



Holmbush Mine Engine House Windsor Lane, Kelly Bray Cornwall

*Costed and Prioritised Proposals for Capital Works
to support Conservation and Management of the
Scheduled Monument
(Costs redacted version)*

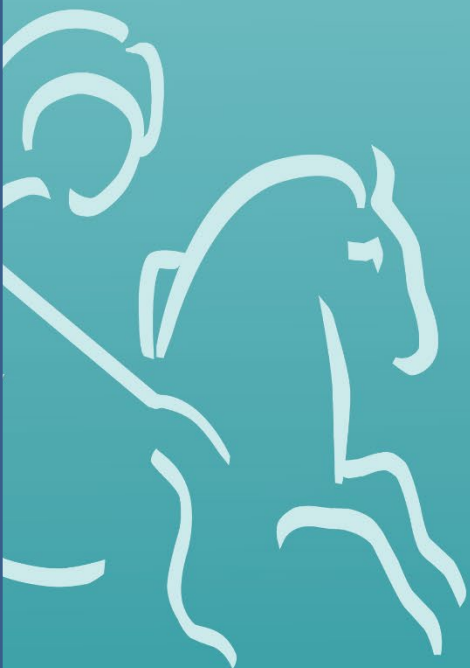


Report prepared for:
The Tamara Landscape Partnership

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December 2022



Holmbush Mine Engine House Windsor Lane, Kelly Bray, Cornwall

Costed and Prioritised Proposals for Capital Works to support Conservation and Management of the Scheduled Monument

CA Project: CR1008

CA Report: CR1008_1

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SUMMARY

Project Name: Holmbush Mine Engine House

Location: Windsor Lane, Kelly Bray, Cornwall

NGR: 236116 71931

In May 2021 Cotswold Archaeology was commissioned by Tamara Landscape Partnership to undertake a 'Costed and Prioritised Proposal for Capital Works for the Conservation and Management of Holmbush Mine Engine House, Windsor Lane, Kelly Bray, Cornwall'. The work includes an update to the existing condition survey and has been undertaken to help address the declining overall condition of the Scheduled Monument.

Holmbush Mine, Windsor Lane is a Scheduled Monument located within the Cornwall and West Devon Mining Landscape World Heritage Site. It is also listed on the Heritage at Risk Register due to its deteriorating condition. During the 19th century it powered winding gear as part of the larger Holmbush Mine complex, which was a copper, lead and arsenic mine operating during the 19th century.

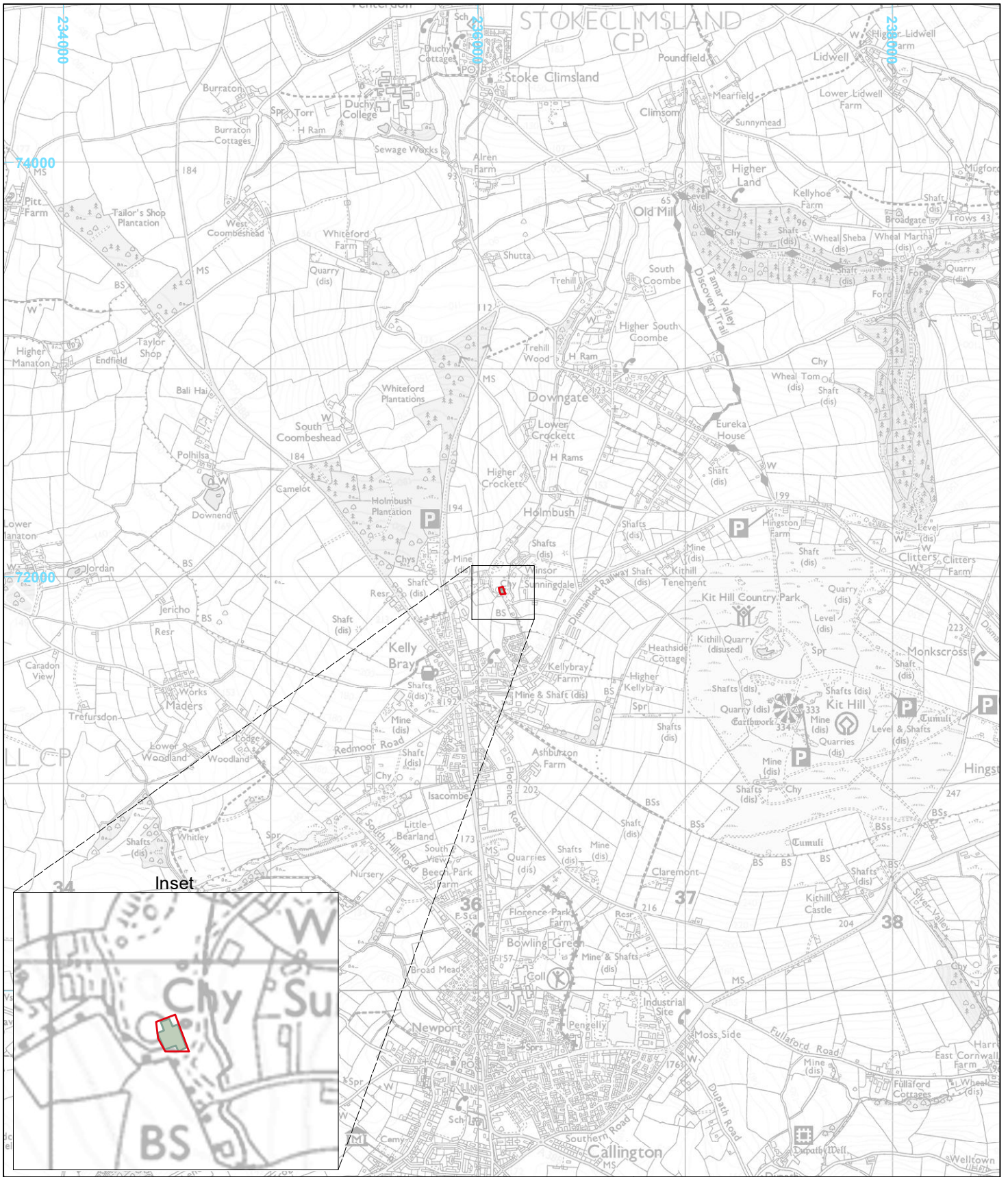
This project has been informed by an existing archaeological assessment, undertaken in 1998. The current works include a drone and photographic survey with resultant 3D modelling, a phase 1 ecological survey, and separate archaeological and structural condition surveys. It also presents an update to relevant elements of the existing site gazetteer, prepared as part of the earlier assessment.

Costed and prioritised management recommendations, targeted at the individual structures on site, have been informed by the recently completed field surveys and associated assessment work. The principal threat to the Site was found to be unchecked vegetation growth and general deterioration due to weathering and lack of maintenance. Recommended works have been assigned a Priority Rating, ranging from High to Low, derived from a consideration of relative heritage significance and condition.

The principal recommended conservation works include: vegetation clearance, repointing, rebedding of loose masonry, capping and repair of wall heads, and more substantive localised repairs to defective areas. In addition, it has been recommended that a 5m buffer around the footprint of the structures is cleared of vegetation threats, and maintained clear, so that the standing remains are given adequate room to 'breathe'.

1. INTRODUCTION

- 1.1. In May 2021, Cotswold Archaeology was commissioned by Tamara Landscape Partnership to undertake a 'Costed and Prioritised Proposal for Capital Works for the Conservation and Management of Holmbush Mine Engine House' (hereafter referred to as 'the Site'). The Site occupies an area of rough ground, located north of Windsor Lane on the north edge of Kelly Bray, Cornwall, approximately 2km north of the town of Callington (NGR 236116 71931; Fig. 1).
- 1.2. For the purposes of this assessment and for consistency with the Historic England (HE) Scheduled Monument reference (see below), the Site is referred to as being at Windsor Lane. However, it is understood that locally, the preferred spelling is 'Winsor Lane', with the 'd' omitted.
- 1.3. The engine house at Windsor Lane was originally part of the larger Holmbush Mine, the remains of which now occupy two discrete locations. These are separately designated as Scheduled Monuments; however, the second area does not form part of the present Site and is situated on the west side of Stoke Road, focussed on Hitchens Shaft, approximately 300m north-west of the Site. Although once part of a much larger complex of mining activity, the Windsor Lane Site now forms a relatively small area of scheduling, comprising the remains of an engine house and attached chimney, boiler house, loadings and a winding drum platform (HE List Ref: 1020327). The engine house is also Grade II Listed (HE List Ref: 1220770).
- 1.4. The Site is located within the Cornwall and West Devon Mining Landscape World Heritage Site (HE List Ref: 1000105). It is also listed on Historic England's Heritage at Risk Register, where it is described as follows
- '.....a substantial mine engine house in deteriorating condition. The building is densely covered in ivy and surrounded by trees. The roof is mostly collapsed but still retains a few slates and roof timbers which are vulnerable to further damage. Timber fittings are deteriorated and rotten. Arched window openings have slipped bricks. (Historic England, Heritage at Risk Register, 2021).*
- 1.5. The Scheduled Monument is in private ownership and was fenced in 2007 for safety reasons, under the previous ownership, the Duchy of Cornwall. The fenced area occupies an area of approximately 750m² and for the purposes of this study, forms the extent of the Site.



