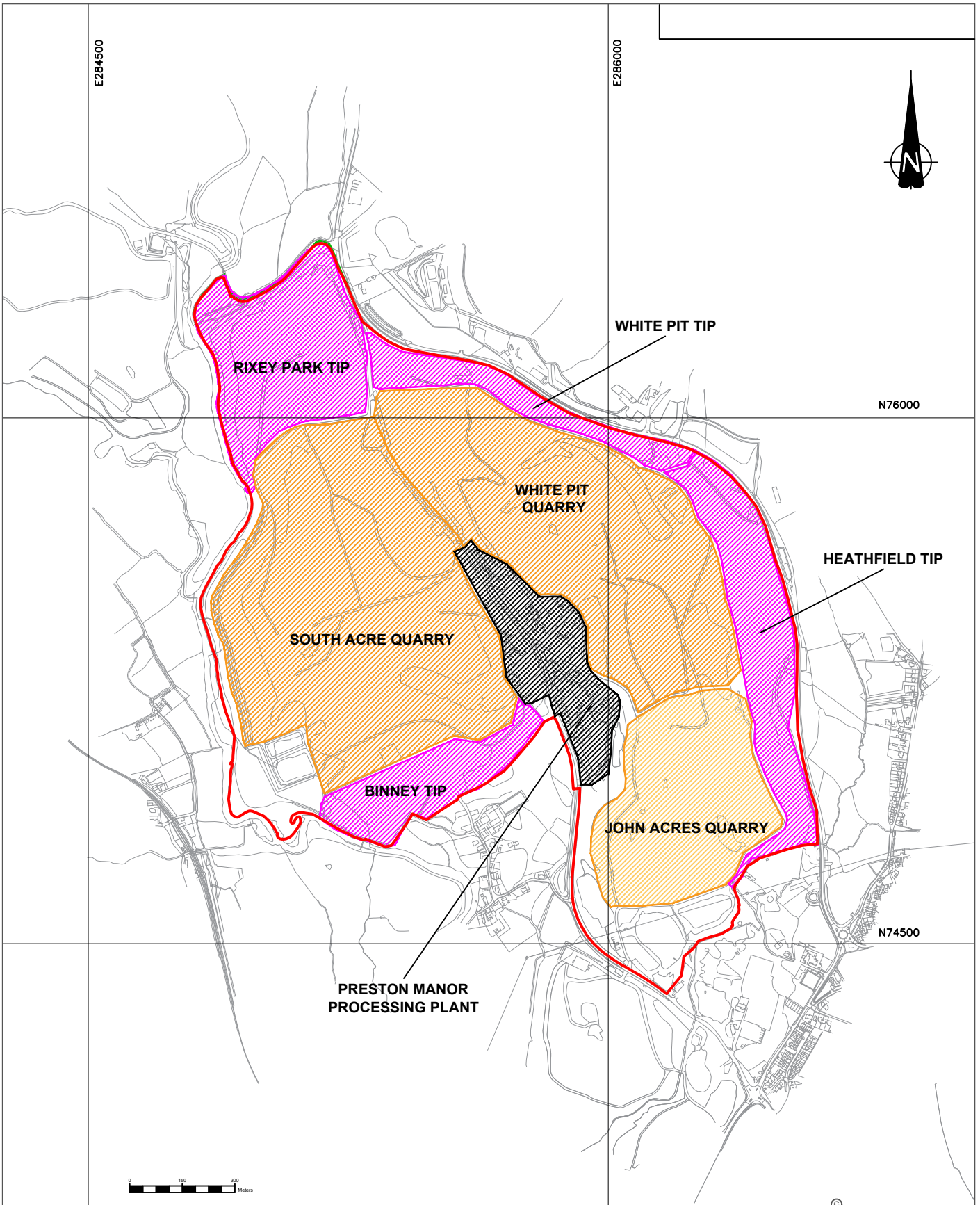
- the probability of exposure (e.g., whether a risk is unlikely or highly likely);
- potential consequences (i.e., what harm could be caused);
- proposed measures to be adopted to reduce risks; and
- an assessment of the overall risk following implementation of any identified mitigation measures.

# 10. Summary and Conclusions

## 10.1 Conceptual Site Model

- 10.1.1 A drawing titled “Schematic Hydrogeological Conceptual Site Model” is presented in **Appendix A** and was produced by Wardell Armstrong as part of a Controlled Wasters Risk Assessment<sup>7</sup> submitted as part of the planning application.
- 10.1.2 The Site extends circa 219 Ha and comprises five operational areas including the three Central Area Quarries (Southacre, White Pit and John Acres Lane), Preston Manor Works and overburden/interburden tipping areas. The topography of the Site ranges from -46 m AOD at the lowest elevation across the three quarries (South Acre Quarry) to 57 m AOD at the east of the Site at Heathfield Tip (adjacent to White Pit Quarry). The general gradient across the Site slopes from the east to south-west.
- 10.1.3 The Site lies within what is known geologically as “the Bovey Basin”. The Bovey Basin extends from Bovey Tracey, approximately 4 km north-west of the Site, to Newton Abbot 3 km south of the Site. The basin contains deposited sediments from the Paleogene age, namely clay, silt, sand, gravel and lignite. The deposited sediments make up the Bovey Formation and include the clay layers targeted by quarrying activities of which the area is renowned for.
- 10.1.4 It is understood that ball clay extraction within the area dates back to the 17<sup>th</sup> Century. With the conception of the planning system the area became characterised by a series of planning permissions, reflecting the large number of small independent companies operating their own quarries or mines. As such, the Site benefits from a series of historic planning permissions for mineral extraction. Over the period of these permissions, the quarries have expanded in area.
- 10.1.5 A consolidating Planning Permission has recently been granted by Devon County Council (DCC) for the continued winning and working of permitted mineral reserves, associated development, and progressive restoration of the Site (DCC/4344/2023) .
- 10.1.6 Restoration cannot be completed exclusively from overburden and interburden. Additional material will be required to provide a suitable substrate for the establishment of new habitats.
- 10.1.7 A depth of 30 cm of topsoil and 90 cm of imported subsoil has been allowed for to meet the design levels whilst providing an appropriate growth layer. These thicknesses should be sufficient in completing the approved restoration taking into account best practice guidance and Sibelco’s previous experiences.
- 10.1.8 Only inert subsoils, are to be imported for the restoration along with clean topsoil.

# Appendix A      Wardell Armstrong Drawings



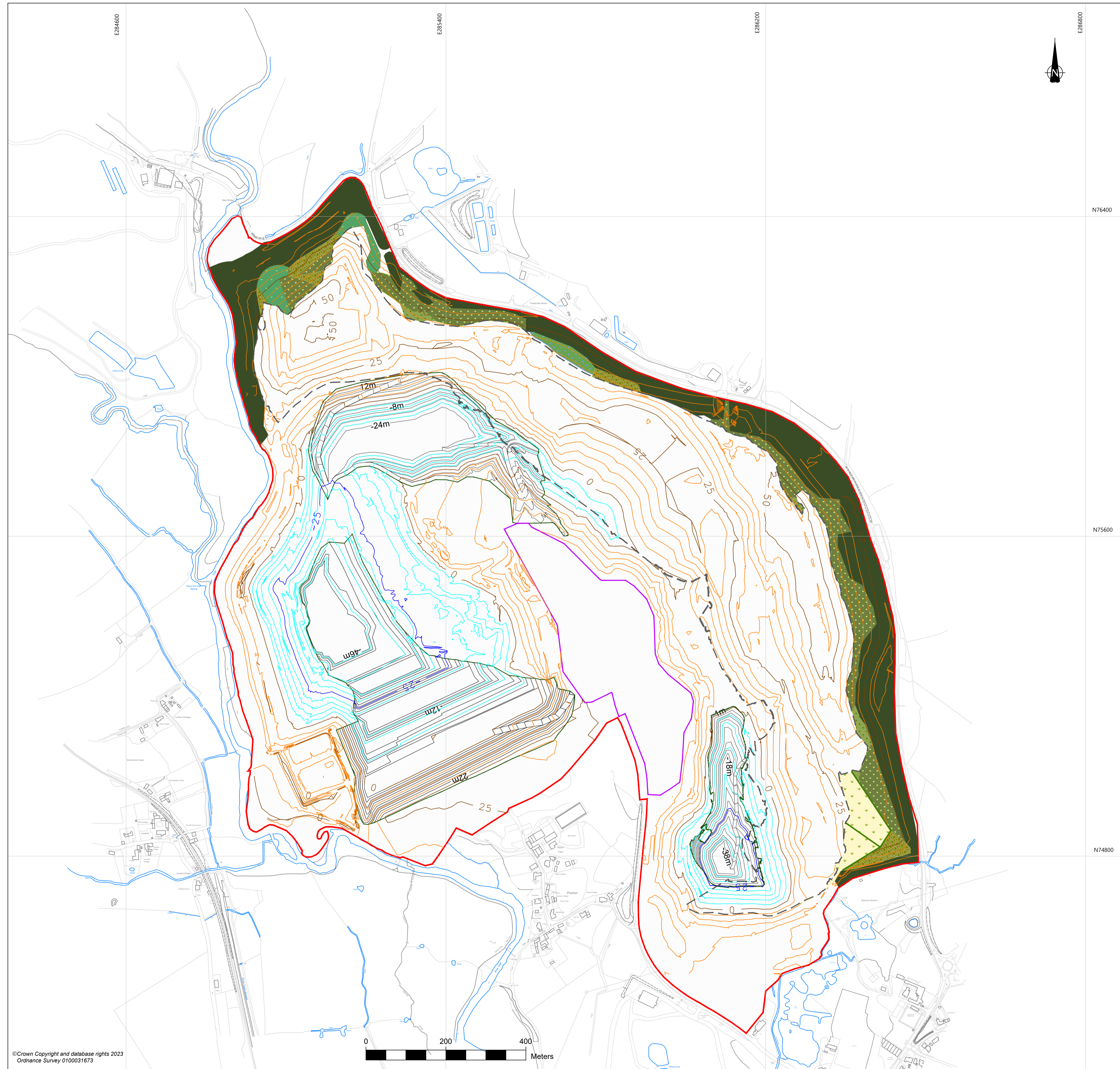
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|  |  |                         |                          |
|--|--|-------------------------|--------------------------|
| CLIENT<br><b>SIBELCO UK LIMITED</b>                      | DRG No.<br><b>ST18876-011</b>              |                         | REV<br><b>P3</b>         |
|  | SIZE<br><b>A4</b>                          | SCALE<br><b>1:15000</b> | DATE<br><b>17/3/2022</b> |
| PROJECT<br><b>CENTRAL AREA CONSOLIDATION APPLICATION</b> | DRAWN BY<br><b>EL</b>                      | CHECKED BY<br><b>GP</b> | APPROVED BY              |
|  | DRAWING TITLE<br><b>SITE OVERVIEW PLAN</b> |                         |                          |



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- LEGEND**
- PLANNING BOUNDARY
  - PRESTON MANOR PROCESSING PLANT
  - PHASE 1 EXTRACTION AREA
  - ACTIVE PHASE 1 CONTOURS
  - CONTOURS WITH POSITIVE VALUES
  - CONTOURS WITH NEGATIVE VALUES
  - TIPPING FOOTPRINT= 64.354HA  
(EXTENT OF LANDSCAPE SCHEME= 95.074HA)
  - EXISTING RETAINED
  - NEUTRAL MEADOW (UNIMPROVED)
  - NEUTRAL GRASSLAND
  - EPHEMERAL / SHORT PERENNIAL
  - DENSE SCRUB
  - BROADLEAVED WOODLAND

|   |                                     |          |     |    |    |
|---|-------------------------------------|----------|-----|----|----|
| B | AREA OF EXTENT OF LANDSCAPE AMENDED | 20/10/23 | EL  | MP | SR |
| A | FIRST ISSUE                         | 26/10/23 | S.R | MP | SR |

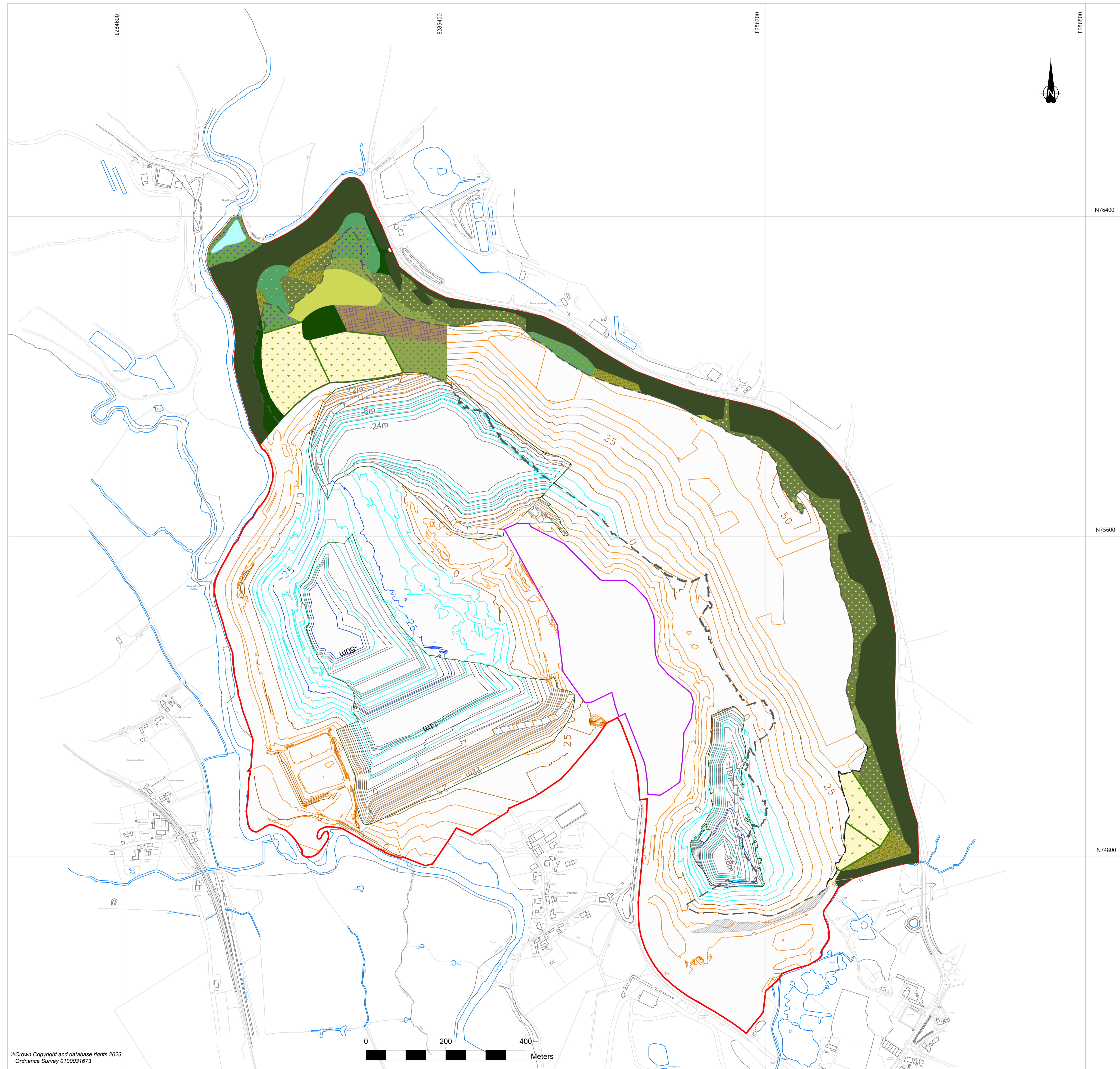
CLIENT  
**SIBELCO UK LIMITED**

PROJECT  
**CENTRAL AREA  
CONSOLIDATION APPLICATION**

DRAWING TITLE  
**PHASE 1  
PROGRESSIVE RESTORATION PLAN**

|          |             |            |        |             |
|----------|-------------|------------|--------|-------------|
| DRG No.  | ST18876-032 | REV        | B      | SUIT. CODE  |
| DRG SIZE | A1          | SCALE      | 1:5000 | DATE        |
| DRAWN BY | EL          | CHECKED BY | AY     | APPROVED BY |
|          |             |            |        | SR          |

**wardell armstrong**



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Ordnance Survey 0100031673

- LEGEND**
- PLANNING BOUNDARY
  - PRESTON MANOR PROCESSING PLANT
  - PHASE 1 EXTRACTION AREA
  - ACTIVE PHASE 1 CONTOURS
  - CONTOURS WITH POSITIVE VALUES
  - CONTOURS WITH NEGATIVE VALUES
  - TIPPING FOOTPRINT= 64.354HA  
(EXTENT OF LANDSCAPE SCHEME= 95.074HA)
  - EXISTING RETAINED
  - NEUTRAL MEADOW (UNIMPROVED)
  - NEUTRAL GRASSLAND
  - EPHEMERAL / SHORT PERENNIAL
  - DENSE SCRUB
  - BROADLEAVED WOODLAND
  - PROPOSED NEW**
  - NEUTRAL MEADOW - PROPOSED
  - NEUTRAL GRASSLAND - PROPOSED
  - HEATHLAND - PROPOSED
  - BROADLEAVED WOODLAND - PROPOSED
  - WOODLAND EDGE - PROPOSED
  - ATTENUATION POND - PROPOSED
  - NATURAL REGENERATION - PROPOSED

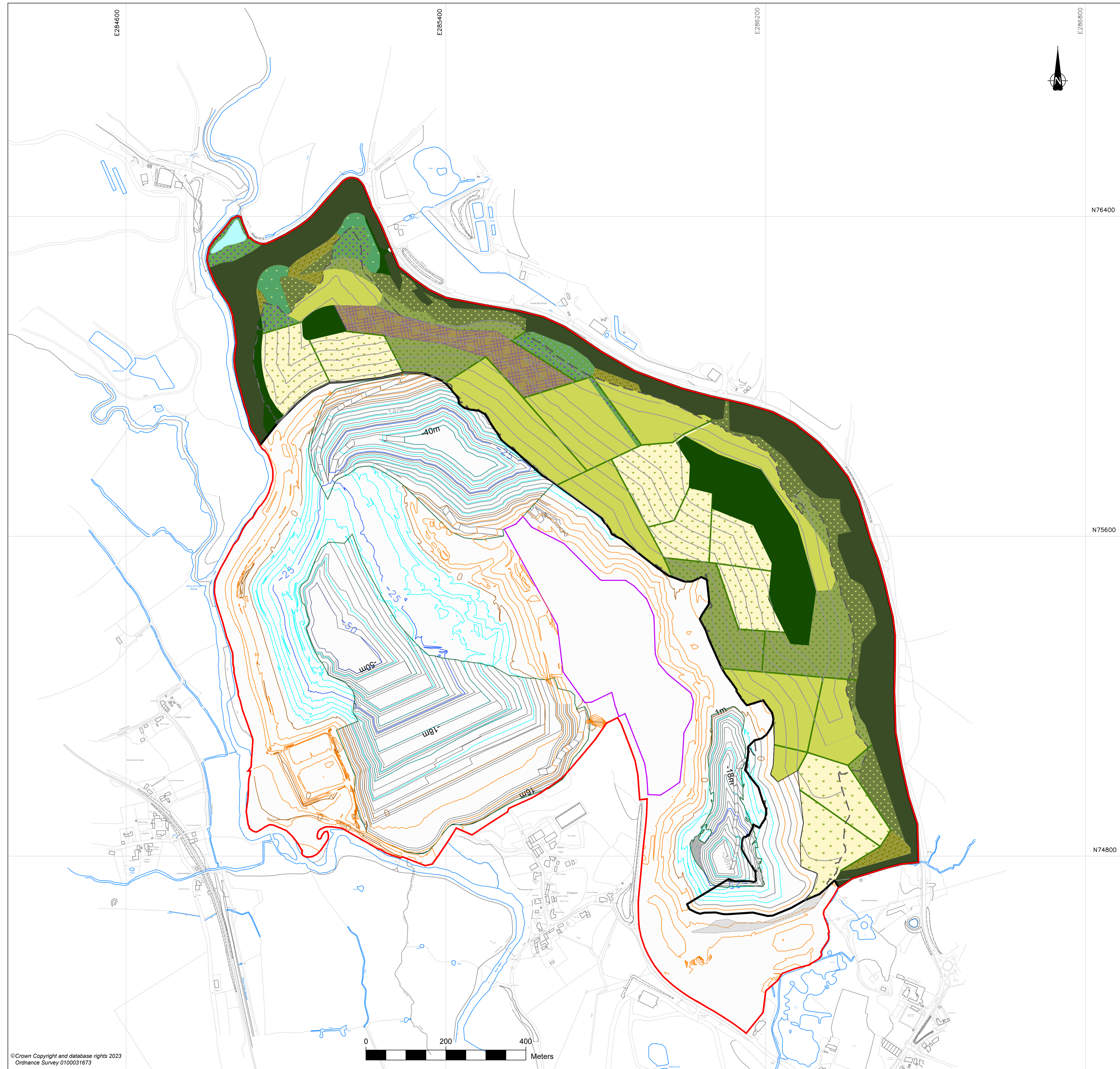
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|----------|-------------------------------------|----------|-----|----|----|
| <b>B</b> | AREA OF EXTENT OF LANDSCAPE AMENDED | 31/01/21 | EL  | MP | SR |
| <b>A</b> | FIRST ISSUE                         | 25/10/21 | SLB | MP | SR |

CLIENT  
**SIBELCO UK LIMITED**

PROJECT  
**CENTRAL AREA  
CONSOLIDATION APPLICATION**

DRAWING TITLE  
**PHASE 2  
PROGRESSIVE RESTORATION PLAN**

|          |             |            |        |             |
|----------|-------------|------------|--------|-------------|
| DRG No.  | ST18876-033 | REV        | B      | SUIT. CODE  |
| DRG SIZE | A1          | SCALE      | 1:5000 | DATE        |
| DRAWN BY | EL          | CHECKED BY | AY     | APPROVED BY |
|          |             |            |        | SR          |



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Ordnance Survey 0100031673

- LEGEND**
- PLANNING BOUNDARY
  - PRESTON MANOR PROCESSING PLANT
  - PHASE 1 EXTRACTION AREA
  - ACTIVE PHASE 1 CONTOURS
  - CONTOURS WITH POSITIVE VALUES
  - CONTOURS WITH NEGATIVE VALUES
  - TIPPING FOOTPRINT= 64.354HA  
(EXTENT OF LANDSCAPE SCHEME= 95.074HA)
  - EXISTING RETAINED
  - NEUTRAL MEADOW (UNIMPROVED)
  - NEUTRAL GRASSLAND
  - EPHEMERAL / SHORT PERENNIAL
  - DENSE SCRUB
  - BROADLEAVED WOODLAND
  - PROPOSED NEW
  - NEUTRAL MEADOW - PROPOSED
  - NEUTRAL GRASSLAND - PROPOSED
  - HEATHLAND - PROPOSED
  - BROADLEAVED WOODLAND - PROPOSED
  - WOODLAND EDGE - PROPOSED
  - ATTENUATION POND - PROPOSED
  - NATURAL REGENERATION - PROPOSED

|          |                                     |          |        |         |          |
|----------|-------------------------------------|----------|--------|---------|----------|
| C        | AREA OF EXTENT OF LANDSCAPE AMENDED | 14/03/22 | DR     | MP      | SR       |
| B        | AREA OF EXTENT OF LANDSCAPE AMENDED | 31/01/22 | EL     | MP      | SR       |
| A        | FIRST ISSUE                         | 25/01/22 | SR     | MP      | SR       |
| REVISION | DETAILS                             | DATE     | ISSUED | CHECKED | APPROVED |

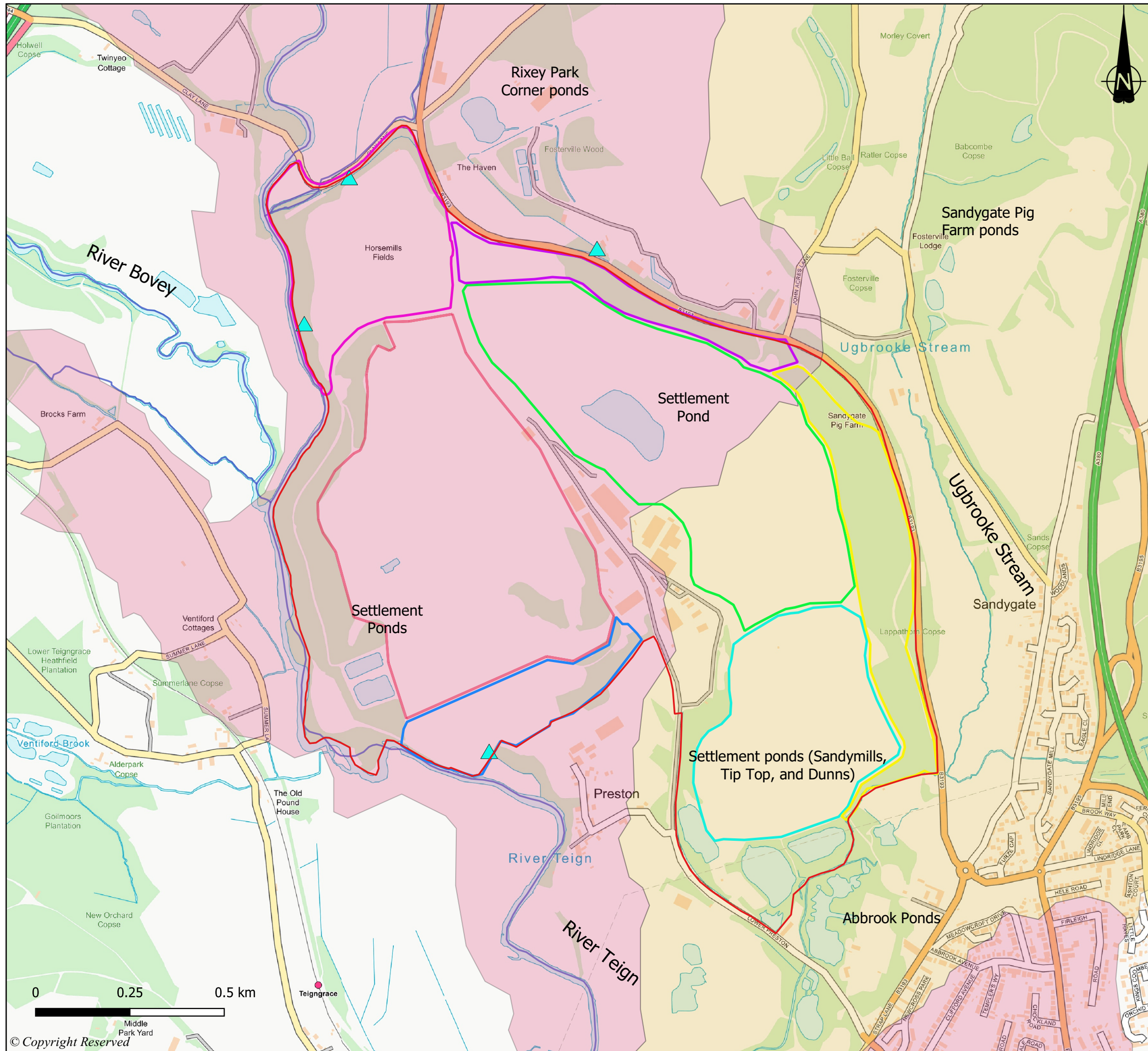
CLIENT  
**SIBELCO UK LIMITED**

PROJECT  
**CENTRAL AREA  
CONSOLIDATION APPLICATION**

DRAWING TITLE  
**PHASE 3  
PROGRESSIVE RESTORATION PLAN**

|          |             |            |        |             |
|----------|-------------|------------|--------|-------------|
| DRG No.  | ST18876-034 | REV        | C      | SUIT. CODE  |
| DRG SIZE | A1          | SCALE      | 1:5000 | DATE        |
| DRAWN BY | EL          | CHECKED BY | AY     | APPROVED BY |
|          |             |            |        | SR          |





DO NOT SCALE FROM THIS DRAWING

**KEY**

- Site Boundary
- Ugbrooke Stream Surface waterbody catchment
- Teign (Lower) Surface waterbody catchment
- John Acres Quarry
- Rixey Park Tip
- South Acre Quarry
- White Pit Tip
- White Tip Quarry
- Binney Tip
- Heathfield Tip
- ▲ Issues
- Main Rivers (EA)

Reproduced from Ordnance Survey Maps  
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Contains Environment Agency Main Rivers data ©  
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| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|
|          |         |      |     |       |       |

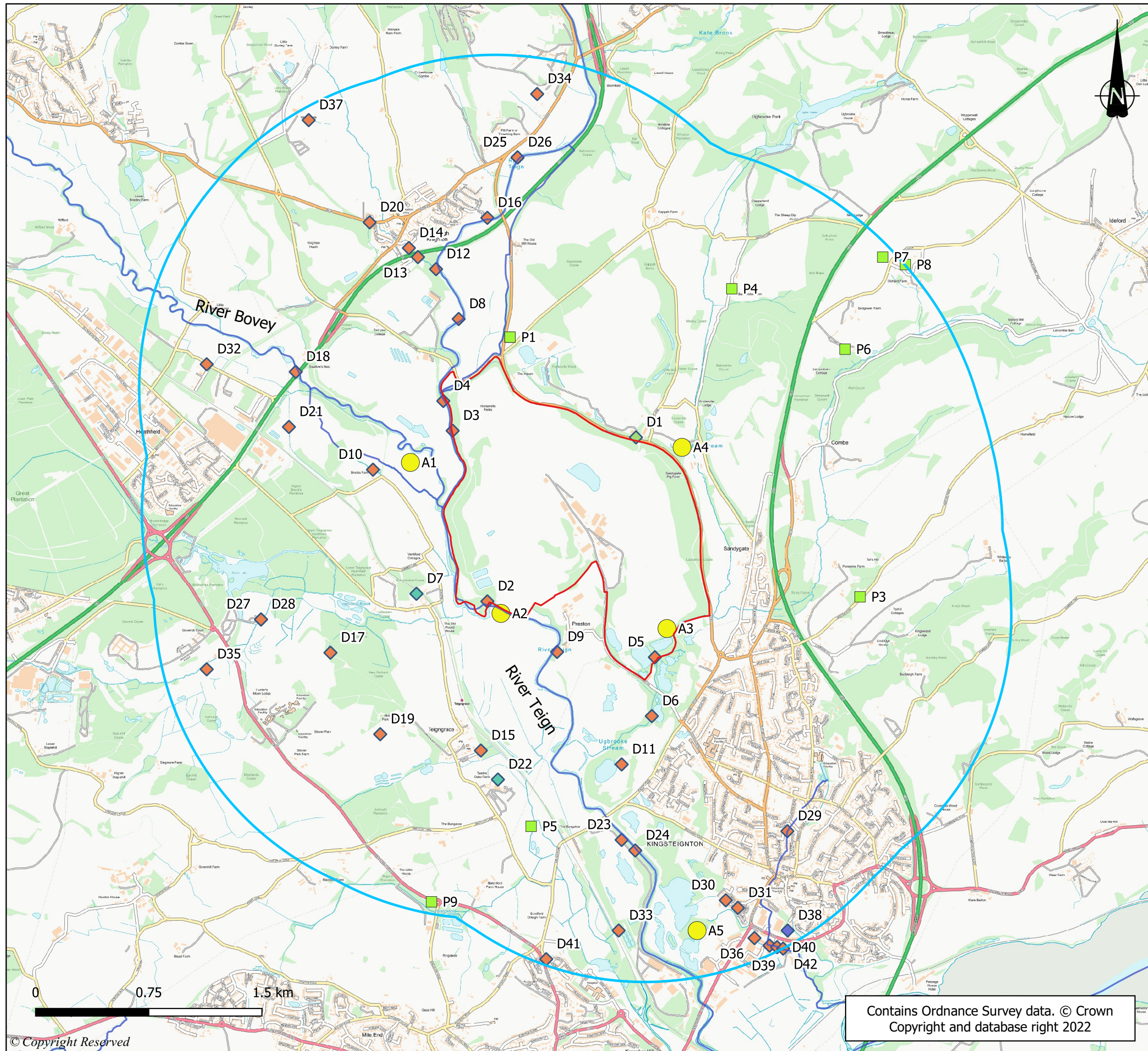
CLIENT  
**Sibelco UK Ltd**

PROJECT  
**Bovey Basin Ball Clay Workings Environmental Statement**

DRAWING TITLE  
**Figure 6.1 Surface water catchments, ponds, and issues**

|          |                |             |               |
|----------|----------------|-------------|---------------|
| DRG No.  | ST18876/06/001 | REV         | A             |
| DRG SIZE | A3             | SCALE       | 1:10,000      |
|          |                | DATE        | December 2022 |
| DRAWN BY | DO             | CHECKED BY  | AB            |
|          |                | APPROVED BY | AB            |