Site (Red rectangle)
Scheduled Monument (Green rectangle)

0 1 km

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PROJECT TITLE
 Holmbush Mine

FIGURE TITLE
 Site Location

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- 1.6. The work has been jointly funded by the Tamar Valley Area of Outstanding Natural Beauty (TVAONB) and Historic England (HE) through their National Lottery Heritage funded Tamara Landscape Project. The work forms part of a wider Monument Management Scheme for capital works and enhanced management within the Tamar Valley for Scheduled Monuments, as agreed between HE and TVAONB.
- 1.7. This report is informed by, and presents an update, to the relevant elements contained in the *Holmbush Mine Archaeological Assessment*, reported in 1998 and undertaken as part of a Land Reclamation Scheme of Safety Works (Buck, C. 1998).

Objectives and professional standards

- 1.8. As defined under Principle 4.2 of the HE guidance on Conservation Principles, Policies and Guidance (2008, p22), conservation is '*the process of managing change to a significant place in its setting in ways that will best sustain its heritage values, while recognising opportunities to reveal or reinforce those values for present and future generations*'. Conservation Management Plans can take a variety of reported forms, but aim to respond to the need for conservation, by providing '*a sound framework for the management of significant places, particularly those in responsible long-term ownership*' (HE 2008, p48). As such, this document will summarise the historic background of the Site and re-assess the condition of known heritage assets within it. The potential risks to the preservation of these assets, and potential opportunities to restore, conserve, and enhance them will be identified to inform future proposals for the long-term sustainable management of the Site.
- 1.9. Conservation management planning for important elements of the historic environment is now a well-established process, and where relevant, this assessment has been undertaken in accordance with the guidance on Conservation Plans, produced by the Heritage Lottery Fund (2017), and on their online resource, as well as the approaches laid out in *Informed Conservation: Understanding Historic Buildings and Their Landscapes for Conservation* (Clark 2001). These documents are now widely accepted as best practise in Conservation Management processes. The 2022 guidance on Heritage Impact Assessments provided by UNESCO and the three Advisory Bodies to the World Heritage Committee (ICCROM, ICOMOS and IUCN), will be considered where appropriate, although it should be noted that this assessment does not form a heritage impact assessment.

-
- 1.10. The overall aims of this updated condition assessment along with the costed and prioritised recommendations for capital works are to arrest the declining condition of the engine house and its associated remains, and to establish a more targeted and appropriate management framework within which the Site can be stabilised.
- 1.11. The work also seeks to integrate archaeological and ecological objectives wherever possible and practicable, and to optimise the potential for enhancing the ecological resource through sympathetic management of the archaeological and historical resource.

Consultation

- 1.12. The scope of the project has been undertaken in accordance with the '*Brief for a Costed and Prioritised Proposal for Capital Works for the Conservation and Management of Holmbush Mine, Windsor Lane near Kelly Bray, Cornwall*' (A. Preston-Jones & D. Bashford, 2021) and the responding Offer of Service (Cotswold Archaeology, 2021a), and then subsequently in full consultation with Ann Preston-Jones, Heritage at Risk Project Officer for HE and Gary Lewis, Senior Heritage Officer, Tamara Landscape Partnership.

2. METHODOLOGY

Introduction

- 2.1. In accordance with the project brief, the *Holmbush Mine Archaeological Assessment* (Buck, C. 1998), has formed the foundation for this updated condition assessment with costed and prioritised recommendations for capital works.
- 2.2. The project team comprised:
- Cotswold Archaeology
 - PCA Consulting Engineers
 - Western Ecology
 - SUMO Aerial Cam
- 2.3. Surveys were undertaken individually by the project team between April and July 2022. Prior to survey work being undertaken, some vegetation clearance of low-lying scrub was undertaken around the structural remains to enable access and specialist surveys. Necessary permissions were also gained to undertake some localised felling of diseased ash around the structures.
- 2.4. For consistency, the numbering references for individual structures and elements within the Site have been retained from the 1998 Archaeological Assessment. Within the Site these are as follows:
- Engine House and plinth (**23**)
 - Boiler House (**24**)
 - Boiler House Chimney (**25**)

Drone Survey and Photogrammetry

- 2.1. A drone survey was undertaken across the site by SUMO Aerial-Cam in March 2022, with the assessed structures then processed as 3D Structure from Motion (SfM) models. The results of this survey and the 3D models have also been used to inform this report.
- 2.2. The collection of 3D models, as well as the site model are publicly accessible at: <https://sketchfab.com/aerial-cam/collections>.
- 2.3. The drone and photographic surveys were undertaken in accordance with a Method and Resource Statement set out previously (Cotswold Archaeology, 2021b). The digital outputs for the photographic survey will also be delivered in accordance with

the project brief, as set out in the briefing document (Preston-Jones, A. & Bashford, D. 2021).

Condition Surveys and Costed and Prioritised Recommendations

- 2.4. Condition surveys were undertaken by both Cotswold Archaeology and PCA Consulting Engineers between April 2022 and June 2022. The results of these surveys were synthesised to produce the reported output set out in Section 5: Holmbush Mine Engine House, Chimney and Boiler House. The full report prepared by PCA Consulting Engineers is included as Appendix 1 and should be consulted for further detail.
- 2.5. The recommendations contained in Section 5: Holmbush Mine Engine House, Chimney and Boiler House, as well as the Costed and Prioritised Recommendations have also been informed by the results of the Phase 1 Ecological Survey produced by Western Ecology.
- 2.6. Where internal levels of significance have been ascribed for the purposes of prioritising conservation works, these have been informed by the industry-standard guidance on assessing heritage value provided within *Conservation Principles* (HE 2008) and in *Advice Note 12 Statements of Heritage Significance: Analysing Significance in Heritage Assets* (HE 2019). This approach considers heritage significance to derive from a combination of discrete, complementary heritage values, principal among which are: i) evidential (archaeological) value, ii) historic (illustrative and associative) value, iii) aesthetic value, iv) communal value, amongst others.

Phase 1 Ecology and Bat Survey

- 2.7. The Phase 1 Ecology Survey has been undertaken by Western Ecology, the results of which are summarised in Section 4. The full report is included as Appendix 2 and should be consulted for further information concerning the results and assessment methodology.

Limitations of the assessment

- 2.8. Specialist surveys were undertaken between April and July 2022 in generally clement weather conditions. Access issues primarily related to dense vegetation and general health and safety concerns. Details of these limitations are provided in the text below, where considered relevant.

2.9. The condition surveys as well as the drone and photographic survey, and the resulting 3D SfM models, were all impaired by the extensive ivy colonisation on the Engine House, Boiler House and Chimney walls. The established vegetation cover significantly impacted the ability to view, assess, interpret and photograph the masonry remains, most particularly for external elevations.

3. SITE BACKGROUND

Landscape context

- 3.1. The Site is located on the north side of Windsor Lane on the north periphery of Kelly Bray, Cornwall, in the historic parish of Stoke Climsland. The river Tamar lies c.3km to the north-east, and the locally prominent Kitt Hill c.1.3km to the south-east where it rises to a maximum height of 333m. The Cornish town of Callington is located 2km to the south of the Site, and the main A388 Callington to Launceston Road runs approximately 500m to the west.
- 3.2. The Site forms an irregular parcel of land, measuring approximately 0.75ha. It occupies the valley floor of a feeder tributary to the river Tamar, with the stream flowing generally south to north, approximately 30m east of the Site. Although some landscaping associated with the construction and operation of the Engine House has been undertaken within the Site, the surrounding topography is generally flat, located at the base of the east facing valley slope, around 170aOD (above Ordnance Datum).
- 3.3. At the time of the Site visit, the Site was generally overgrown with hardy perennial scrub, such as gorse and brambles, and a variety of self-seed trees (Photograph 1). However, recent vegetation clearance and felling of diseased ash trees provided adequate access to the structures for specialist survey work.