DO NOT SCALE FROM THIS DRAWING

KEY

- Site Boundary
  - 2km Buffer
  - Main Rivers (EA)
  - Licensed abstractions within 2km
  - Private Water Supplies within 2km
- Active discharges within 2km
- ◆ Freshwater river
  - ◆ Grass plots / irrigation area
  - ◆ Into groundwater via borehole
  - ◆ Into land / infiltration system

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| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|
|          |         |      |     |       |       |

|        |                |  |  |  |  |
|--------|----------------|--|--|--|--|
| CLIENT | Sibelco UK Ltd |  |  |  |  |
|--------|----------------|--|--|--|--|

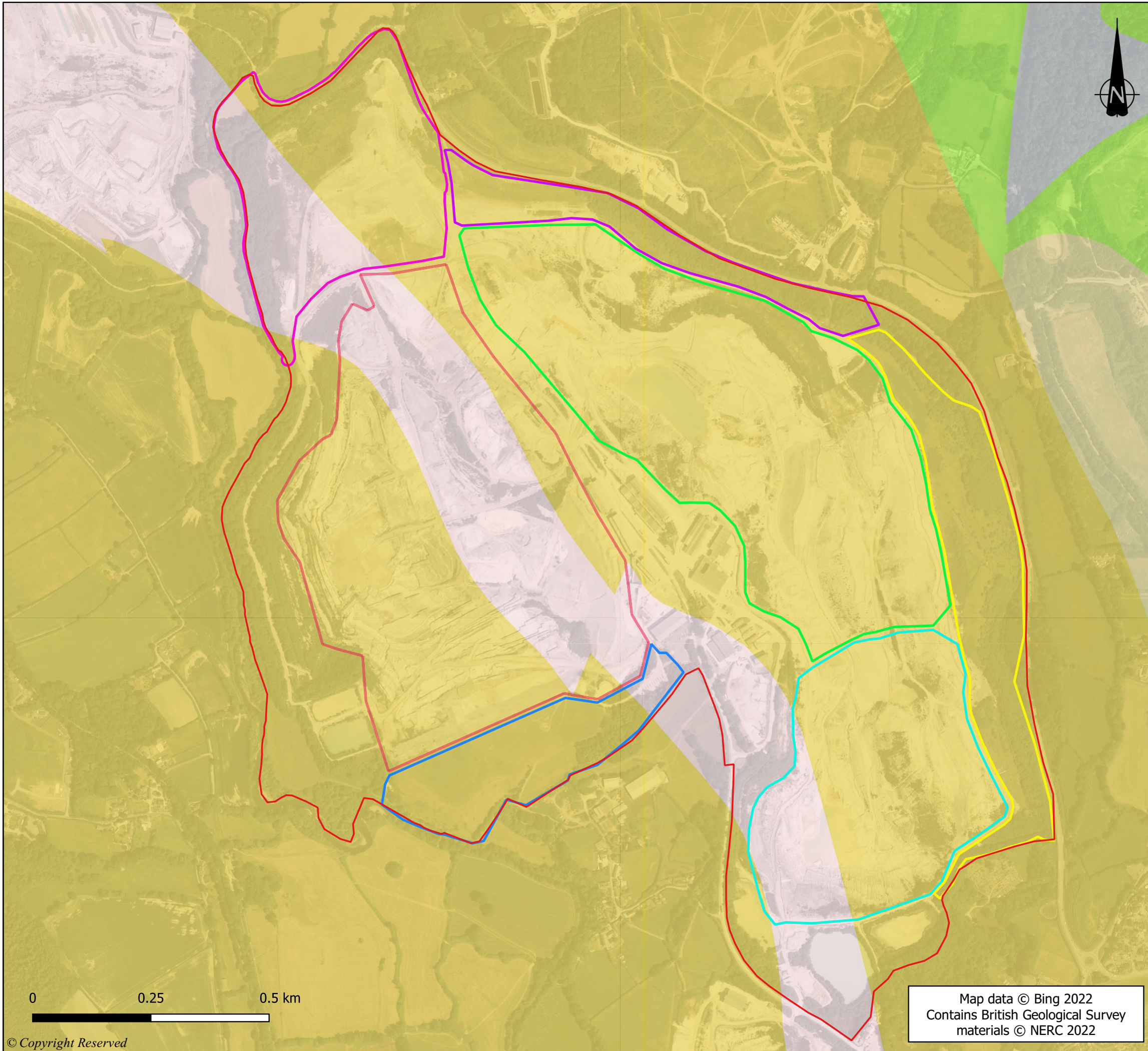
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|---------|--|--|--|--|--|
| PROJECT | Bovey Basin Ball Clay Workings Environmental Statement |  |  |  |  |
|---------|--|--|--|--|--|

|               |   |  |  |  |  |
|---------------|---|--|--|--|--|
| DRAWING TITLE | Figure 6.2 Abstractions, Discharges, and Private Water Supplies |  |  |  |  |
|---------------|---|--|--|--|--|

|          |                |            |          |             |               |
|----------|----------------|------------|----------|-------------|---------------|
| DRG No.  | ST18876/06/002 |            | REV      | -           |               |
| DRG SIZE | A3             | SCALE      | 1:25,000 | DATE        | December 2022 |
| DRAWN BY | DO             | CHECKED BY | AB       | APPROVED BY | AB            |




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DO NOT SCALE FROM THIS DRAWING

KEY

- Site Boundary
- Binney Tip
- Heathfield Tip
- John Acres Quarry
- Rixey Park Tip
- South Acre Quarry
- White Pit Tip
- White Tip Quarry

GBR BGS 1:50k Bedrock

- Abbrook Clay and Sand Member
- Southacre Clay and Lignite Member
- Bovey Formation
- Upper Greensand Formation
- Aller Gravel Formation
- Ugbrooke Sandstone Formation

Boundaries are indicative. Aerial imagery shown for context purposes only.

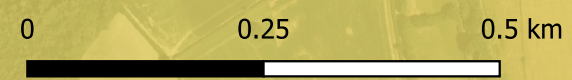
| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|
|          |         |      |     |       |       |

|        |                |
|--------|----------------|
| CLIENT | Sibelco UK Ltd |
|--------|----------------|

|         |  |
|---------|--|
| PROJECT | Bovey Basin Ball Clay Workings Environmental Statement |
|---------|--|

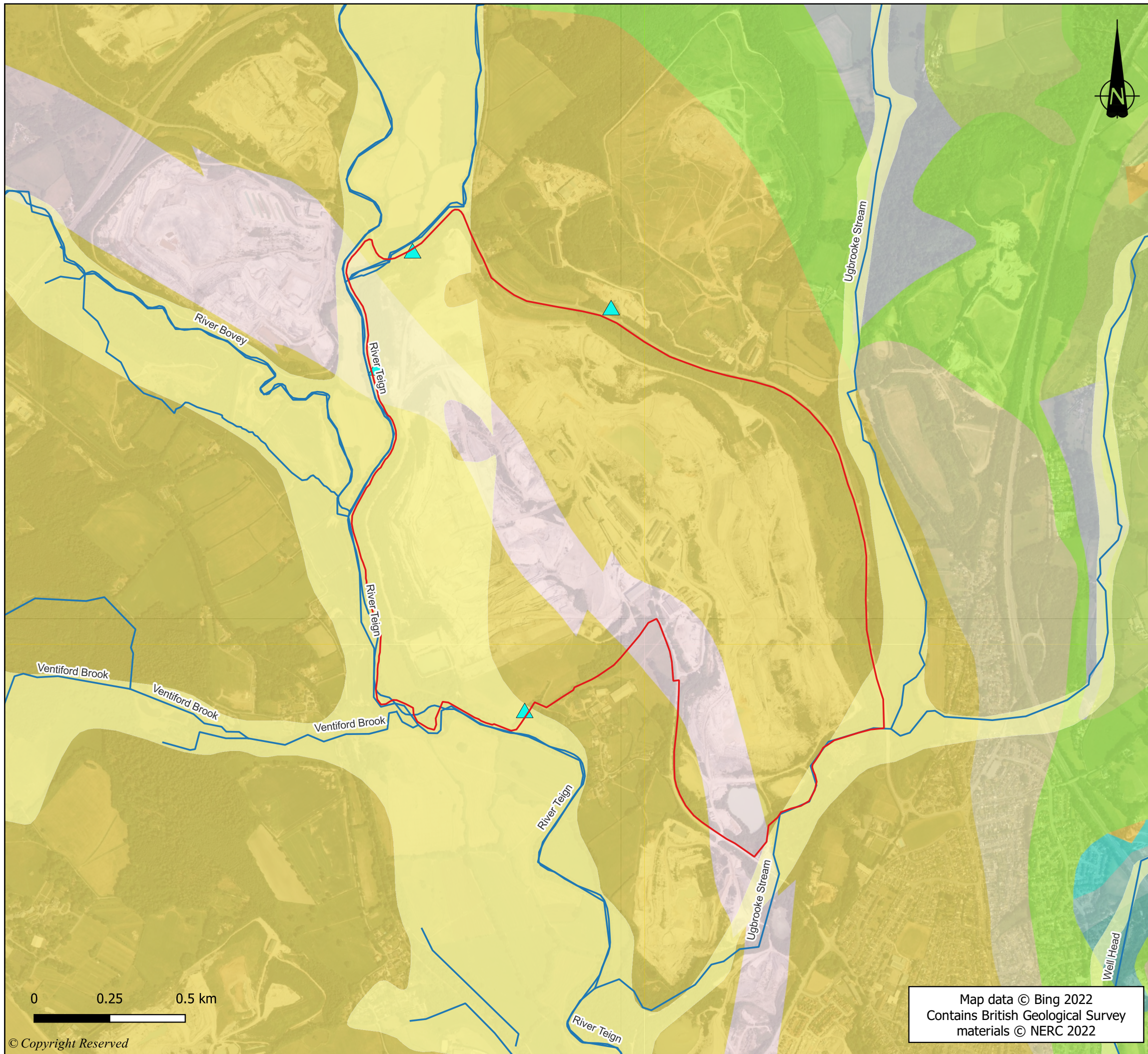
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| DRAWING TITLE | Figure 6.3 Bedrock Geology |
|---------------|----------------------------|

|          |                |             |               |
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| DRG No.  | ST18876/06/003 | REV         | A             |
| DRG SIZE | A3             | SCALE       | 1:8,000       |
|          |                | DATE        | December 2022 |
| DRAWN BY | DO             | CHECKED BY  | AB            |
|          |                | APPROVED BY | AB            |



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Contains British Geological Survey materials © NERC 2022





DO NOT SCALE FROM THIS DRAWING

KEY

- Site Boundary
- Watercourse
- ▲ Issues
- GBR BGS 1:50k Superficial deposits
  - Alluvium
- GBR BGS 1:50k Bedrock
  - Abbrook Clay and Sand Member
  - Southacre Clay and Lignite Member
  - Bovey Formation
  - Upper Greensand Formation
  - Aller Gravel Formation
  - Ugbrooke Sandstone Formation

Boundaries are indicative. Aerial imagery shown for context purposes only.

| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|
|          |         |      |     |       |       |

|        |                |
|--------|----------------|
| CLIENT | Sibelco UK Ltd |
|--------|----------------|

|         |  |
|---------|--|
| PROJECT | Bovey Basin Ball Clay Workings Environmental Statement |
|---------|--|

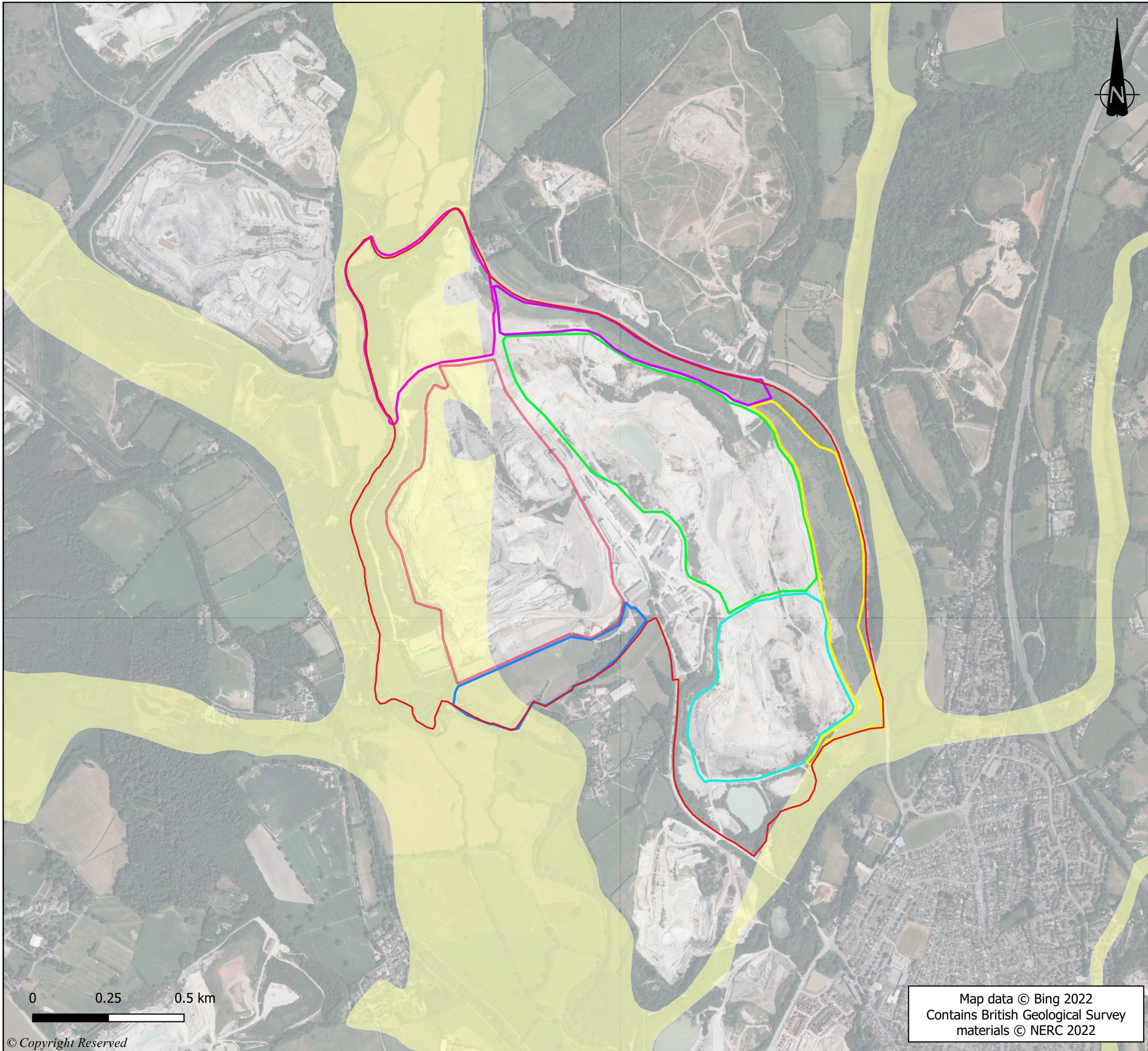
|               |                               |
|---------------|-------------------------------|
| DRAWING TITLE | Figure 6.4 Issues and Geology |
|---------------|-------------------------------|

|          |                |             |               |
|----------|----------------|-------------|---------------|
| DRG No.  | ST18876/06/004 | REV         | A             |
| DRG SIZE | A3             | SCALE       | 1:12,500      |
|          |                | DATE        | December 2022 |
| DRAWN BY | DO             | CHECKED BY  | AB            |
|          |                | APPROVED BY | AB            |