Photograph 1. Holmbush Engine House looking north-west

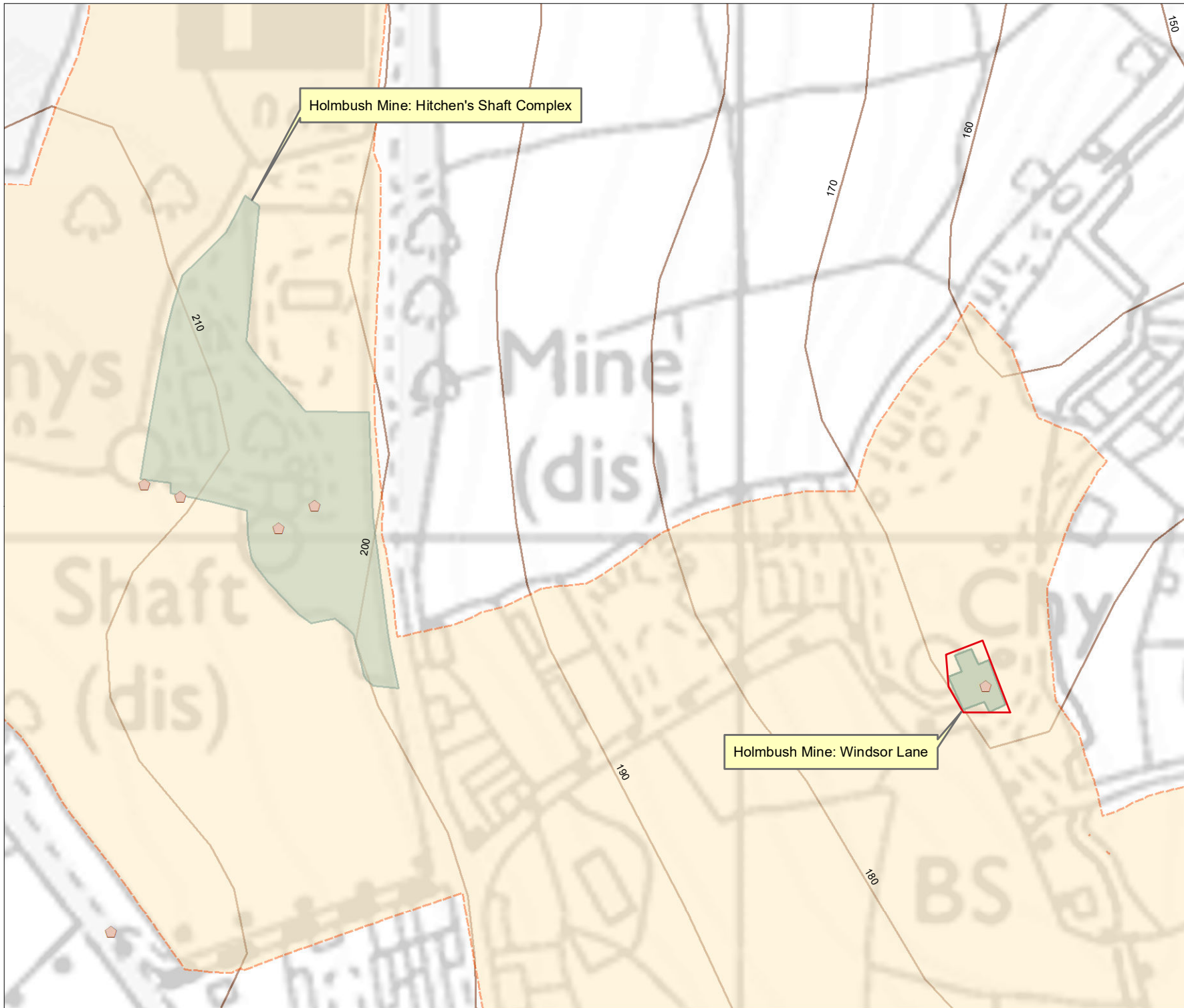
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- 3.4. To the north and east the Site is bounded by rough ground with a mixture of farmland and residential dwellings beyond, as well as woodland which envelops the course of the tributary stream as it flows northward. To the south and west, the Site is bordered by Windsor Lane with a mixture of woodland and enclosed fields beyond. The Site is approached from the north-west from Windsor Lane, via Stoke Road.
- 3.5. The underlying geology within the Site forms part of the Tavy Formation, comprising metamorphic bedrock of Slate and Hornfels, formed approximately 359 to 383 million years ago during the Devonian Period. The original sedimentary rocks were formed in open seas by pelagic deposits before being altered by the higher temperatures introduced through igneous intrusion. No Superficial Quaternary deposits are recorded with the Site. (British Geological Survey Online Viewer accessed 05/06/2022).

Heritage Designations

Holmbush Mine: Windsor Lane rotative engine house with adjacent boiler house, loadings and platform – Scheduled Monument

- 3.6. The Site forms part of the larger Holmbush Mine complex, comprising surface, buried and underground remains, but is separately scheduled from the larger area, known as Holmbush Mine: Hitchen's Shaft Complex (HE Listing Ref: 1020435), which is located approximately 300m north-west of the Site (Fig. 2).
- 3.7. Holmbush Mine Windsor Lane Scheduled Monument was first listed in July 2002. Scheduled Monuments are designated heritage assets considered to be of national significance. The Historic England Listing details provide the following reasons for designation:

The Windsor Lane rotative engine house at the Holmbush Mine survives very well, complete with its adjacent boiler house, loadings and platform. Its largely intact built structure, with little collapse and only minor modifications from un-intensive 20th century reuse, owes much to it being one of very few 19th century engine houses to have retained a considerable part of its original roof structure into the 21st century. The good body of supporting documentation for this mine allows the development of the Windsor Lane complex to be understood as well as the context for the erection of this engine house within that development. The good survival of this engine house also provides a tangible reminder of the ongoing impact of the 19th century mining boom on settlement patterns, accounting for the development of Kelly Bray, which remains a substantial settlement in the landscape neighbouring this engine house.



- Site
- Scheduled Monument
- World Heritage Site
- ◆ Grade II Listed Building



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3.8. Holmbush Mine is one of a large number of mining sites that once operated in the Tamar Valley, predominantly during the second half of the 19th century, and early 20th century. Together, they would have created an imposing visual presence, reflecting the industrialised landscape in this part of Cornwall. In the modern landscape these remains survive in varying states of ruin and decay. Most have been reclaimed within mixed woodland on the slopes of the river Tamar, although several are protected as Scheduled Monuments. The closest of these include: the copper, tin and arsenic mine at New Consols, Lockett, located approximately 2.9km to the north-east; the Prince of Wales Mine at Harrowbarrow, located approximately 4.1km to the south-east; Gunnislake Clitters located near Chilsworthy, approximately 6km to the east and the former extensive arsenic workings at Devon Great Consols, located approximately 6.5km to the east-north (Fig. 3).

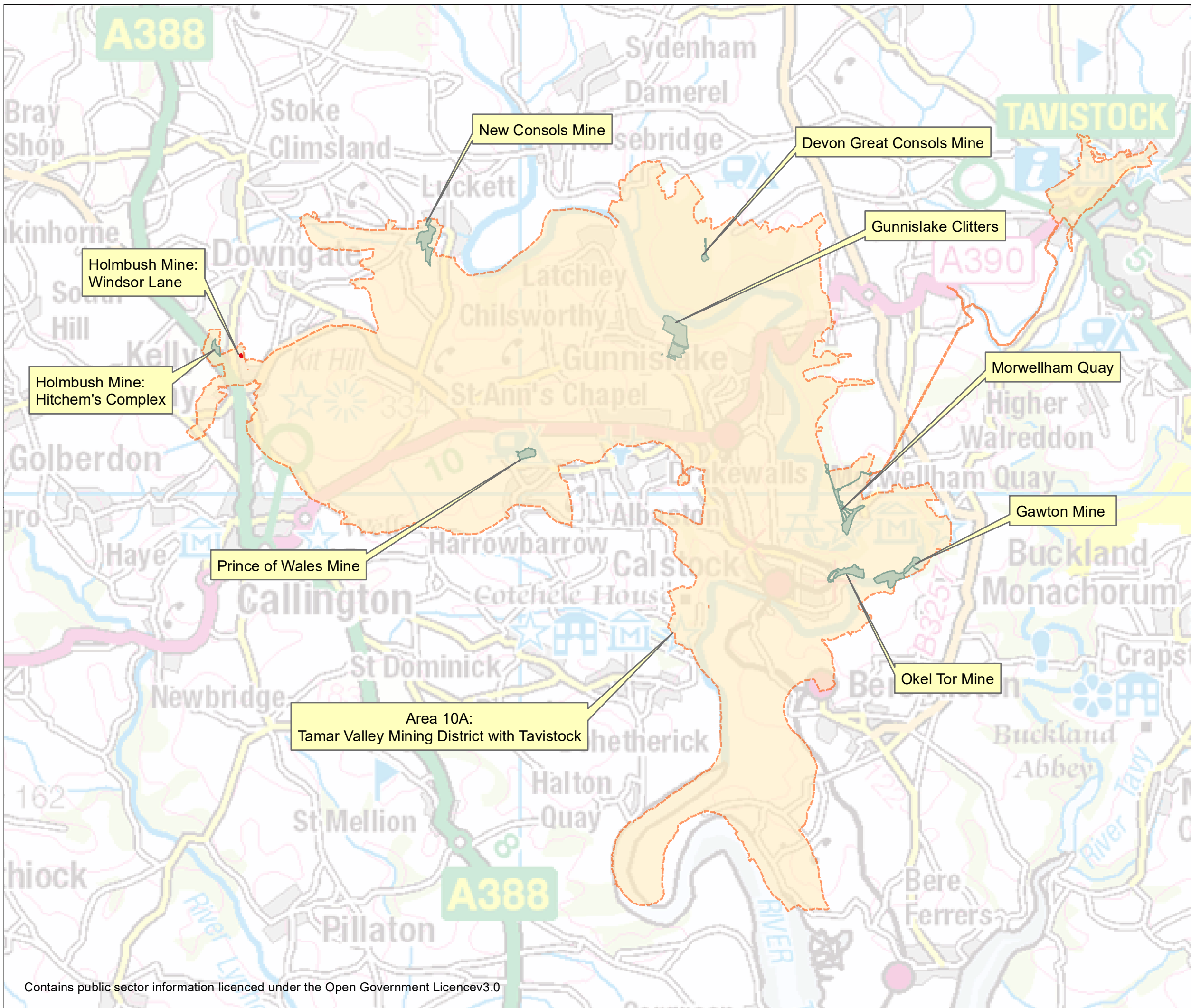
3.9. Scheduled Monuments are subject to the provisions of the Ancient Monuments and Archaeological Areas Act 1979. The Act sets out the controls of works affecting Scheduled Monuments and other related matters. Holmbush Mine Windsor Lane is also listed on the HE Heritage at Risk Register. The most recent register was published in 2021, which describes the condition of the Site as ‘very bad’ (Historic England, 2020; see para 1.3 for description).

Listed Buildings

3.10. Holmbush Mine Windsor Lane Engine House is also Grade II Listed and was first listed in 1989. The HE Listing Details are transcribed below:

Engine House and Attached Chimney, Winsor Lane (List Entry Number 1220770)

*Engine house and attached chimney. Early to mid-C19. Roughly coursed slate stone with yellow brick dressings; slate roof with ceramic cresting to engine house, the whole partly ivy clad (November 1987). Engine house rectangular in plan with circular chimney, tapering to top, attached to west gable end. 2 storeys with 2 tiers of round-headed windows to sides and round-headed opening to east gable end. Interior. Engine house retains cross beams for first floor at west end; stone mounting for former wheel. Collar truss roof in 4 bays. Formed part of Holmbush Mine, first referred to as a lead mine in C17 later extracting copper and tin. Working ceased in 1954 but the mine was later reopened as part of Callington United Mines from 1888-1892. (A K Hamilton Jenkin, *Mines and Miners of Cornwall*, Vol XV, Calstock, Callington and Launceston (1976), pp 36-8).*



Site
 World Heritage Site
 Selected Scheduled Monuments



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PROJECT TITLE
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FIGURE TITLE
 Cornwall and West Devon Mining
 World Heritage Site: Area A10

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3.11. Listed buildings are buildings of ‘special architectural or historic interest’ and are subject to the provisions of the Planning (Listed Buildings and Conservation Areas) Act 1990 (‘the Act’). Under Section 7 of the Act ‘*no person shall execute or cause to be executed any works for the demolition of a listed building or for its alteration or extension in any manner which would affect its character as a building of special architectural or historic interest, unless the works are authorised.*’ Such works are authorised under Listed Building Consent. In this case, their special architectural and historical interest is afforded by the historic character of their appearance, their historic form and purpose, and their relationship with the surrounding mining features and structures.

Cornwall and West Devon Mining World Heritage Site

3.12. Holmbush Mine Windsor Lane is also located within the Cornwall and West Devon Mining World Heritage Site (WHS; Fig. 3). Its global importance has been clearly set in the Statement of Outstanding Universal Value (OUV) and Significance provided in the Cornwall and West Devon Mining World Heritage Site Management Plan 2020 - 2025 (Cornish Mining World Heritage, 2020, Section 4.2. p17). This describes how the mining landscape here was ‘*radically reshaped during the 18th and 19th centuries by deep mining for predominantly copper and tin*’, and that it ‘*comprises the most authentic and historically important components of the Cornwall and west Devon mining landscape dating principally from 1700 to 1914...*’ (ibid). It further states that the industrial heritage within the WHS serves as a reminder of the prominence of Cornwall and west Devon during the Industrial Revolution, and its worldwide influence (ibid).

3.13. This WHS is divided into 10 Areas; each defined by different OUV attributes contributing to the significance of the WHS as a whole. The Site is located within Area A10: Tamar Valley Mining District with Tavistock. The key characteristics of this district are detailed in the Management Plan and include the industrial river quays (such as Morwellham Quay), the major town at Tavistock, and the concentration of tin, copper, and arsenic lodes which were exploited between Callington and Tavistock, in both valley and upland settings (Cornish Mining World Heritage, 2020, Area A10 Tamar Valley Mining District with Tavistock, p.71-77).

3.14. WHS are considered to be designated heritage assets of international importance.

Tamar Valley Area of Outstanding Natural Beauty

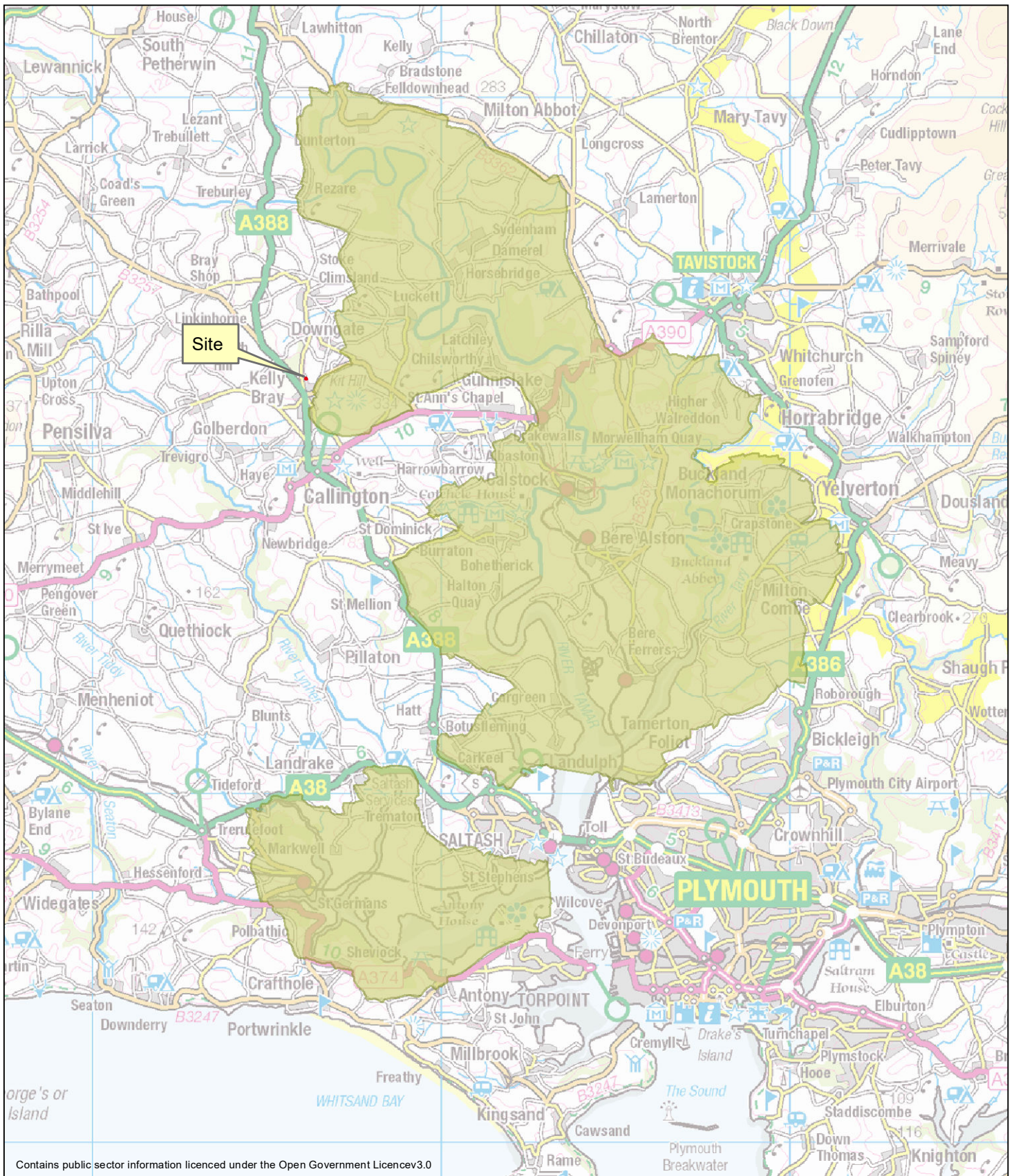
- 3.15. Holmbush Mine Windsor Lane is located approximately 300m to the north-west of Tamar Valley Area of Outstanding Natural Beauty (TVAONB; Fig. 4). Areas of Outstanding Natural Beauty (AONBs) are not heritage designations, but statutory designations which are often closely associated with historic landscapes and how these contribute to their character. This is indeed the case for the TVAONB, which encompasses a vast area of land; largely influenced by the course of the Tamar, Tavy and Lynher rivers, and by the human activity focused on them.

Summary of Historic Background

- 3.16. The historic background of Holmbush Mine Windsor Lane is comprehensively detailed in the 1998 Archaeological Assessment (Buck, C. 1998), and in the HE Listing Entry (NHLE, 2002). This is not reproduced in full here; however, the relevant elements of historic background set out in the NHLE are extracted below for information and context. The HE Listing details and/or the 1998 Archaeological Assessment should be consulted directly for more complete detail:

Mining at Holmbush dates from at least the 17th century. By the 1820s shafts were being sunk on the copper-rich Holmbush Lode in two areas: the eastern, containing this scheduling, occupied the floor and western slope of a narrow valley crossed by Windsor Lane, north-west of Kit Hill; the western area, the subject of a separate scheduling, was sited on an adjacent ridge.

Prior to the mid-19th century, the Windsor Lane site formed the chief operational centre for the mine and it remained the focus for ore dressing, administration and service facilities throughout the mine's active life though the principal pumping, winding and access provision transferred to the mine's western area from the 1840s. From the 1830s the mine produced large quantities of copper ore with some lead and silver ore, complemented by arsenic after 1876 which rapidly became its most profitable product. The mine's workforce and supply needs promoted growth of the nearby settlement of Kelly Bray and, from 1872, the East Cornwall Mineral Railway's terminus.