Map data © Bing 2022  
Contains British Geological Survey materials © NERC 2022

0      0.25      0.5 km

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DO NOT SCALE FROM THIS DRAWING

- KEY**
- Site Boundary
  - Binney Tip
  - Heathfield Tip
  - John Acres Quarry
  - Rixey Park Tip
  - South Acre Quarry
  - White Pit Tip
  - White Tip Quarry

GBR BGS 1:50k Superficial deposits  
 Alluvium

Boundaries are indicative. Aerial imagery shown for context purposes only.

|          |         |      |     |       |       |
|----------|---------|------|-----|-------|-------|
| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|

CLIENT  

Sibelco UK Ltd

PROJECT  

Bovey Basin Ball Clay Workings Environmental Statement

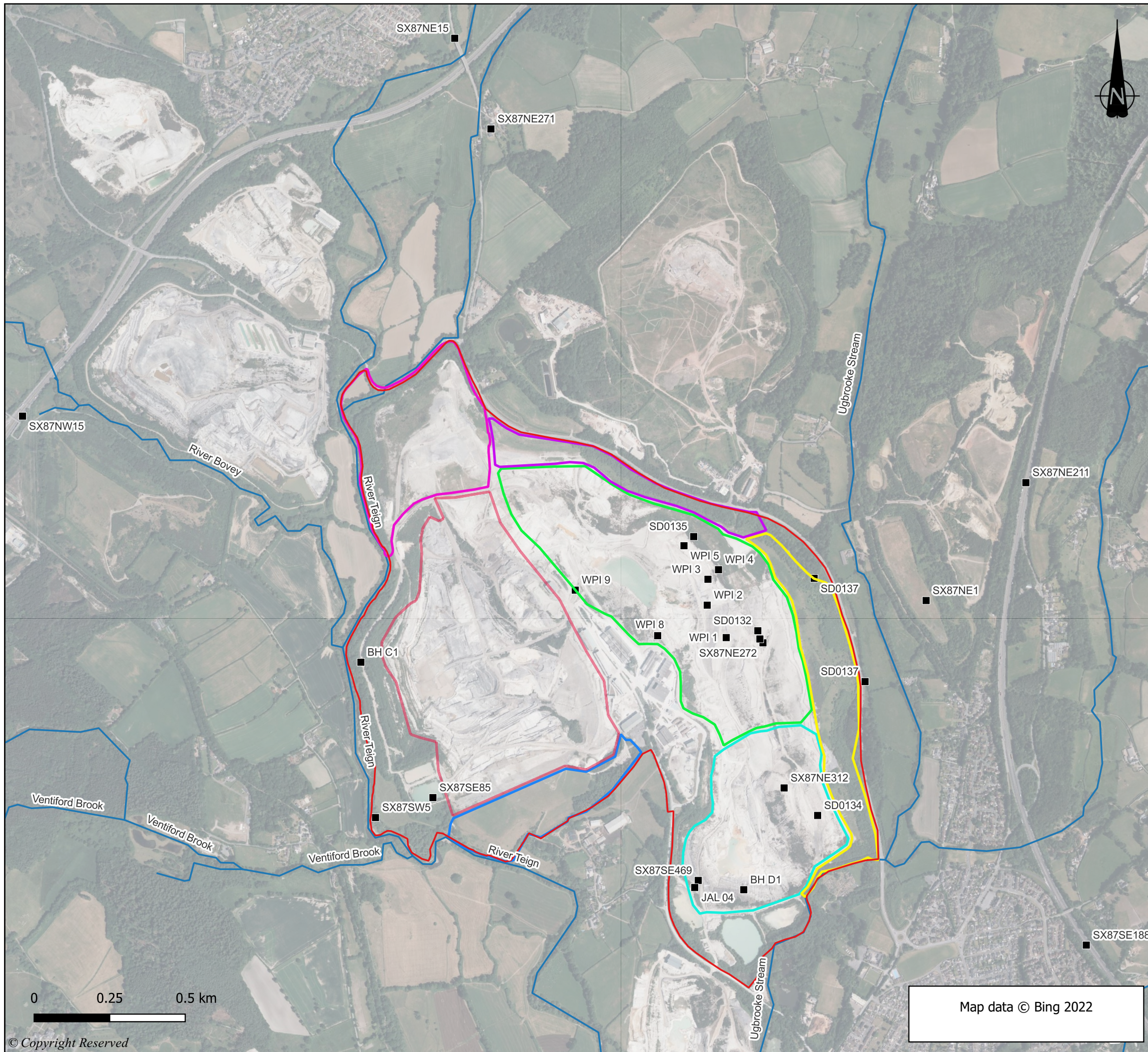
DRAWING TITLE  

Figure 6.5 Superficial Geology

|          |                |             |               |
|----------|----------------|-------------|---------------|
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| DRG SIZE | A3             | SCALE       | 1:12,500      |
|          |                | DATE        | December 2022 |
| DRAWN BY | DO             | CHECKED BY  | AB            |
|          |                | APPROVED BY | AB            |



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 Contains British Geological Survey materials © NERC 2022



DO NOT SCALE FROM THIS DRAWING

KEY

- Site Boundary
- Binney Tip
- Heathfield Tip
- John Acres Quarry
- Rixey Park Tip
- South Acre Quarry
- White Pit Tip
- White Tip Quarry
- Main Rivers (EA)
- Borehole Records

Boundaries are indicative. Aerial imagery shown for context purposes only.

| REVISION | DETAILS | DATE | DRN | CHK'D | APP'D |
|----------|---------|------|-----|-------|-------|
|          |         |      |     |       |       |

|        |                |  |  |  |  |
|--------|----------------|--|--|--|--|
| CLIENT | Sibelco UK Ltd |  |  |  |  |
|--------|----------------|--|--|--|--|

|         |  |  |  |  |  |
|---------|--|--|--|--|--|
| PROJECT | Bovey Basin Ball Clay Workings Environmental Statement |  |  |  |  |
|---------|--|--|--|--|--|

|               |                             |  |  |  |  |
|---------------|-----------------------------|--|--|--|--|
| DRAWING TITLE | Figure 6.6 Borehole Records |  |  |  |  |
|---------------|-----------------------------|--|--|--|--|

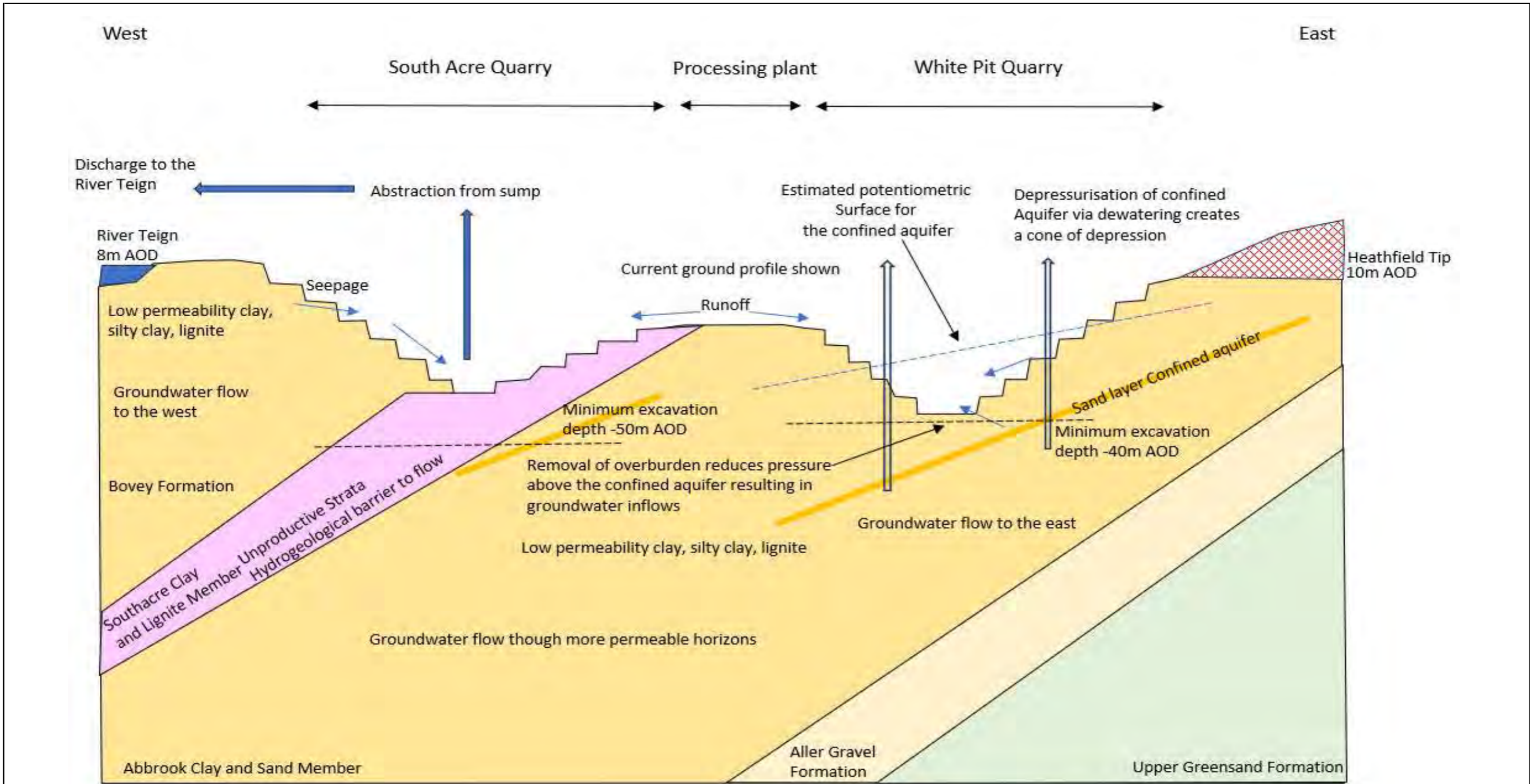
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|          |    |       |          |      |               |
|----------|----|-------|----------|------|---------------|
| DRG SIZE | A3 | SCALE | 1:12,500 | DATE | December 2022 |
|----------|----|-------|----------|------|---------------|

|          |    |            |    |             |    |
|----------|----|------------|----|-------------|----|
| DRAWN BY | DO | CHECKED BY | AB | APPROVED BY | AB |
|----------|----|------------|----|-------------|----|




Map data © Bing 2022



Not to scale, schematic only  
 Colours taken from British Geological Survey

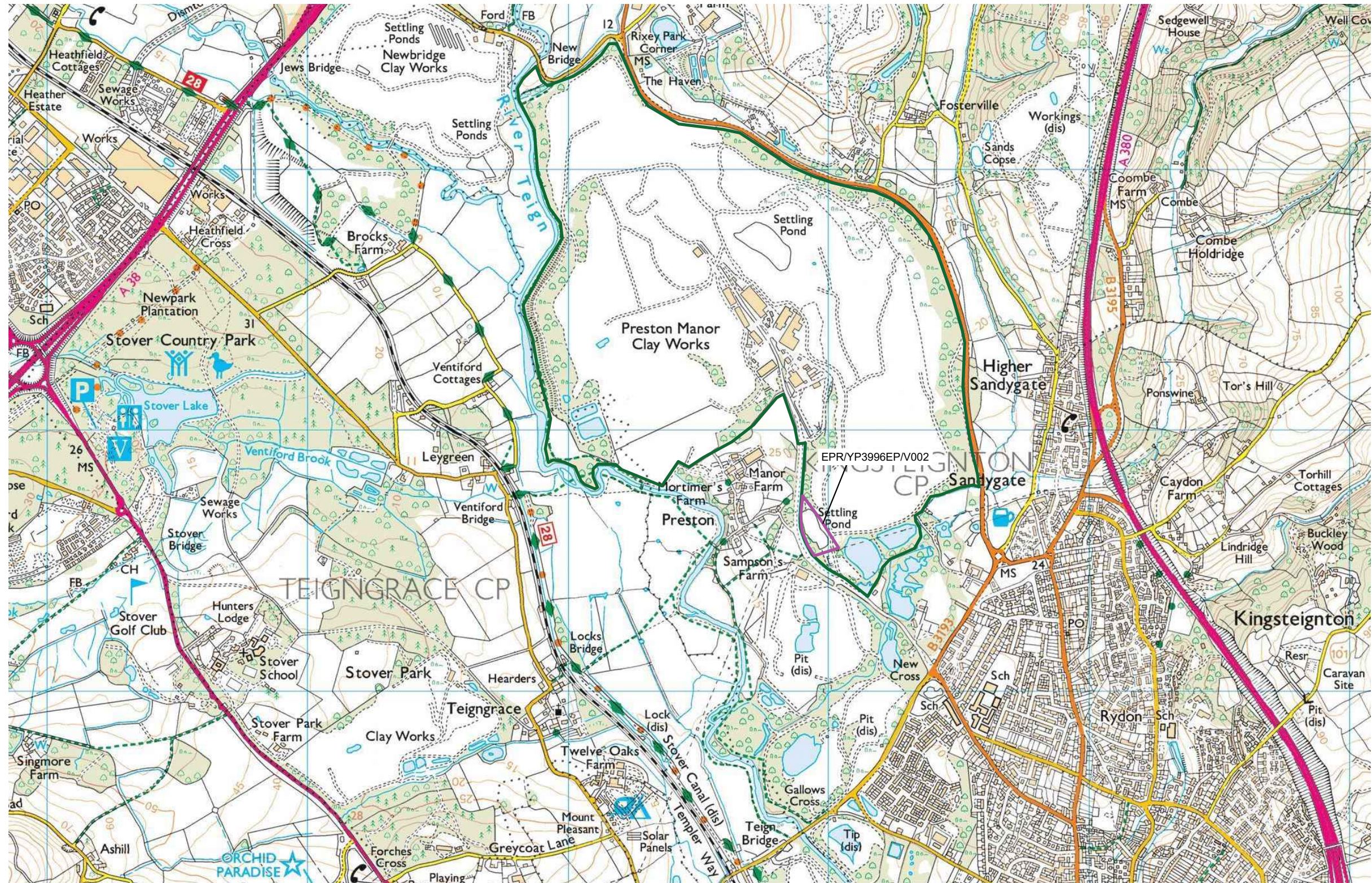


|              |   |             |        |
|--------------|---|-------------|--------|
| CLIENT       | Sibelco UK Ltd                                  |             |        |
| PROJECT      | Bovey Basin Controlled Waters Risk Assessment   |             |        |
| FIGURE TITLE | Schematic Hydrogeological Conceptual Site Model |             |        |
| FIGURE NO.   | DRAWN BY  | APPROVED BY | DATE   |
| Figure 4     | TM  | AB          | Sep-23 |

# Appendix B      Horizon Drawings

NOTES: GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT SCHEME DRAWINGS AND SPECIFICATIONS.



KEY:

|  |   |
|--|---|
|  | PROPOSED BOUNDARY FOR PERMIT APPLICATION (AS PER 2024 PLANNING PERMISSION)                  |
|  | EXISTING BOUNDARY ASSOCIATED WITH SR2009 NO.8 PERMIT (NOT ASSOCIATED WITH THIS APPLICATION) |



Tresco House, Westpoint Crt, Sidmouth Rd, Exeter EX5 1DJ  
T: 01392 363364 www.horizon-ce.co.uk



JOB TITLE  
**BOVEY BASIN BALL CLAY WORKINGS  
KINGSTEIGNTON**

DRAWING TITLE  
**SITE LOCATION PLAN**

|   |             |        |        |         |              |
|---|-------------|--------|--------|---------|--------------|
| Rev   | Description | Drn    | Chk    | Date    | regen        |
| REVISIONS   |             |        |        |         |              |
| Preliminary   | Approval    | Tender | Const. |         |              |
| DRAWING STATUS  |             |        |        |         |              |
| DATE  | SEP '24     | DRAWN  | JH     | CHECKED | .            |
| DRAWING No.   | 1205.101    | REV    | .      | SCALE   | 1:5,000 @ A3 |
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NOTES: GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT SCHEME DRAWINGS AND SPECIFICATIONS.



- KEY:
- SITE & PERMIT BOUNDARY
  - ▨ SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)
  - ▨ LOCAL NATURE RESERVE
  - LISTED BUILDING (WITHIN APPROXIMATELY 500 M)



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T: 01392 363364 www.horizon-ce.co.uk



JOB TITLE  
**BOVEY BASIN BALL CLAY WORKINS  
KINGSTEIGNTON**

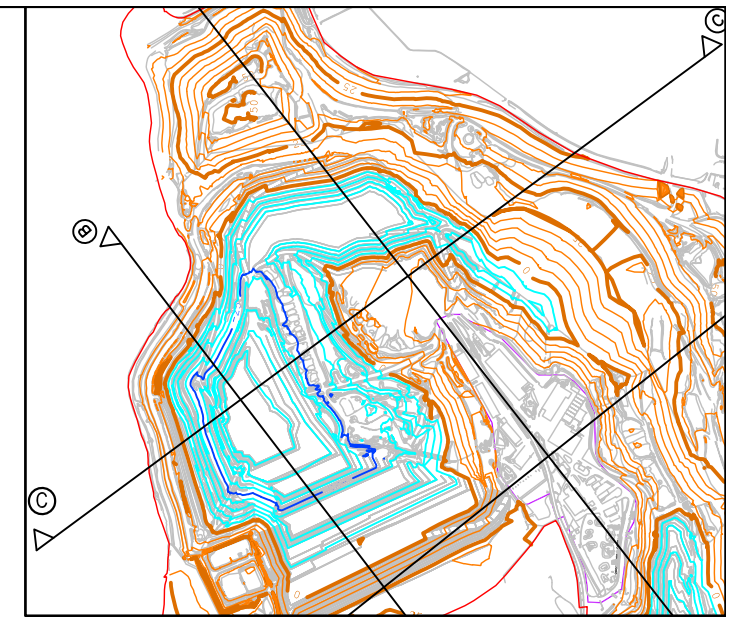
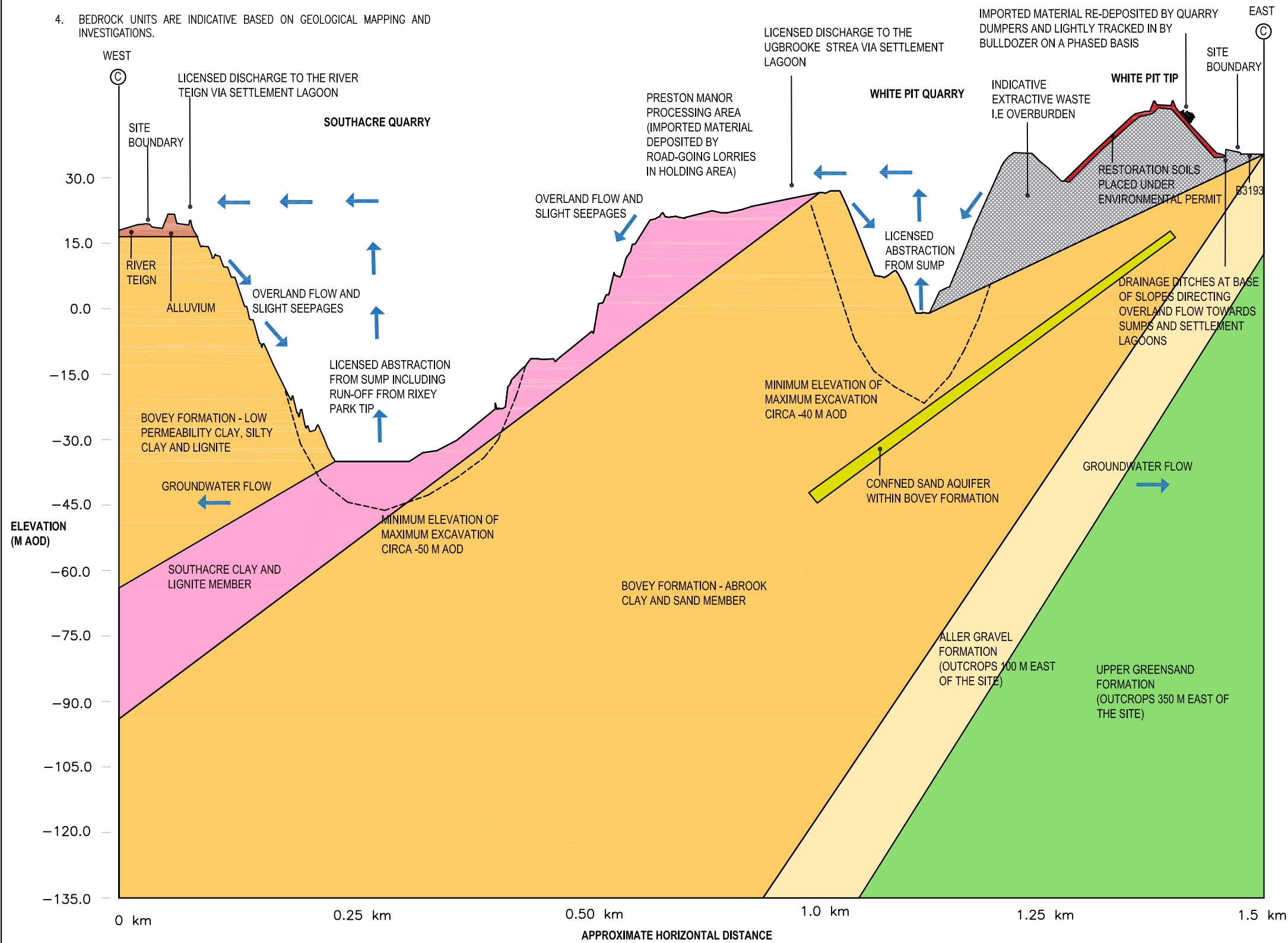
DRAWING TITLE  
**SENSITIVE RECEPTORS PLAN**

| Rev            | Description | Drn          | Chk    | Date |
|----------------|-------------|--------------|--------|------|
| REVISIONS      |             |              |        |      |
| Preliminary    | Approval    | Tender       | Const. |      |
| DRAWING STATUS |             |              |        |      |
| DATE           | DRAWN       | CHECKED      |        |      |
| NOV' 24        | JH          |              |        |      |
| DRAWING No.    | REV         | SCALE        |        |      |
| 1205.102       |             | 1:5,000 @ A3 |        |      |

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- DO NOT SCALE FROM THIS DRAWING.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT SCHEME DRAWINGS AND SPECIFICATIONS.
- CROSS-SECTION DEVELOPED FOR SCHEMATIC PURPOSES. VERTICAL SCALE EXAGGERATED BY 5:1. RESTORATION PROFILE BASED ON DRAWING ST18876-008.
- BEDROCK UNITS ARE INDICATIVE BASED ON GEOLOGICAL MAPPING AND INVESTIGATIONS.



PHASE 1 LANDFORM - WARDELL ARMSTRONG DRAWING ST18876-008



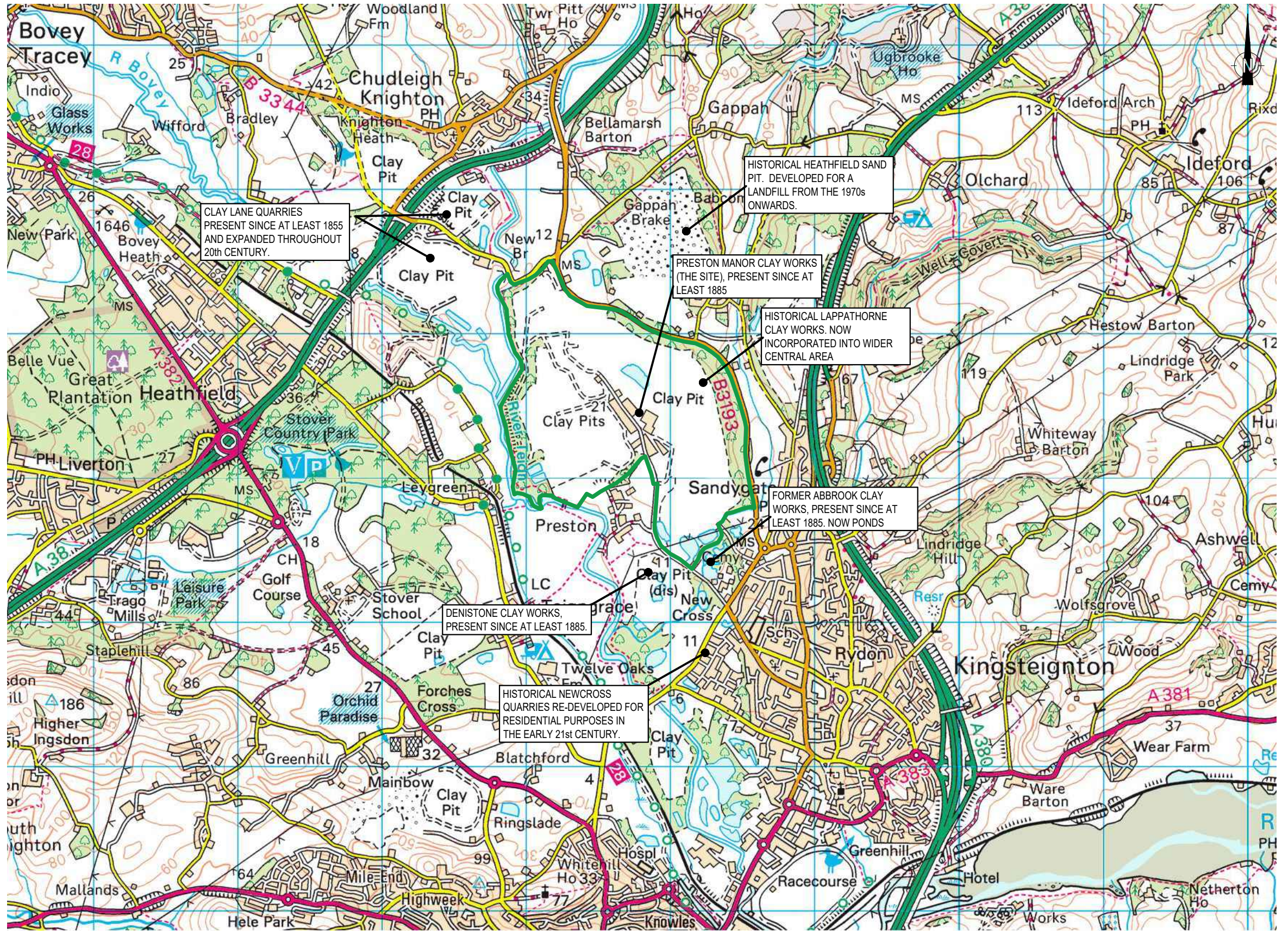
JOB TITLE  
BOVEY BASIN BALL CLAY WORKINGS  
KINGSTEIGNTON

DRAWING TITLE  
CONCEPTUAL SITE MODEL (PROPOSED RESTORATION)

| Rev   | Description | Drn     | Chk            | Date |
|---|-------------|---------|----------------|------|
| REVISIONS   |             |         |                |      |
| Preliminary   | Approval    | Tender  | Const.         |      |
| DRAWING STATUS  |             |         |                |      |
| DATE  | DRAWN       | CHECKED | ISSUE CHECKBOX |      |
| NOV '24   | JH          | AL      |                |      |
| DRAWING No.   | REV         | SCALE   |                |      |
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1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT SCHEME DRAWINGS AND SPECIFICATIONS.



KEY:

SITE & PERMIT BOUNDARY



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JOB TITLE  
**BOVEY BASIN BALL CLAY WORKINS  
KINGSTEIGNTON**

DRAWING TITLE  
**HISTORICAL FEATURES PLAN**

| Rev            | Description | Drn    | Chk    | Date               |
|----------------|-------------|--------|--------|--------------------|
| REVISIONS      |             |        |        |                    |
| Preliminary    | Approval    | Tender | Const. |                    |
| DRAWING STATUS |             |        |        |                    |
| DATE           | MAR '25     | DRAWN  | JH     | CHECKED            |
| DRAWING No.    | 1205.107    | REV    |        | SCALE 1:5,000 @ A3 |

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# Appendix C      Photosheet

# Photo Sheet 1

Project Reference: HCE1205 – Bovey Basin Central Area



**Photograph 1:** View from the north of the Site looking south. Processing area in centre of photo. B3193 road running north-west to south-east adjacent to the east of the Site is shown in the left of the photo.

## Photo Sheet 2

Project Reference: HCE1205 – Bovey Basin Central Area



**Photograph 2:** View of the Site from east looking north-west. Processing area in left of photo.

## Photo Sheet 3

Project Reference: HCE1205 – Bovey Basin Central Area



**Photograph 3:** View of the south-west of the Site looking north-east. Processing area in right of photo.

## Photo Sheet 3

Project Reference:

HCE1205 – Bovey Basin Central Area



**Photograph 4:** View of the south-east of the Site looking north-west. Processing area in centre of photo.

# Appendix D      Historical Aerial Imagery

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

December 1999



Higher Sandygate

Sandygate

Preston

River T



1 km

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

December 2002



B3193

B3193

B3193

A380

B3195

Higher Sandygate

Sandygate

A380

Preston

River T

B3193

1 km



# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

June 2006



# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

December 2010



B3193

B3193

B3193

A380

B3195

Higher Sandygate

Sandygate

A380

Preston

B3193

1 km



# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

October 2011



Higher Sandygate

Sandygate

Preston



1 km

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

April 2013



Higher Sandygate

Sandygate

Preston

River T



1 km

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

February 2014



B3193

B3193

B3193

A380

B3195

Higher Sandygate

Sandygate

Preston

A380

B3193

1 km



River T

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

August 2016



B3193

B3193

B3193

Higher Sandygate

Sandygate

Preston

A380

B3195

A380

B3193

1 km

Google Earth



River T

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

September 2017



# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

June 2018



B3193

B3193

B3193

A380

A380

B3195

Higher Sandygate

Sandygate

Preston

River T

B3193

1 km



# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

March 2020



B3193

B3193

B3193

A380

B3195

Higher Sandygate

Sandygate

A380

Preston

B3193

1 km



River T

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

May 2020



B3193

B3193

B3193

Higher Sandygate

Sandygate

Preston

A380

A380

B3195

B3193

1 km



Google Earth

River T

# Bovey Basin Central Area Historical Aerial Imagery

FOSTERVILLE

June 2022



B3193

B3193

B3193

A380

A380

B3195

Higher Sandygate

Sandygate

Preston

River T

B3193

1 km



# Appendix E      Ground Conditions Summary



Table 6.11 Table Summary of Geology

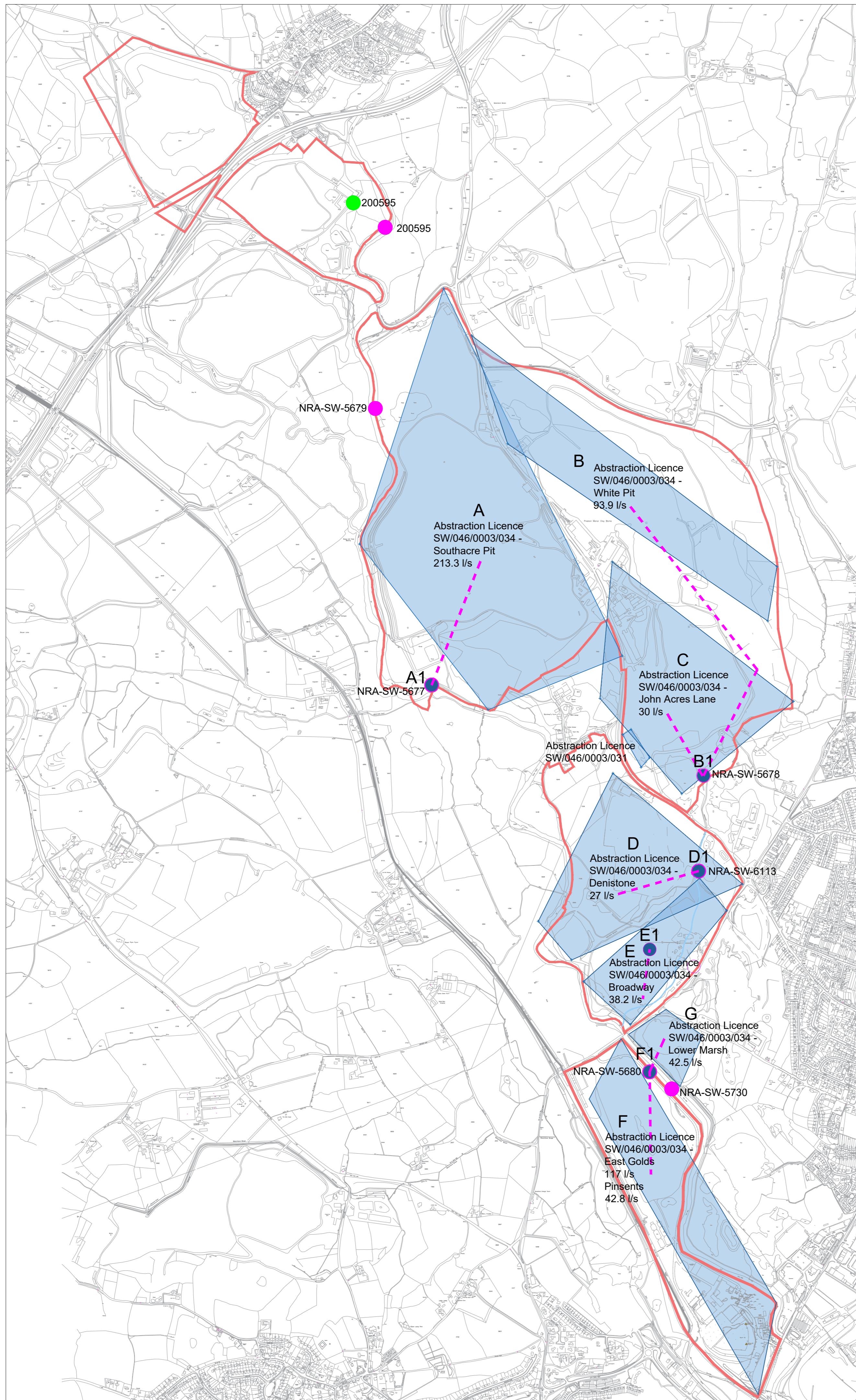
| Borehole ID  | NGR            | Approximate Surface Level Elevation (mAOD) | Data Source   | Depth of Borehole (mBGL) | Summary of Geology Depth (mBGL)           |              | BGS Geological Formation <small>Error! Bookmark not defined.</small> | Water Strike (mBGL) | Water Strike (mAOD) | Geology of Water Strike | Resting Groundwater Level (mBGL) | Resting Groundwater Level (mAOD) | Distance from Site   |
|--------------|----------------|--|---|--------------------------|---|--------------|--|---------------------|---------------------|-------------------------|----------------------------------|----------------------------------|--|
|              |                |  |   |                          |   |              |  |                     |                     |                         |                                  |                                  |  |
| SD0135 (BH3) | SX 85971 75851 | 24.2                                       | Watts, Blake, and Bearn (WBB) Minerals (Sibelco trading name) | 78.0                     | Made Ground                               | 0.0-0.99     | Abbrook Clay and Sand Member   | -                   | -                   | -                       | -                                | -                                | Within Site – east boundary in White Pit, adjacent to settling pond in White Pit |
|              |                |  |   |                          | Red and grey stained clay                 | 0.99-24      |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Grey and orange sand, lignite             | 24.0-40.0    |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Grey and pink stained silty Clay          | 40.0-77.0    |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Gravel                                    | 77.0-78.0    |  |                     |                     |                         |                                  |                                  |  |
| SX87NE272    | SX 86200 75500 | 27.7                                       | BGS   | 106.0                    | Clay                                      | 0.0-28.5     | Abbrook Clay and Sand Member   | -                   | -                   | -                       | 5.3                              | 22.4                             | Within Site, 300m east of centre conveyors – White Pit Quarry                    |
|              |                |  |   |                          | Sand and gravel                           | 28.5 – 31.5  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Sandy clay layer                          | 31.5 – 36.0  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay                                      | 36.0 – 82.0  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Gravel                                    | 82.0 – 95.0  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Green sand                                | 95.0 – 106.0 |  |                     |                     |                         |                                  |                                  |  |
| BH C1        | SX 84870 75436 | 9.1  | MCG Consultancy Services Ltd.                                 | 12.7                     | Made Ground                               | 0.0-3.0      | Bovey Formation  | 6.4                 | 2.7                 | Silty sand and gravel   | 5.1                              | 4.0                              | Within Site - South Acre quarry on west side of Site                             |
|              |                |  |   |                          | Silty Sand and Gravel                     | 3.0-6.6      |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay                                      | 6.6 – 9.1    |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Sand                                      | 9.1 – 11.5   |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay                                      | 11.5 -12.7   |  |                     |                     |                         |                                  |                                  |  |
| JAL 04       | SX 85997 74717 | 3.8  | ADS Drilling Log provided by MCF Consultancy Services Ltd     | 86.0                     | Made Ground (Sandy gravel from haul road) | 0.0-0.7      | Southacre Clay and Lignite Member                                    | 61.0                | -51.2               | Clay                    | 18.9                             | -15.1                            | Within Site – John Acres quarry adjacent to settlement pond                      |
|              |                |  |   |                          | Clay with interbedded lignite             | 0.7 – 5.5    |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay                                      | 5.5-61.0     |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay and sand                             | 61.0 – 76.0  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Clay                                      | 76.0 – 82.0  |  |                     |                     |                         |                                  |                                  |  |
|              |                |  |   |                          | Sand and gravel                           | 82.0 – 86.0  |  |                     |                     |                         |                                  |                                  |  |
| SX87NE312    | SX 8627 7502   | 16.1                                       | BGS   | 31.0                     | Clay                                      | 0.0-1.0      |  | 2.0                 | 14.1                |                         | Artesian                         | 16.1                             |  |



**Table 6.11 Table Summary of Geology**

| Borehole ID | NGR            | Approximate Surface Level Elevation (mAOD) | Data Source                  | Depth of Borehole (mBGL) | Summary of Geology Depth (mBGL)                |             | BGS Geological Formation <small>Error! Bookmark not defined.</small> | Water Strike (mBGL) | Water Strike (mAOD) | Geology of Water Strike        | Resting Groundwater Level (mBGL) | Resting Groundwater Level (mAOD) | Distance from Site                                    |
|-------------|----------------|--|------------------------------|--------------------------|--|-------------|--|---------------------|---------------------|--------------------------------|----------------------------------|----------------------------------|---|
|             |                |  |                              |                          |  |             |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Cemented sands                                 | 1.0-4.0     | Abbrook Clay and Sand Member   | 10.0<br>25.0        | 6.1<br>-8.9         | Cemented sands<br>Clay<br>Clay |                                  |                                  | Centre of John Acres quarry                           |
|             |                |  |                              |                          | Sandy clay                                     | 4.0-6.0     |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Clay   | 6.0-26.0    |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Sand with gravel                               | 26.0-31.0   |  |                     |                     |                                |                                  |                                  |   |
| SX87SE469   | SX 85986 74714 | 5.0  | BGS                          | 92.0                     | Clay   | 1.0 – 57.0  | Southacre Clay and Lignite Member                                    | 83.0-92.0           | -78.0 to<br>-87.0   | Sand and gravel                | 12.7                             | -7.8                             | Within John Acres quarry (south area of Site)         |
|             |                |  |                              |                          | Gravel, clay, and green sand                   | 57.0 – 65.0 |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Clay with some sands                           | 65.0 – 83.0 |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Sand and small gravel                          | 83.0 – 92.0 |  |                     |                     |                                |                                  |                                  |   |
| BH D1       | SX 86137 74683 | 10.6                                       | MCG Consultancy Services Ltd | 16.1                     | Grey brown Clay with gravel                    | 0.0 -4.0    | Southacre Clay and Lignite Member                                    | -                   | -                   | -                              | -                                | -                                | John Acres Quarry, north of Ugbrooke stream and ponds |
|             |                |  |                              |                          | Clayey sand with gravel                        | 4.0-5.1     |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Stiff to firm clay with fine to medium lignite | 5.1 – 15.6  |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Grey brown Mudstone                            | 15.6 – 16.1 |  |                     |                     |                                |                                  |                                  |   |
| SX87NE1     | SX 86740 75640 | 50.3                                       | BGS                          | 18.3                     | Brown sandy gravel                             | 0.0-2.7     | Aller Gravel Formation   | 2.7                 | 47.6                | Sandy gravel                   | 2.7                              | 47.6                             | 0.39km east of the Site boundary                      |
|             |                |  |                              |                          | Firm sandstone                                 | 2.7 – 3.4   |  |                     |                     |                                |                                  |                                  |   |
| SX87NE71    | SX 85300 77200 | 15.0                                       | BGS                          | 51.0                     | Sand, clay and grit                            | 0.3 – 17.0  | Upper Greensand Formation  | -                   | -                   | -                              | 21.9                             | -6.9                             | 0.7km north east                                      |
|             |                |  |                              |                          | Shales/slates                                  | 17.0 – 51.0 |  |                     |                     |                                |                                  |                                  |   |
| SX87SE188   | SX 87270 74500 | 43.5                                       | BGS                          | 14.0                     | Clay with gravel                               | 0.4-2.2     | Upper Greensand Formation  | 7.6                 | 35.9                | Weathered mudstone             | 7.6                              | 35.9                             | 0.93km south east of the Site at A380                 |
|             |                |  |                              |                          | Clay with cobbles and boulders                 | 2.2 – 7.6   |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Weathered mudstone                             | 7.6-14.0    |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Light brown sandy gravel                       | 3.4 – 6.1   |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Brown clay to sandy clay                       | 6.1 – 9.8   |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Sandstone                                      | 9.8 – 10.1  |  |                     |                     |                                |                                  |                                  |   |
|             |                |  |                              |                          | Sandy Clay                                     | 10. – 18.3  |  |                     |                     |                                |                                  |                                  |   |

# Appendix F      Sibelco Abstractions



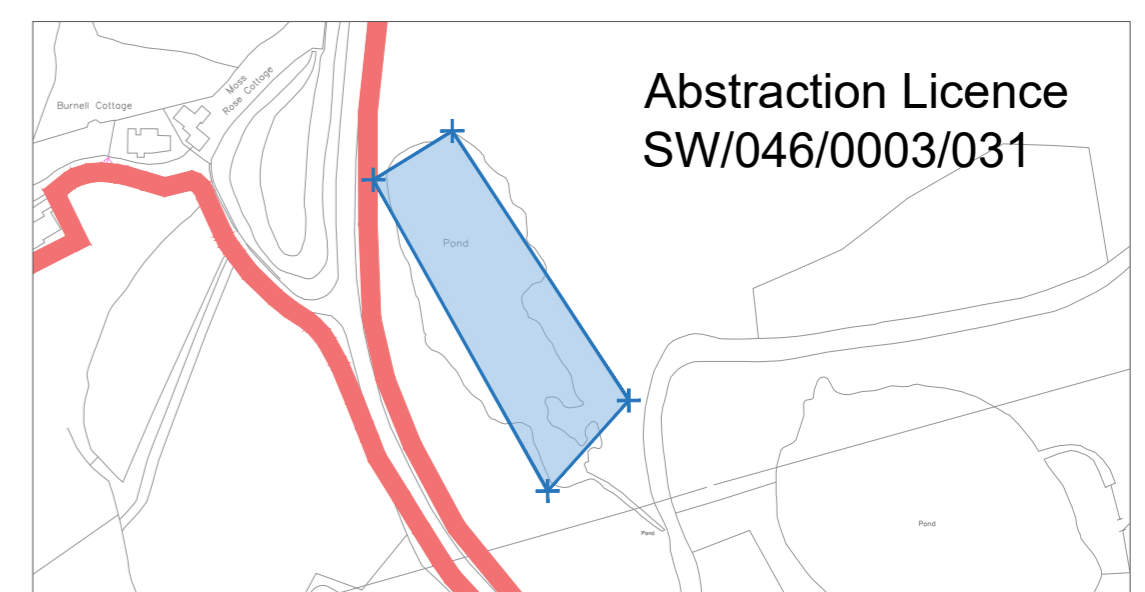
- KEY**
- Abstraction Area
  - Abstracted Water Return Point
  - Corresponding Water Return Point
  - Discharge Consent Point
  - Sample and Flow Measurement Point

**Abstraction for Dewatering Purposes**

- A** Abstraction Licence SW/046/0003/034 - Southacre Pit 213.3 l/s (submersible pump)
- B** Abstraction Licence SW/046/0003/034 - White Pit 93.9 l/s (submersible pump)
- C** Abstraction Licence SW/046/0003/034 - John Acres Lane 30 l/s (submersible pump)
- D** Abstraction Licence SW/046/0003/034 - Denistone 27 l/s (submersible pump)
- E** Abstraction Licence SW/046/0003/034 - Broadway 38.2 l/s (raft mounted vertical pump)
- F** Abstraction Licence SW/046/0003/034 - East Golds 117 l/s (submersible pump) Pinsents 42.8 l/s (submersible pump)
- G** Abstraction Licence SW/046/0003/034 - Lower Marsh 42.5 l/s (submersible pump)

**Abstraction for:**

**Dust Suppression  
Mineral Washing  
Industrial (conveying materials)**



**SW/046/0003/031 Dust Suppression**

12 cubic metres per hour  
114 cubic metres per day  
28,741 cubic metres per year  
At an instantaneous rate not exceeding 48 litres per second

Quantity of water to be measured by number of fills of bowser x defined capacity of bowser

Retain documents for tankers used to define volume and verify calculation.

Quantity of water to be recorded daily.

Records provided annually to EA and saved for 6 years.

**SW/046/0003/031 Mineral Washing**

198 cubic metres per hour  
2,178 cubic metres per day  
194,656 cubic metres per year  
At an instantaneous rate not exceeding 55 litres per second

Quantity of water to be measured by meter.

Quantity of water to be recorded daily at the same time each day.

Records provided annually to EA and saved for 6 years.

**SW/046/0003/031 Industrial - Conveying Materials**

316 cubic metres per hour  
3,476 cubic metres per day  
121,968 cubic metres per year  
At an instantaneous rate not exceeding 88 litres per second

Quantity of water to be measured by meter.

Quantity of water to be recorded daily at the same time each day.

Records provided annually to EA and saved for 6 years.