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- Site
- Tamar Valley AONB



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The development of the Windsor Lane complex, providing the context for the construction and operation of this engine house, is evident from documentary sources and depictions on successive maps and mine drawings. The Stoke Climsland tithe map of 1841 shows the mine's main service buildings on the valley's western lower slope, with two small buildings beside the Wall Shaft on the valley floor (approximately 80m north-west of the Site). On an 1860s' sectional view of the mine, 'Wall's Engine Shaft' was served by an adjacent pumping engine house with boiler house and chimney (approximately 90m north-west of the Site). From 1861, underground working from Hitchen's Shaft, in the mine's western area, began development along a second copper-rich lode, the Flopjack Lode, to the south of the original Holmbush Lode (approximately 70m south-east of the Site). The Flopjack Shaft was sunk on this lode from the valley floor at a point 175m SSE of the Wall Shaft. Both the Wall and Flopjack Shafts appear on the 1883 Ordnance Survey map, by which time the pumping engine complex specifically serving the Wall Shaft in the 1860s had been removed and the engine house complex in this scheduling had appeared. By 1883 a roofed dressing floor had also appeared south-east of the Wall Shaft, with a tramway to the spoil dumps north-east along the valley floor.

In 1876, the Holmbush Mining Company had been formed to extract arsenic ore which, by the early 1880s, had joined copper ore as the mine's chief profitable products. By 1885 the mine achieved its highest annual production of copper ore, but falling ore prices severely diminished its value and greater profits were gained from arsenic production. In the later 1880s the mine became increasingly uneconomic against cheaper ores available from overseas; shaft-mining operations eventually ended in 1892, followed by only limited and intermittent activity during the first half of the 20th century.

By 1906 the Ordnance Survey map shows no evident ore-dressing structures around the Wall Shaft and demolition had begun among the mine's service buildings on the lower slope to the west, marking the start of considerable modification and redevelopment which took place throughout the 20th century over the site of the Windsor Lane complex beyond those features in this scheduling.

Modern Conservation Work

- 3.17. No sustained heritage conservation of the Site appears to have been undertaken since its abandonment during the late 19th or early 20th century, although it is thought to have been used for a variety of unspecified non-industrial purposes during the first half of the 20th century (Buck, C. 1998, p.34).

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- 3.18. In 1998 the *Archaeological Assessment of Holmbush Mine*, (Buck, C, 1998) which informs the current work, was undertaken by Cornwall Archaeological Unit (CAU). This was commissioned by Cornwall County Council, following the identification of Holmbush Mine by the County Land Reclamation Officer and the Duchy of Cornwall, as one of a number of mining sites within the Tamar Valley considered to pose a potential health and safety risk to the public (CAU, 1989).
- 3.19. The 1998 Archaeological Assessment outlined the mining history of the Site, and identified buildings and landscape features, describing their previous function and extent. It also included feature/structure specific recommendations for future management including consolidation and preservation.
- 3.20. Although in 1998 specific recommendations were included for the Windsor Lane Engine House (**23**), Boiler House (**24**) and Boiler House Chimney (**25**), it would appear that no works were subsequently carried out. Since then, the Site seems to have become increasingly overgrown with perennial scrub and self-seeded trees, and the structures more thickly carpeted with ivy, and other destructive vegetation.

4. SUMMARY OF ECOLOGICAL SURVEY WORK

Introductions

- 4.1. A preliminary ecological appraisal of the Site was undertaken by Western Ecology, the results of which are summarised briefly below. The full report is included as Appendix 2: Preliminary Ecological Appraisal, Holmbush Mine, Cornwall, and should be consulted for further detail.
- 4.2. The ecological survey aimed to identify features of conservation importance that might constitute a constraint for proposals within the Site, and where appropriate, to make recommendations for impact avoidance, mitigation and post-development enhancements to ensure compliance with wildlife legislation and relevant planning policy.

Phase 1 Habitats

- 4.3. The Site was found to comprise areas of woodland and scrub with some scattered trees. The following habitats were identified and recorded:
- Semi-natural broadleaved woodland: Woodland was found to border the northern and western edges of the Site, comprising mature and semi-mature trees, with scattered understorey species. Species included Pedunculate oak, ash, sycamore, harts tongue fern, hawthorn, nettles, male fern, ivy, hazel, and bramble. Although not encroaching meaningfully onto the Site, should any vegetation works be undertaken within the Site, it was considered that mitigation would be required to prevent any accidental damage to this habitat.
 - Buildings: These included the Engine House and Chimney, Boiler House and Plinth. Much of the stonework was found to be densely covered in ivy, with species such as bramble, nettles, elder, hazel, male ferns, harts tongue fern, red campion, hawthorn, nettles, ash saplings and ground elder growing at the base or emerging from it.
 - Scrub: The east and south sides of the Site were found to be dominated by bramble, nettles, ground elder, male fern, ivy, red campion, hawthorn, sycamore, hazel and marsh valerian. Some of the scrub was butting up against the building remains.
 - Scattered Hazel Stands: Along the north edge of the Site there was a line of hedgerow shrubs, running along a post and wire fence. However, the stand didn't form a hedgerow, as there were clear gaps between each plant. Hazel

stands dominated with other species such as bramble, elder, nettles, ivy and male ferns growing at their base.

- Tall Ruderal: Some scattered ruderal plants were found to be growing within the footprint of buildings and around the edge of the site. Wood chippings from scrub clearance at the base of the buildings had suppressed much of the growth of some emergent species, which included male fern, red campion, nettles, marsh valerian, hogweed, ground elder and ivy.

Desktop Survey

4.4. A search of biological records within 1 km of the Site found a number of notable species, although due to the broad scale of many records, it was not possible to determine if they relate to the Site.

4.5. The Site was not found to be part of a Statutory or Non-Statutory Nature Conservation Site.

Potential for Species of Nature Conservation Importance

4.6. Habitats were assessed from the results of the field survey for their potential to support protected species. The results are summarised below:

- Amphibians: No aquatic habitat was found within the Site, but they are a common and widespread species and likely to be present within the Site.
- Badgers: No evidence was identified within the Site, although they are likely to be active in the area.
- Bats (roosting/hibernating): Likely to be present on structural gaps within the upstanding buildings.
- Bats (foraging/commuting): Likely to be present.
- Dormouse: Likely to be present.
- Nesting Birds: Certain to be present
- Reptiles: Low probability to be present
- Otter: No evidence within the Site, although they are likely to be present along the river Lynher and nearby woodland
- Water Vole: Unlikely to be present
- Notable invertebrates: Low probability to be present
- Notable plants: Moderate potential on building remains
- Invasive non-native plants: Not present

Evaluation of Ecological Features and Potential Impacts

Habitats of Nature Conservation Importance

- 4.7. Semi-natural broadleaved woodland was identified as a habitat of nature conservation importance. Mitigation should be adopted to minimise any loss in extent of woodland habitat.

Species of Nature Conservation Importance

Badgers

- 4.8. Badgers were considered very likely to be active in the area, although no evidence of setts or other activity were identified during the survey. Badgers are protected from persecution or ill-treatment under the Protection of Badgers Act 1992. Natural England has provided guidance of which activities may need licencing as they risk an offence. The following would be unlikely to need a license.

- work with hand tools or machinery above or below ground close to a sett
- vegetation clearance near setts, including felling small trees or shrubs, provided they are not uprooted and don't block access to the sett

- 4.9. An offence is considered unlikely during the proposed works, although precautionary mitigation should be adopted.

Bats

- 4.10. An assessment of buildings on the Site was undertaken to assess their potential to support roosting bats both within their structure (lintel gaps, cracks, fissures, etc) and behind vegetation adhering to walls (mainly ivy). Mitigation for roosting bats is required during any proposed works.

- 4.11. The suitability for roosting bats within specific structures is summarised below:

- Engine House (23) - **High suitability** behind thick ivy and within voided wall cavities
- Boiler House Chimney (25) - **Moderate suitability** behind ivy and within open jointed brickwork exposed at the top of the Chimney
- Boiler House (24) - **Negligible suitability**
- Plinth (23) - **Negligible suitability**

- 4.12. The following prescriptive category descriptions relating to suitability were outlined:

- Negligible suitability - Negligible habitat features on Site likely to be used by roosting bats

-
- Moderate Suitability - A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status.
 - High Suitability - A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

4.13. Furthermore, woodland around the Site will likely provide optimal foraging habitat for bats. Provided that works do not result in the significant loss of woodland extent, it is likely that the opening of glades around buildings would enhance the Site for foraging bats through the creation of edge habitat.

4.14. On this basis, no mitigation is recommended for foraging bats.

Birds

4.15. It is certain that common and widespread bird species will nest within scrub and woodland in and around the Site. It is also likely that the built features will be used by nesting birds at different times, and this includes vegetated/collapsing walls and standing buildings, although chimneys are unlikely to be used.

4.16. Mitigation for nesting birds is recommended during proposed works.

4.17. Any activities that expose invertebrates, such as earth worms and grubs, will provide an additional food resource for local birds and will have a positive temporary effect, particularly when adults are feeding nested chicks.

Dormice

4.18. Although there was no evidence of dormouse nesting/activity, it was thought likely that they will be present within the area, as Hazel stands and scrub provide good nesting and foraging habitats.

4.19. On this basis, precautionary mitigation for dormice was recommended during proposed works.

Flora

4.20. Thin soils found on building remnants and walls are considered to have the potential to support plants of restricted distribution.

Vegetation Clearance Plan

- 4.21. A vegetation clearance plan was also included within the Preliminary Ecological Appraisal. This sets out proposed mitigation, to be undertaken during any conservation work. The following categories are considered, and include appropriate ecological guidance and mitigation measures:

General Low Level Vegetation Clearance

- Avoiding/minimising impacts to dormice and nesting birds
- Avoiding impacts to badgers and their setts
- Minimising loss of woodland habitat

Clearance of Vegetation on Specific Structures

- Avoiding impact to bats and their resting places
- Avoiding impacts on nesting birds

- 4.22. Provisional costs associated with the proposed ecological mitigation, where relevant, are also included. These are set out below, in Section 6: Costed and Prioritised Recommendations – Ecological Constraints.

5. HOLMBUSH MINE ENGINE HOUSE, CHIMNEY AND BOILER HOUSE

Introduction







- 5.1. As part of the 1998 archaeological survey and assessment work a gazetteer was compiled and reported (Buck, C. 1998 pp. 15-37). Archaeological features and extant buildings, including the Hitchen's Shaft area west of Stoke Road were identified and recorded through field survey, and located on a 1:2500 Ordnance Survey (OS) map. The information gathered in the field was then transcribed to form the site gazetteer, which reported the background, survey results and recommendations for each specific element.
- 5.2. The original gazetteer comprised a total of 26 individually referenced elements (1-26). This updated condition survey re-assesses three of these elements, all located within the Windsor Lane Site. These are the Engine House and Plinth (**23**), Boiler House (**24**) and the Boiler House Chimney (**25**). The original identifiers Nos. **23 -25** have been retained for continuity.
- 5.3. The updated assessment includes a summary description of each element, drawn from the 1998 archaeological assessment, which should be consulted for fuller detail (Buck, C. 1998). However, it should be noted that in some instances, building footprint measurements have been altered to accurately reflect those recorded in the HE Listing details, the OS Masterplan, and/or the results of the current survey. The gazetteer also includes a description of the current condition (recorded between April and June 2022) and revised management recommendations, including any works required to further stabilise structures.
- 5.4. The Site plan (Fig. 5) illustrates the location of the assessed structures and has been derived from the OS Masterplan.
- 5.5. Fieldwork was undertaken separately between April and June 2022 by both Cotswold Archaeology and PCA Consulting Engineers to identify and record the current condition of relevant structures and features contained in the 1998 archaeological assessment.
- 5.6. The 'present condition' and 'recommendations' sections outlined below in the updated gazetteer have been compiled and amalgamated from the results of fieldwork and observations undertaken separately by Cotswold Archaeology and

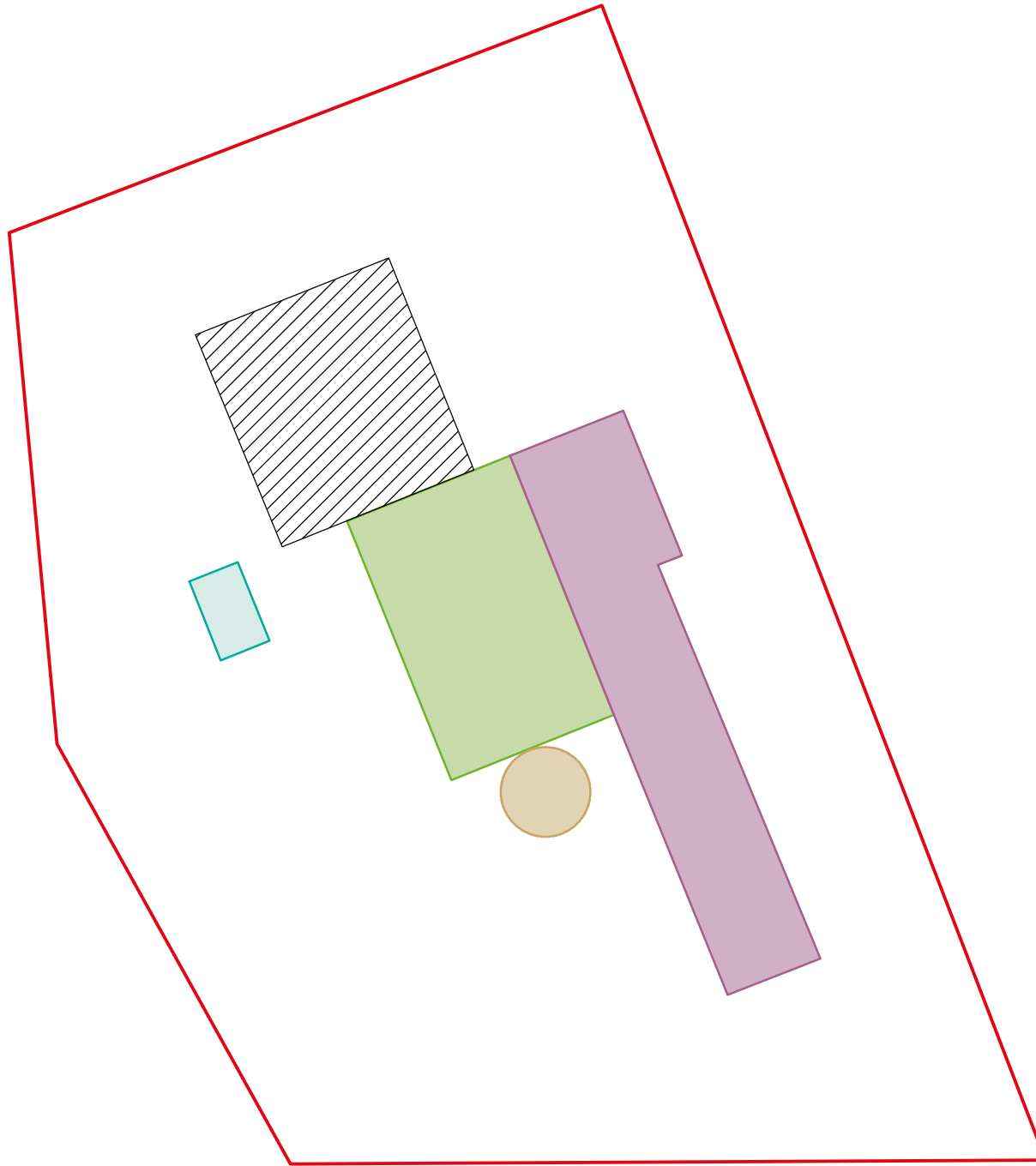
PCA Consulting Engineers. A general Condition Rating was assigned by PCA Consulting Engineers in relation to their survey work, graded 1-4 as follows:

- Good/Stable (1)
- Medium (2)
- Poor (3)
- Very Poor (4)

- 5.7. The full structural commentary prepared by PCA Consulting Engineers is included as Appendix 1. The results of their work are also summarised and tabulated in Section 6: Costed and Prioritised Recommendations.
- 5.8. References to destructive vegetation are made in the following assessment, and subsequent sections of the report. This term encompasses those plants, trees and vegetation, along with their root systems, that are having a sustained deleterious effect on upstanding structures, and/or buried deposits across the Site. For the larger extent these are considered to include self-seeded trees, scrub, gorse, ivy and other fast-growing weeds and intrusive perennials. Conversely, and unless stated otherwise, heathers, grasses, mosses and lichens are not considered to present an ongoing destructive threat to upstanding structures and/or buried deposits.
- 5.9. Where recommendations are included to clear potentially destructive vegetation from around upstanding buildings, unless stated otherwise, the proposed buffer zone is considered to extend 5m from the edge of the built form.



-  Site
-  Engine House
-  Boiler House
-  Engine House Chimney
-  Plinth
-  Loadings



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PROJECT TITLE
Holmbush Mine Windsor Lane

FIGURE TITLE
Site Plan

DRAWN BY	CM	PROJECT NO.	CR1008	FIGURE NO.
CHECKED BY	JP	DATE	03/11/2022	
APPROVED BY	CM	SCALE @ A4	1:200	5

Engine House and plinth (23)

NGR: 236115 71931

Summary of background and Survey Results recorded in 1998 (Buck, C. p.34-36)

- 5.10. The Windsor Lane site formerly occupied a much larger extent than the current small area of scheduling, with pumping steam engines recorded on the site from the 1840s onwards and whim engines from the 1850s; however, all the recorded cylinder sizes were too large for the surviving small Engine House. The exact date of its construction is uncertain but was most likely contemporary with the peak phases of production around the 1850s. It is illustrated on the First Edition OS map along with its fly wheel loadings (1883; not reproduced). This map also illustrates two parallel walls on the west side of the Engine House in an area possibly infilled to form a platform, now measuring approximately 13.5m north to south, and 8.7m wide. That said, it is equally possible that the parallel walls were constructed on this platform and have since been demolished. It was thought this structure may have been part of the crank pit, where rotative motion was converted to horizontal, working the flat rods that pumped Flop Jack's Shaft. Notably, the platform was directly aligned between Wall Shaft located approximately 90m to the north-west, and Flop Jack's Shaft approximately 70m to the south-east.
- 5.11. The Engine House is thought to have been reused for a variety of non-industrial purposes during the first half of the 20th century.
- 5.12. In 1998 the Engine House was found to measure approximately 8.25m long by c.6.0m wide with walls between 0.75m and 1.12m thick, built of local rubble and squared killas. All the walls survived to full height, between 7.5m and 9.5m high, and the roof retained its roof timbers as well as approximately three-quarters of its slate covering.
- 5.13. Recorded architectural features on the bob wall (north facing elevation) included three courses of brick headers over the plug door (areas of which were still covered with lime washed render). In addition, a timber bearer was intact at floor level and a tie-bar was *in situ* on the eastern side of the wall, which was level with the top of the plug door brick header arch, situated approximately 4.5m above the ground level. The upper half of the wall was found to be densely covered in ivy, obscuring any structural weaknesses, although a slight crack at the crown of the plug arch brick header was visible.