# Appendix G      EA Water Quality Data Summary

**Table 1 River Teign at Chudleigh Bridge (Upstream of the Site)**

| Determinand                              | Units | EQS LTAA | EQS MAC | 16/04/2019   | 25/06/2019   | 01/07/2019   | 13/08/2019   | 01/10/2019   | 09/01/2020   | 15/01/2020   | 21/01/2020  | 20/02/2020  | 04/03/2020   |
|--|-------|----------|---------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|
| Lead                                     | µg/l  | NA       | NA      | 13.90        | 5.99         | 4.50         | 7.00         | 4.40         | 6.40         | 5.10         | 8.80        | 6.70        | 4.20         |
| Lead, Dissolved                          | µg/l  | 1.2      | 14      | <b>2.35</b>  | <b>3.22</b>  | <b>3.20</b>  | <b>3.03</b>  | < 2.00       | < 2.00       | <b>2.20</b>  | < 2.00      | < 2.00      | <b>2.10</b>  |
| pH                                       | pH    | NA       | NA      | 7.54         | 7.64         | 7.60         | 7.39         | 7.48         | 7.43         | 7.59         | 7.68        | 7.65        | 7.88         |
| Temperature of Water                     | °C    | NA       | NA      | 9.1          | 15.8         | 15.8         | 15.2         | 14.4         | 8.6          | 8.3          | 4.9         | 8.4         | 7.4          |
| Conductivity at 25 C                     | µs/cm | NA       | NA      | 143.6        | 141.5        | 143          | 119.9        | 83.7         | 161.3        | 110.2        | 134.8       | 129.4       | 130.9        |
| Cadmium, Dissolved                       | µg/l  | 0.08     | 0.45    | <b>0.215</b> | <b>0.183</b> | <b>0.160</b> | <b>0.245</b> | <b>0.150</b> | <b>0.160</b> | <b>0.160</b> | <b>0.20</b> | <b>0.20</b> | <b>0.210</b> |
| Cadmium                                  | µg/l  | NA       | NA      | 0.239        | 0.223        | 0.2          | 0.299        | 0.21         | 0.23         | 0.21         | 0.28        | 0.26        | 0.23         |
| Ammoniacal Nitrogen as N                 | mg/l  | 0.6      | NA      | < 0.03       |              | 0.13         | 0.09         |              |              |              |             |             |              |
| Nitrogen, Total Oxidised as N            | mg/l  | NA       | NA      | 1.57         |              | 1.60         | 0.89         |              |              |              |             |             |              |
| Nitrite as N                             | mg/l  | NA       | NA      | 0.0046       |              | 0.0140       | 0.0074       |              |              |              |             |             |              |
| Solids, Suspended at 105 C               | mg/l  | NA       | NA      | < 3.0        | < 3.0        | 3.1          | < 3.0        | 7.5          | 20.0         | 20.0         | 8.3         | 14.0        | 7.6          |
| Hardness, Total as CaCO3                 | mg/l  | NA       | NA      | 39.0         |              | 36.5         | 30.3         |              |              |              |             |             |              |
| Alkalinity to pH 4.5 as CaCO3            | mg/l  | NA       | NA      | 23           |              | 27           | 22           |              |              |              |             |             |              |
| Chloride                                 | mg/l  | NA       | NA      | 16.7         |              | 16.0         | 14.3         |              |              |              |             |             |              |
| Fluoride                                 | mg/l  | NA       | NA      |              |              | 0.086        |              |              |              |              |             |             |              |
| Orthophosphate, reactive as P            | mg/l  | NA       | NA      |              |              | 0.17         |              |              |              |              |             |             |              |
| Silica, reactive as SiO2                 | mg/l  | NA       | NA      | 8.50         |              | 9.70         | 8.41         |              |              |              |             |             |              |
| Sulphate as SO4                          | mg/l  | NA       | NA      | < 10         |              | 10           | < 10         |              |              |              |             |             |              |
| Sodium, Dissolved                        | mg/l  | NA       | NA      | 11           |              | 11.00        | 9.58         |              |              |              |             |             |              |
| Sodium                                   | mg/l  | NA       | NA      | 10.8         |              | 11.00        | 9.67         |              |              |              |             |             |              |
| Potassium, Dissolved                     | mg/l  | NA       | NA      | 1.59         |              | 1.9          | 1.73         |              |              |              |             |             |              |
| Potassium                                | mg/l  | NA       | NA      | 1.6          |              | 1.9          | 1.74         |              |              |              |             |             |              |
| Magnesium, Dissolved                     | mg/l  | NA       | NA      | 3.29         |              | 3.1          | 2.6          | 1.5          | 2.3          | 2.3          | 2.9         |             |              |
| Magnesium                                | mg/l  | NA       | NA      | 3.21         |              | 3.1          | 2.53         |              |              |              |             |             |              |
| Calcium, Dissolved                       | mg/l  | NA       | NA      | 10.2         | 10.2         | 9.5          | 7.84         | 5.3          | 8.1          | 8.2          | 9.9         |             |              |
| Calcium                                  | mg/l  | NA       | NA      | 10.1         | 9.97         | 9.6          | 7.95         |              |              |              |             |             |              |
| Carbon, Organic, Dissolved as C :- {DOC} | mg/l  | NA       | NA      | 2.29         | 2.73         | 2.9          | 5.03         | 9.5          | 4.4          | 4.2          | 2.3         | 2.7         | 2.4          |
| Chromium                                 | µg/l  | NA       | NA      | < 0.5        |              | < 0.5        | < 0.5        |              |              |              |             |             |              |
| pH : In Situ                             | pH    | NA       | NA      | 7.69         |              | 7.70         | 7.62         |              |              |              |             |             |              |
| Zinc, Dissolved                          | µg/l  | 10.9     | NA      | <b>34.1</b>  | <b>88.4</b>  | <b>39.0</b>  | <b>60.1</b>  | <b>25</b>    | <b>23</b>    | <b>25</b>    | <b>36</b>   | <b>25</b>   | <b>27</b>    |
| Chromium, Dissolved                      | µg/l  | NA       | NA      | < 0.5        |              | < 0.5        | < 0.5        |              |              |              |             |             |              |
| Nickel, Dissolved                        | µg/l  | 4        | 34      | 1.43         | 1.57         | <b>4.7</b>   | 2.06         | 1.3          | 1.4          | 1.6          | 1.4         | 1.3         | 1.4          |
| Lithium, Dissolved                       | µg/l  | NA       | NA      | < 100        |              | < 100        | < 100        |              |              |              |             |             |              |
| Aluminium, Dissolved                     | µg/l  | NA       | NA      | 25.4         |              | 24           | 56.7         |              |              |              |             |             |              |
| Arsenic, Dissolved                       | µg/l  | 50       | NA      |              |              |              | 3.3          |              |              |              |             |             |              |
| Arsenic                                  | µg/l  | NA       | NA      |              |              |              | 3.7          |              |              |              |             |             |              |
| Manganese                                | µg/l  | NA       | NA      | 25.6         |              | 34           | 36.2         |              |              |              |             |             |              |
| Iron                                     | µg/l  | NA       | NA      | 193          |              | 260          | 351          |              |              |              |             |             |              |
| Aluminium                                | µg/l  | NA       | NA      | 55.6         |              | 48           | 102          |              |              |              |             |             |              |
| Boron                                    | µg/l  | NA       | NA      | < 100        |              | < 100        | < 100        |              |              |              |             |             |              |
| Barium                                   | µg/l  | NA       | NA      | 12.5         |              | 15           | 18           |              |              |              |             |             |              |

| Table 1 River Teign at Chudleigh Bridge (Upstream of the Site) |       |          |         |             |             |            |             |            |            |            |            |            |            |
|--|-------|----------|---------|-------------|-------------|------------|-------------|------------|------------|------------|------------|------------|------------|
| Determinand  | Units | EQS LTAA | EQS MAC | 16/04/2019  | 25/06/2019  | 01/07/2019 | 13/08/2019  | 01/10/2019 | 09/01/2020 | 15/01/2020 | 21/01/2020 | 20/02/2020 | 04/03/2020 |
| Strontium  | µg/l  | NA       | NA      | 32.1        |             | 31         | 26          |            |            |            |            |            |            |
| Lithium  | µg/l  | NA       | NA      | < 100       |             | < 100      | < 100       |            |            |            |            |            |            |
| Copper, Dissolved  | µg/l  | <b>1</b> | NA      | <b>1.19</b> | <b>1.62</b> | <b>17</b>  | <b>1.99</b> | <b>1.5</b> | <b>1.4</b> | <b>1.4</b> | <b>1.3</b> | <b>1.5</b> | <b>1.5</b> |
| Copper   | µg/l  | NA       | NA      | 2.04        | 2.3         | 1.7        | 2.54        | 1.9        | 2.6        | 2.1        | 2.2        | 2.1        | 2          |
| Zinc   | µg/l  | NA       | NA      | 37          | 108         | 34         | 116         | 31         | 64         | 39         | 73         | 33         | 31         |
| Manganese, Dissolved   | µg/l  | 123      | NA      | 21.4        |             | 26.0       | 23.8        |            |            |            |            |            |            |
| Iron, Dissolved  | µg/l  | 1000     | NA      | 105         |             | 180        | 209         | 300        | 140        | 310        | 91         |            |            |
| Nickel   | µg/l  | NA       | NA      | 1.45        | 1.73        | 1.5        | 2.28        | 1.5        | 2.5        | 2.0        | 2.4        | 1.8        | 1.7        |
| Strontium, Filtered  | µg/l  | NA       | NA      | 32.7        |             | 31         | 26.4        |            |            |            |            |            |            |
| Ionic Balance  | %     | NA       | NA      | 1.1         |             | -2.02      | -2.05       |            |            |            |            |            |            |
| Sulphate, Dissolved as SO4                                     | mg/l  | NA       | NA      | < 10        |             | 10         | < 10        |            |            |            |            |            |            |
| Barium, Dissolved  | µg/l  | NA       | NA      | 12.5        |             | 14.0       | 15.2        |            |            |            |            |            |            |
| Boron, Dissolved   | µg/l  | NA       | NA      | < 100       |             | < 100      | < 100       |            |            |            |            |            |            |
| Oxygen, Dissolved, % Saturation                                | %     | NA       | NA      |             |             |            |             | 78.9       | 100.1      | 104.7      | 100.3      | 100.5      | 102.5      |
| <b>Note</b>  |       |          |         |             |             |            |             |            |            |            |            |            |            |
| All exceedances are shaded in grey                             |       |          |         |             |             |            |             |            |            |            |            |            |            |
| EQS LTAA are <b>bold</b>                                       |       |          |         |             |             |            |             |            |            |            |            |            |            |
| NA indicates no applicable EQS                                 |       |          |         |             |             |            |             |            |            |            |            |            |            |
| Bank cells indicate no data point                              |       |          |         |             |             |            |             |            |            |            |            |            |            |

| Table 2 River Teign at Teign Bridge (Downstream of the Site)   |       |        |         |            |            |            |            |            |            |            |            |            |            |
|--|-------|--------|---------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Determinand  | Units | EQS AA | EQS MAC | 02/10/2019 | 11/11/2019 | 04/12/2019 | 09/01/2020 | 20/02/2020 | 09/03/2020 | 08/04/2021 | 06/05/2021 | 22/06/2021 | 12/07/2021 |
| Lead   | µg/l  | 1.2    | 14      | 2.5        | 3.9        | 2.2        | 4.8        | 5.7        | 3.3        | 2.2        | 2.0        | 2.9        | 5.3        |
| pH   | pH    | NA     | NA      | 7.70       | 7.40       | 7.60       | 7.60       | 8.0        | 7.5        |            |            |            |            |
| Temperature of Water   | °C    | NA     | NA      | 13.3       | 8.7        | 6.4        | 9.4        | 8.7        | 8.9        |            |            |            |            |
| Conductivity at 25 C   | µs/cm | NA     | NA      | 65         | 147        | 115        | 150        | 143        | 142        |            |            |            |            |
| Mercury  | µg/l  | NA     | 0.07    | < 0.010    | < 0.010    | < 0.010    | < 0.010    | < 0.010    |            | < 0.010    | < 0.010    | < 0.010    | 0.017      |
| Cadmium  | µg/l  | 0.8    | 0.45    | 0.14       | 0.16       | 0.12       | 0.17       | 0.18       | 0.14       | 0.13       | 0.14       | 0.14       | 0.23       |
| Ammoniacal Nitrogen as N   | mg/l  | NA     | NA      | < 0.030    | 0.033      | 0.031      | 0.057      | 0.042      | < 0.030    | 0.036      |            | 0.036      | 0.04       |
| Nitrogen, Total Oxidised as N  | mg/l  | NA     | NA      | 1.00       | 1.54       | 1.90       | 1.60       | 1.50       | 1.50       | 1.70       |            | 1.40       | 0.95       |
| Nitrate as N   | mg/l  | NA     | NA      | 0.996      | 1.540      | 1.900      | 1.590      | 1.500      | 1.500      | 1.690      |            | 1.390      | 0.939      |
| Nitrite as N   | mg/l  | NA     | NA      | < 0.004    | 0.005      | 0.005      | 0.007      | < 0.004    | < 0.004    | 0.010      |            | 0.014      | 0.011      |
| Ammonia un-ionised as N  | mg/l  | NA     | NA      | < 0.00035  | 0.00014    | 0.00017    | 0.00040    | 0.00070    | < 0.00016  |            |            |            |            |
| Solids, Suspended at 105 C   | mg/l  | NA     | NA      | 14.0       | 10.5       | 5.1        | 15.0       | 25.0       | 8.3        | 4.1        |            | 5.8        | 54.0       |
| Alkalinity to pH 4.5 as CaCO3  | mg/l  | NA     | NA      | 29         | 32         | 28         | 34         | 29         | 31         |            |            |            |            |
| Orthophosphate, reactive as P  | mg/l  | NA     | NA      | 0.043      | 0.026      | 0.027      | 0.034      | 0.026      | 0.019      | 0.057      |            | 0.063      | 0.043      |
| Phosphorus, Total as P   | mg/l  | NA     | NA      | 0.064      | 0.031      | 0.035      | 0.076      | 0.055      | 0.038      | 0.084      |            | 0.088      | 0.110      |
| HCH -gamma :- {Lindane}  | µg/l  | NA     | NA      | < 0.003    | < 0.003    | < 0.003    | < 0.003    | < 0.003    |            | < 0.003    | < 0.003    | < 0.003    |            |
| PCB : Total  | µg/l  | NA     | NA      | < 0.008    | < 0.008    | < 0.008    | < 0.008    | < 0.008    |            | < 0.008    | < 0.008    | < 0.008    |            |
| Copper   | µg/l  | 1      | NA      | 2.2        | 2.4        | 1.5        | 3.0        | 2.7        | 1.8        | 1.6        | 1.5        | 2.3        | 4.8        |
| Zinc   | µg/l  | 10.9   | NA      | 27         | 24         | 20         | 26         | 25         | 20         | 23         | 24         | 23         | 31         |
| Nitrogen, Total as N   | mg/l  | NA     | NA      | 1.40       | 1.98       | 2.10       | 2.00       | 2.00       | 1.80       | 1.90       |            | 1.90       | 1.90       |
| PCB - 028  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 052  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 101  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 118  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 138  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 153  | µg/l  | NA     | NA      | < 0.001    | < 0.001    | < 0.001    | < 0.001    | < 0.001    |            | < 0.001    | < 0.001    | < 0.001    |            |
| PCB - 180  | µg/l  | NA     | NA      | < 0.002    | < 0.002    | < 0.002    | < 0.002    | < 0.002    |            | < 0.002    | < 0.002    | < 0.002    |            |
| Oxygen, Dissolved, % Saturation  | %     | NA     | NA      | 89         | 93         | 99         | 93         | 97         | 99         |            |            |            |            |
| Oxygen, Dissolved as O2  | mg/l  | NA     | NA      | 9.29       | 10.80      | 12.20      | 10.60      | 11.30      | 11.50      |            |            |            |            |
| <b>Note</b><br>All exceedances are shaded in grey<br>EQS LTAA are <b>bold</b><br>NA indicates no applicable EQS<br>Bank cells indicate no data point |       |        |         |            |            |            |            |            |            |            |            |            |            |

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# Appendix H Nature & Heritage Screening Report

# Nature and Heritage Conservation

Screening Report: Bespoke Waste

|                         |                          |
|-------------------------|--------------------------|
| Reference               | <b>EPR/SP3427SW/P003</b> |
| NGR                     | <b>SX 85655 75576</b>    |
| Buffer (m)              | <b>400</b>               |
| Date report produced    | <b>13/02/2025</b>        |
| Number of maps enclosed | <b>2</b>                 |

## This nature and heritage conservation report

The nature and heritage conservation sites, protected species and habitats, and other features identified in the table below **must be considered in your application**.

In the further information column, there are links which give more information about the site or feature type and indicate where you are able to self-serve to get the most accurate site boundaries or feature locations.

Most designated site boundaries are available on [Magic map](#). Using Magic map allows you to zoom in and see the site boundary or feature location in detail, Magic map also allows you to measure the distance from these sites and features to your proposed boundary. [Help videos](#) are available on Magic map to guide you through.

Where information is not publicly available, or is only available to those with GIS access, we have provided a map at the end of this report.

### Protected Species within screening distance

Atlantic Salmon migratory route, European Eel migratory route, River Lamprey migratory route, Sea Lamprey migratory route

### Screening distance (m)

up to 500m

Further Information  
Environment Agency. Dial 03708 506 506 for your local Fisheries and Biodiversity team

### Protected Habitats within screening distance

Deciduous woodland (see map below)

### Screening distance (m)

up to 50m

[Natural England](#)

Where protected species are present, a licence may be required from [Natural England](#) to handle the species or undertake the proposed works.

**The following nature and heritage conservation sites, protected species and habitats, and other features have been checked for, where they are relevant for the permit type requested, but have not been found within screening distance of your site unless included in the list above.**

Special Areas of Conservation (cSAC or SAC), Special Protection Area (pSPA or SPA), Marine Conservation Zone (MCZ), Ramsar, Sites of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Local Nature Reserve (LNR), Local Wildlife Sites (LWS), Ancient Woodland, relevant species and habitats.