-
- 5.14. No cylinder arch opening was present on the intact rear gable end wall (south facing elevation), as the Boiler House Chimney (25) had been built in the centre of the exterior face. However, internally, a triangular section of rear wall, just above the cylinder bedstone level, had been removed to access the chimney flue. This was thought to have happened during reuse of the structure in the first half of the 20th century. No other architectural features were recorded on the gable end wall.
- 5.15. Five openings were recorded in the west wing wall. Two arched openings were recorded at ground level, each with three courses of brick arched header bricks. The southernmost opening was originally a window but had been converted to form the principal doorway access to the Engine House cylinder platform. The door opening on the north side of the wall provided access into the cataract pit, where its ground level was approximately 1.8m below the cylinder bedstone level. A narrow window opening, with arched brick headers was recorded at first floor level, although the cill had either been removed or collapsed. Directly above the first floor window and to the south a timber blocked small opening with a wooden lintel and cill was recorded. Just above this level, centrally on the second floor was a window opening with brick headers and boarding, which had come away from its fixing. A tie bar was visible at the north end of this wall between the second floor window and the bob wall. The upper half of the wall was densely covered with ivy, obscuring any structural defects.
- 5.16. Four openings were recorded on the east wing wall, with central windows on the first and second floors having three courses of arched brick headers. At cylinder bedstone ground level there was a door opening which used a timber wall plate as a lintel and had brick jambs. This opening formerly provided access to the Boiler House (24), although the exterior ground level was c.1.6m below the cylinder bedstone level. The two central arched windows were found to be in reasonable condition, and a small lintelled opening slightly above and to the south of the first floor window, also appeared to be in relatively good condition. Ivy covered the top half of this wall and concealed any possible structural weaknesses.
- 5.17. Internally, first and second floor joists were found to be intact and three half floor joists still *in situ*. A small amount of collapse around the cataract pit to boiler house opening was considered to require remedial attention. Two 'A' frame trusses with supporting remnants of the slate roof covering were also recorded against the gable end wall (south elevation). The granite cylinder bedstone was found to be *in-situ* with four visible cylinder bolt holes.

5.18. Only fragmentary remains of the crankshaft and winding drum loadings with iron mounting bolts protruding from the front of the bob wall were recorded. It was thought that the masonry had been removed for use elsewhere. Furthermore, detailed recording was not possible due to dense overgrowth and a collapsed corrugated iron shed. A granite plinth was also recorded on the raised ground platform, on the west side of the Engine House This was constructed of granite and killas, measuring approximately 1.2m in height. Dense vegetation precluded further interpretation of this feature.

Present Condition

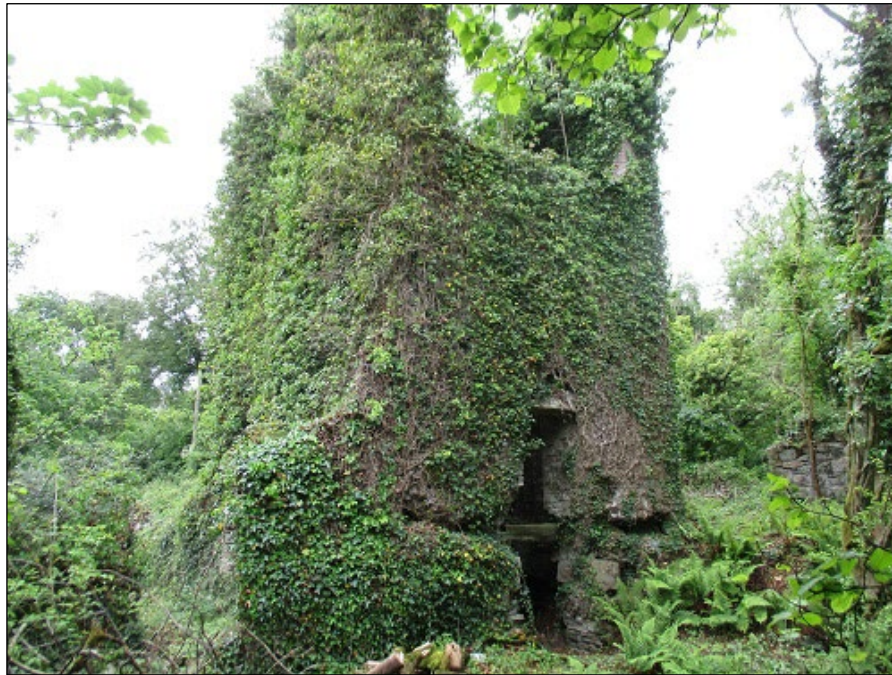
5.19. The current survey work found the Engine House to be even more extensively covered with ivy, making identification of external features and condition very difficult. However, the dimensions of the structure remain unchanged, and there appeared to have been no major structural failures since the 1998 survey,

5.20. On the bob wall, the plug door with its three courses of internally visible brick arch headers appeared to be in similar condition to that set out in 1998, but with a partially slipped brick at the crown of the arch, and bricks also missing generally from around the reveal (Photograph 2). In addition, it was noted that the internal wood lintel had rotted out leaving the masonry panel and opening unsupported. The opposing external part of the arch was infilled with masonry. A localised masonry collapse and hole through the wall was also recorded below the plug door, internally on the west side, just above ground level (Photograph 2).



Photograph 2. Plug door looking north from within the interior

5.21. Externally, a number of original timbers had rotted out at low level, with voids in the stonework local to the central opening. The internal floor level timber bearer was found to be in a deteriorating condition (Photograph 2) and the external bearer entirely missing, creating a significant weakness (Photograph 3). The tie bars were still visible on both the east and west side of the plug door. The bob wall was densely covered by ivy, with small trees growing from wall heads. Without intervention, it is considered that elements of the bob wall could further collapse and fail.



Photograph 3. Bob wall looking south

5.22. On the west wing wall, externally, both ground level openings were partly visible (Photograph 4), although all features above their brick arched headers were concealed beneath dense ivy. There were loose or missing bricks in the internal reveals to most openings (Photograph 5). However, the crack identified in 1998, running from the brick arch to the first floor window to the cill of the second floor window above could not be seen due to ivy. Indeed, a relatively thick covering of ivy on the internal side of the west wing wall, above the level of the first floor window arch, precluded a meaningful assessment of condition, or identification of other features recoded in 1998. Rotted timber lintels were also noted to the northern door opening, and to the blocked opening located just above and to the south of the first floor opening. Externally, the masonry appeared to be relatively stable, but several original roof timbers were noted hanging down from the top of the wall, which are potentially unsafe, and there were also loose slates.



Photograph 4. West wing wall looking east from platform



Photograph 5. West wing wall interior elevation first and second floors

5.23. On the east wing wall, from the exterior, the openings described in 1998 were only partly visible due to the dense colonisation of ivy, but of complicated arrangement. Internally, the bedstone level door opening (Photograph 6), first floor window opening, and opening just above and to the south were visible (Photograph 7) and their condition more readily assessed. These features all appeared to be in similar condition to that described 1998, with no obvious structural failures.



Photograph 6. Door in east wing wall to Boiler House



Photograph 7. Internal elevation of west wing wall first and second floors

5.24. Externally, the rear gable wall was completely concealed by ivy. Internally, the condition was similar to that described in 1998. The triangular opening to the chimney flue was obviously visible and appeared to be in a stable condition, although with no support to the stonework (Photograph 8). There were no obvious failures to the wall itself, although a partially removed/rotted timber wall plate was visible on the west side, just above the surviving first floor joists, leaving stonework unsupported. On the next level above, there are four recessed voids with their timber lintels thought to be in fair condition, although assessment was difficult due to ivy growth. Generally, masonry to this internal elevation appeared to be in good condition.