**Please note** we have screened this application for features for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

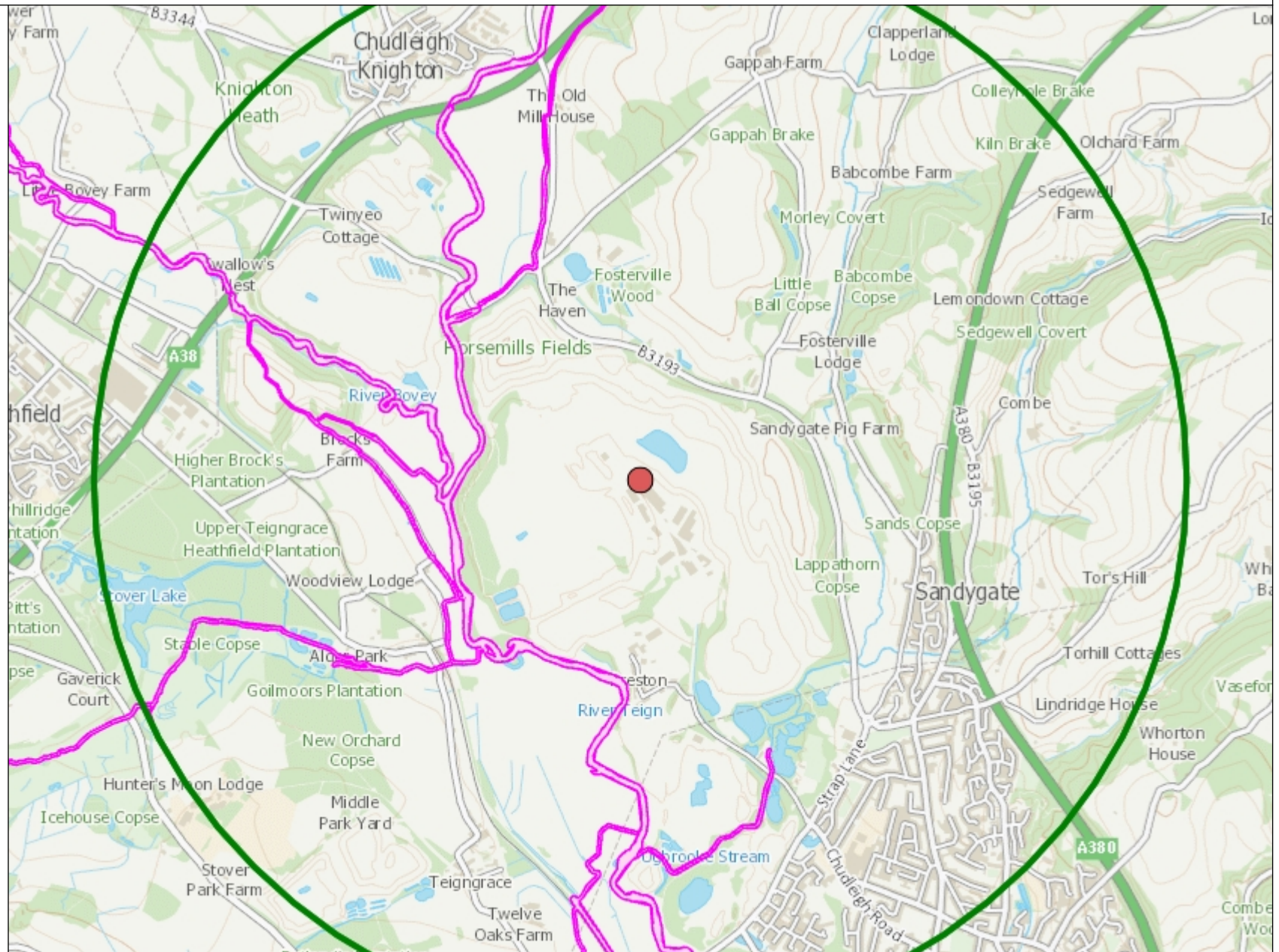
The nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information

# Protected Species

## Legend

Protected species screened for Env Permits - complete set

-  Protected species, non fish
-  Protected fish
-  Protected fish migratory route
-  Coded
-  Fish migratory routes screened for Environmental Permits



1: 25,000

0 625


Metres

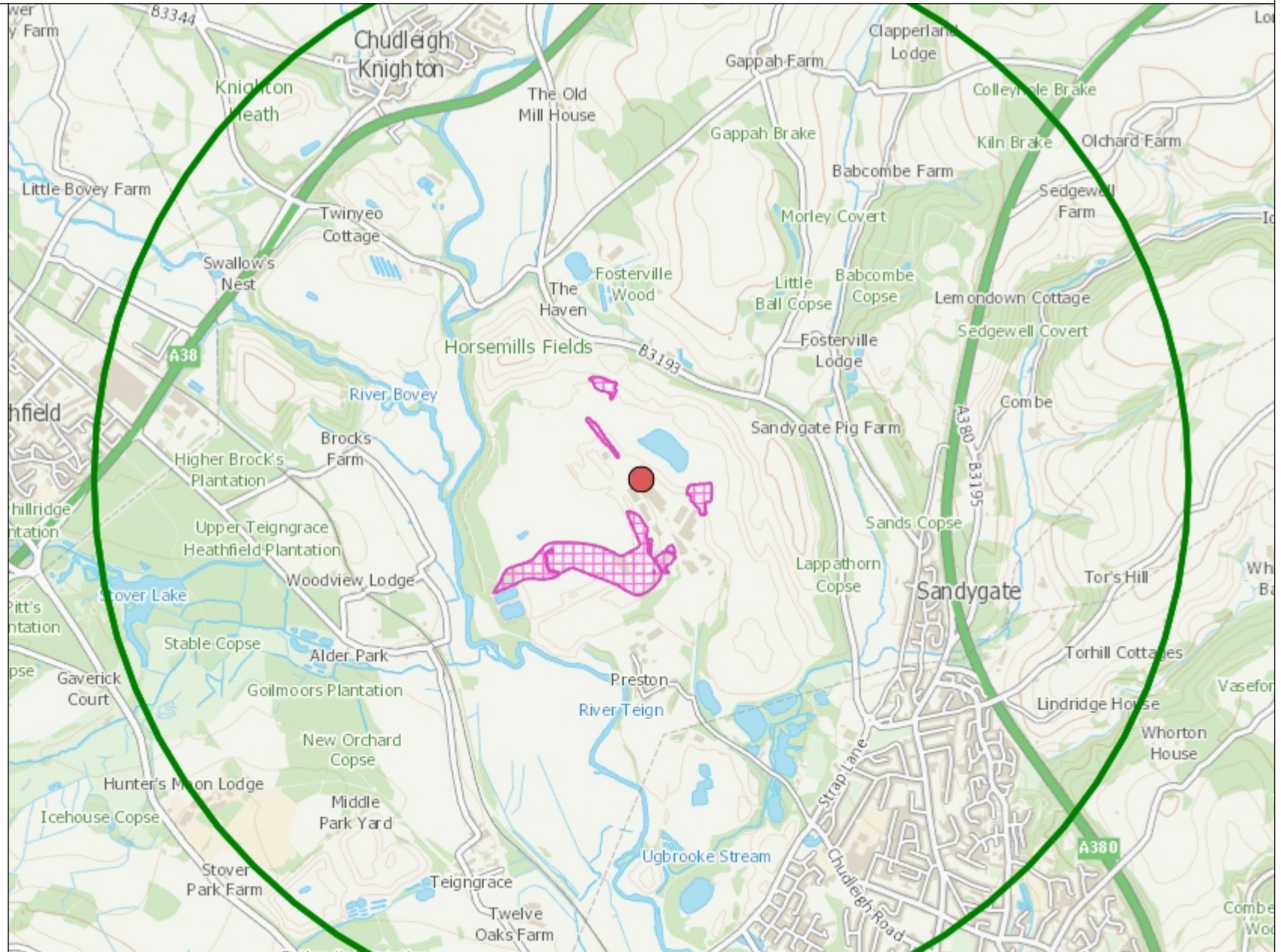


# Protected Habitats



## Legend

-  Protected Habitats screened for En Permits



# Appendix I      Risk Assessment Table

Table 1  
Site Specific Risk Assessment (Deposit for Recovery)  
Bovey Basin Central Area



| Receptor   | Source  | Harm   | Pathway  | Judgement                   |   |  | Action (by permitting)  |  |   |
|--|---|--|--|-----------------------------|---|--|---|--|---|
|  |   |  |  | Probability of exposure     | Consequence   | Magnitude of risk                          | Justification for magnitude   | Risk management  | Residual risk   |
| What is at risk? What do I wish to protect?  | What is the agent or process with potential to cause harm?  | What are the harmful consequences if things go wrong?  | How might the receptor come into contact with the source?  | How likely is this contact? | How severe will the consequences be if this occurs? | What is the overall magnitude of the risk? | On what did I base my judgement?  | How can I best manage the risk to reduce the magnitude?  | What is the magnitude of the risk after management? (This residual risk will be controlled by Compliance Assessment). |
| Local human population   | Releases of particulate matter (dusts) and micro-organisms (bioaerosols).   | Harm to human health - respiratory irritation and illness.   | Air transport then inhalation.   | Low                         | Medium  | Medium                                     | Permitted waste types are inert and do not include dusts or powders and have a low potential to produce bioaerosols. There is potential for increased dust generation from permitted activities during prolonged dry periods e.g. summer months. Nevertheless the site is in an active quarry in which dust emissions are actively controlled as required by planning and LAPPCC Permitting.  | The soils imported will be deposited away from sensitive human receptors. Throughout the works dust monitoring and mitigation to take place as per the DEMP.   | Low   |
| Local human population   | As above  | Nuisance - dust on cars, clothing etc.   | Air transport then deposition  | Low                         | Low   | Medium                                     | As above. Local residents often sensitive to dust.  | As above   | Low   |
| Local human population, livestock and wildlife.  | Litter  | Nuisance, loss of amenity and harm to animal health  | Air transport then deposition  | Low                         | Low   | Low  | Local residents often sensitive to litter, however permitted waste types have low litter potential.   | As above. Appropriate measures would include clearing litter arising from the activities from affected areas outside the site. Should litter be noted this would be cleared by quarry staff.   | Very low  |
| Local human population   | Waste, litter and mud on local roads  | Nuisance, loss of amenity, road traffic accidents.   | Vehicles entering and leaving site.  | Low                         | Medium  | Medium                                     | Road safety, local residents often sensitive to mud on roads. Distance to the public highway reduces probability to low.  | All lorries pass over a rumble strip and through a wheel wash prior to exiting site.   | Low   |
| Local human population   | Odour   | Nuisance, loss of amenity  | Air transport then inhalation.   | Low                         | Low   | Low  | Local residents often sensitive to odour, however permitted waste types have low odour potential.   | Emissions will be free from odour.   | Very low  |
| Local human population   | Noise and vibration   | Nuisance, loss of amenity, loss of sleep.  | Noise through the air and vibration through the ground.  | Low                         | Medium  | Medium                                     | Local residents often sensitive to noise and vibration. Low probability of exposure as noise is subject to planning control.  | Compliance with Planning. Restoration activities considered to have limited potential to generate excessive noise and vibration. If required operations will be subject to a noise and vibration management plan.  | Low   |
| Local human population   | Scavenging animals and scavenging birds   | Harm to human health - from waste carried off site and faeces. Nuisance and loss of amenity  | Air transport and over land  | Low                         | Low   | Low  | Permitted wastes unlikely to attract scavenging animals and birds but may become nesting / breeding sites.  | Only inert wastes to be accepted. A nominated quarry staff member walks the Site perimeter regularly to inspect the condition of the fence line.   | Very low  |
| Local human population   | Pests (e.g. flies)  | Harm to human health - nuisance, loss of amenity   | Air transport and over land  | Low                         | Medium  | Low  | Permitted waste types unlikely to attract pests.  | As above   | Very low  |
| Local human population and local environment   | Flooding of site  | If waste is washed off site it may contaminate buildings / gardens / natural habitats downstream.  | Flood waters   | Low                         | Low   | Low  | Permitted waste types are inert so any waste washed off site will add to the volume of the local post-flood clean up workload, rather than create a hazard, no wastes are to be deposited within the flood zone. The wastes are to be deposited within the catchment of the quarry which will contain any run off and flood waters thus avoiding flooding off site. A flood risk assessment has been submitted and agreed under planning. | Measures are proposed to minimise the potential for suspended solids run off during rainfall events including interception and trapping of suspended solids to prevent discharge to surface water courses.   | Very low  |
| Local human population and / or livestock after gaining unauthorised access to the waste operation | All on-site hazards: wastes; machinery and vehicles.  | Bodily injury  | Direct physical contact  | Medium                      | Medium  | Medium                                     | The site is an active quarry where public access is strictly prohibited.  | The activities shall be managed and operated in accordance with the management system which includes site security measures to limit unauthorised access.  | Low   |
| Local human population and local environment.  | Arson and / or vandalism causing the release of polluting materials to air (smoke or fumes), water or land.           | Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or arsonists/vandals. Pollution of water or land. | Air transport of smoke. Spillages and contaminated firewater by direct run-off from site and via surface water drains and ditches. | Medium                      | Low   | Low  | Permitted waste types do not include any flammable materials so a low magnitude risk is estimated.  | Activities managed and operated in accordance with the written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances (will include fire and spillages).   | Low   |
| Local human population and local environment   | Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land.                    | Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters. Pollution of water or land.                    | As above.  | Low                         | Low   | Low  | As above.   | As above (excluding comments on access to waste). Permitted activities do not include the burning of waste.  | Low   |
| All surface waters close to and downstream of site.  | Spillage of liquids, leachate from waste, contaminated rainwater run-off from waste e.g. containing suspended solids. | Acute effects: oxygen depletion, fish kill and algal blooms  | Direct run-off from site across ground surface, via surface water drains, ditches etc.   | Low                         | Low   | Low  | Permitted waste types do not include sludges or liquids so only a medium magnitude risk is estimated.   | Acceptance of inert waste only in accordance with the Waste Acceptance Procedures (WAP). Imported material subject to chemical testing and inspection to confirm suitability.<br>To control suspended solids at source, it is proposed to incorporate various methods to retard runoff and extend retention time to allow suspended solids to settle out. This is shown on the surface water management plan for the proposed development. | Very low  |
| All surface waters close to and downstream of site.  | As above  | Chronic effects: deterioration of water quality  | As above. Indirect run-off via the soil layer  | Low                         | Low   | Low  | As above and waste types are non-hazardous and inert so harm is likely to be temporary and reversible.  | Risks to controlled waters evaluated as part of Hydrogeological Risk Assessment.   | Very low  |
| Abstraction from watercourse downstream of facility (for agricultural or potable use).             | As above  | Acute effects, closure of abstraction intakes.   | Direct run-off from site across ground surface, via surface water drains, ditches etc. then abstraction.                           | Low                         | Low   | Low  | Limited surface water abstractions on the River Teign or Ugbrooke Stream. Discharge consents in place with limits on suspended solids for both watercourses.  | As above.  | Very low  |
| Groundwater  | As above  | Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole.  | Transport through soil/groundwater then extraction at borehole.  | Low                         | Low   | Low  | As above plus permitted wastes unlikely to contaminate groundwater. Bedrock geology has low permeability.   | As above.  | Very low  |
| Local human population   | Contaminated waters used for recreational purposes  | Harm to human health - skin damage or gastro-intestinal illness.   | Direct contact or ingestion  | Low                         | Medium  | Low  | As above plus permitted wastes unlikely to contaminate groundwater. There is a lack of these receptors within the area.   | As above.  | Very low  |
| Local Nature Reserve & Woodland BAP Habitat within 50 of the site.                                 | Any   | Harm to protected site through toxic contamination, nutrient enrichment, smothering, disturbance, predation etc.                                   | Any  | Medium                      | Medium  | Medium                                     | Uncontrolled waste operations may cause harm to and deterioration of nature conservation sites. Nevertheless only inert waste will be accepted whilst there are physical barriers between the activity and the receptors. As a result the probability of exposure is greatly reduced.   | Clean inert soils to be deposited with strict waste acceptance procedures that limit risk of contaminants present within the imported soils. Waste acceptance procedures and imported material will be required to form a growing medium for restoration habitats and therefore will inherently need to be high quality soils.   | Low   |

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