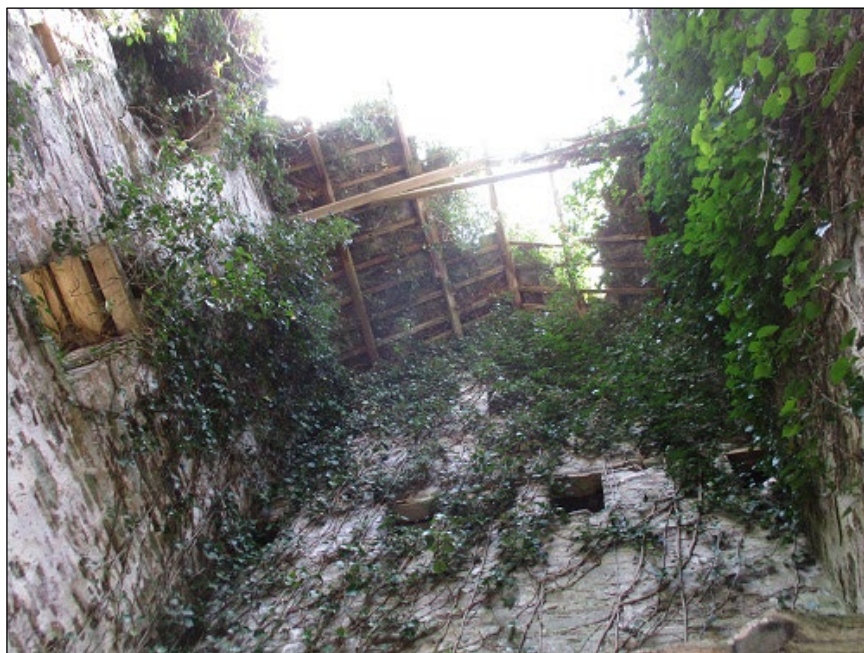
Photograph 8. Gable end wall opening to chimney flue

5.25. For the larger extent, those internal feature described in 1998 were identified. The cylinder bedstone remained *in-situ*, although the surface was covered in detritus so that the four bolt holes were not visible. The retaining wall to the bedstone level, which forms the southern wall to the cataract pit was in generally poor condition, with some masonry failures (Photograph 9). That said, two rectangular access bolts holes were visible, with the one on the eastern side surviving in better condition. First and second floor joist holes were still readily visible and generally in good condition. However, of the three floor joists recorded in 1998, only two complete lengths survive and the most northerly of these was well rotted. Two partial floorboards were also noted, resting on the first floor joists, against the east wing wall. Areas of lime-washed plaster survived in places across the interior walls.

5.26. Also, in 1998 two A-frame trusses were recorded as surviving across the southern half of the structure, supporting the remnants of the original slate roof. Only one of these survived, but with rafters still supporting some of the original slate covering (Photograph 10). Presumably though, since 1998 a large number of the formerly surviving roof slates have fallen into the interior, as attested by the slate fragments strewn across the floor level of the cataract pit and bedstone cylinder.



Photograph 9. Access bolt holes beneath the cylinder bedstone



Photograph 10. A-frame roof truss and surviving covering

5.27. In summary, whilst no new obvious major failures were identified to the Engine House, the general ongoing deterioration was readily apparent, best highlighted by the loss of the A-frame roof truss, and roofing slates, as well as rotting timbers, and localised failures of bricks and stone masonry. Without intervention, the rate at which this structure is deteriorating will only increase. It should also be reiterated that external elevations were almost entirely concealed, as well as large areas of internal elevations, in particular above first floor level. This made a thorough and meaningful assessment of condition impossible.

5.28. The loadings were set externally against the bob wall, projecting to the north to encompass an area of approximately 7m by 7m. As recorded in 1998, these survive in very fragmentary condition, having been extensively robbed of material and reduced in height, so that only a low masonry footprint remains, set within a depression (Photograph 11). The iron mounting bolts protruding from the crankshaft and winding drum loadings are still visible, and overall, the condition of the loadings appears unchanged from the 1998 survey. Indeed, the overlying remnants of the corrugated iron shed are still visible on the ground.



Photograph 11. Loadings looking south-west

5.29. The ground level on the western side of the Engine House was raised to form a platform measuring approximately 13.5m north to south, and 8.7m wide and 1.5m

higher than the adjacent ground surface. From atop the platform the ground falls away relatively sharply on the north and also to the west, down onto the loadings, but merges more gradually with the valley floor to the south. The platform also projects north of the bob wall, partly alongside the depression marking the loadings. It is unclear whether this platform is contemporary with the formative use/construction of the Engine House or represents later infilling of the parallel walls shown on the late 19th century historical mapping (not reproduced). However, given the stone plinth atop the platform, and that the platform surface is level with the door openings in the west wing wall of the Engine House, it seems most likely that the platform was contemporary with the original use of the Engine House.

5.30. In summary, the Engine House was assessed to be in **poor condition**, caused by areas of structural instability, high levels of vegetation growth and areas of loose stone and brickwork. Without intervention the structure will continue to deteriorate.

5.31. The granite quoined plinth, located on the platform, measured approximately 2.6m long by 1.6m wide and 1.6m high (Photograph 12). It was mostly constructed of partially coursed granite, built with a lime mortar which included a course gritty sand. The stonework was found to be open jointed in extensive areas. Two openings were partly exposed at ground level on its east side, measuring approximately 0.2m wide and at least 0.3m high, although their lower sections were infilled and below the ground surface level.



Photograph 12. Stone Plinth, east facing elevation

-
- 5.32. The plinth appeared to be in **medium condition**, although heavily overgrown with ivy and shrubs, and trees growing both around and from the top of it. Given the dense vegetation the identification of any other structural features was not possible.

Recommendations

- 5.33. The following recommendations are principally derived from the structural survey report prepared by PCA Consulting Engineers (Appendix 1):

Engine House

- Clear the Site as necessary to provide safe access to erect full scaffold around the building (including the chimney).
- Carefully clear ivy and vegetation and control/prevent regrowth.
- Review condition of the remaining elements of the truss and purlin roof structure.
- Remove loose timbers and slates and then record.
- Consolidate and locally rebuild wall heads where they are affected by vegetation, ensuring they are fully 'weathered'.
- Following clearance of vegetation, the condition of stonework should be further assessed.
- Allow to infill voids and locally rebuild and repoint affected areas. The extent of this work to be reviewed to ensure that walls are stable.
- Replace rotten lintels and timbers and make-good affected stonework.
- Repoint open jointed stonework and those areas affected by ingrowing ivy and vegetation.
- Consideration to be given to reconstructing the truss and purlin roof structure, modelling on the existing, and re-covering the building in corrugated steel sheeting.
- Monitor condition and control vegetation.

Plinth

- Cut down trees and clear vegetation from around the structure.
- Clear ivy and vegetation from the stonework.
- Locally rebed loose stones and consolidate stonework where required.
- Repoint open jointed stonework.
- Monitor condition and control vegetation.

Boiler House (24)

NGR: 236121 71928

Summary of background and survey results recorded in 1998 (Buck, C. p.36)

- 5.34. The Boiler House was located on the east side of the Engine House, utilising its eastern wall, and was originally designed to house a single boiler. This would have provided enough steam for a high pressure, small, rotative steam engine, although it was unclear whether the Boiler House was constructed in a single phase or later adapted to accommodate a larger boiler.
- 5.35. As with the Engine House, the Boiler House was thought to have been constructed in the mid-19th century. Detailed survey was not possible due to dense vegetation cover. Three walls were found to be partially extant, with openings in the north and south gable ends. East wall heights varied from 0.5m to 2.7m, and the south gable wall survived to its full height, approximately 4.0m above ground level. The north gable wall survived to c.2.2m above ground level. A small antechamber at the north end of the Boiler House was demarcated by a return in the east wall, increasing the overall width of the structure here. This was interpreted as a probable coal store.

Present Condition

- 5.36. The three Boiler House walls described in 1998 were all identified, but in varying states of ruinous condition; all appeared to have deteriorated since 1998 and were heavily colonised by ivy and vegetation. The Boiler House footprint measured approximately 18m long by 3.0m wide, with walls between 0.6m and 0.7m thick (it should be noted that this differs from the length quoted in the HE Listing Details of 11m). The ruins of the Boiler House were quite densely overgrown, despite the recent vegetation clearance, with plants including ivy, holly, perennial shrubs and small trees growing out of the walls and wall tops.
- 5.37. The surviving north gable end wall was in a similar maximum height to that recorded in 1998, up to approximately 2.2m high. On the west side of the door opening there appeared to be a relatively recent structural failure to the internal veneer of the pier (Photograph 13), with a smaller void also recorded in the adjacent section of the Engine House's east wing wall. The gable end wall may also have significantly reduced in height on the east side of the door since 1998.
- 5.38. The east Boiler House wall was found to survive variably along its length, with the maximum height as described in 1998, up to maximum of c.2.7m. It was found to be

densely covered with vegetation and the best surviving section leaning inward at a precarious angle, with the adjacent section to the south, probably representing a recent collapse around a former opening (Photograph 14). The antechamber at the north end of the boiler house was still legible, for approximately 4.5m from the north gable end wall, with the return in the east wall increasing the overall width of the Boiler House footprint here from approximately 3.0m to 3.8m.



Photograph 13. North gable end wall of the Boiler House, showing failed veneer



Photograph 14. East wall leaning inward, looking north from beside collapsed opening

5.39. The south gable end wall was densely covered in vegetation and appeared to have been significantly reduced in height from the 4.0m, recorded in 1998. The dense vegetation and fallen masonry on and around this gable end wall made close inspection impossible (Photograph 15). The opening identified in 1998 was not visible, and the maximum surviving height appeared to be little more than 2m at the corners, with a more substantial central collapse. Masonry and vegetation also obscured the top of the wall when viewed externally from the platform (Photograph 16), alongside the Boiler Houses west wall.



Photograph 15. Looking along the top of the Boiler House west wall at the south gable end wall obscured by vegetation and fallen masonry

5.40. The west wall continued south beyond the extent of the Engine House's east wing wall to complete and enclose the long rectangular footprint of the Boiler House (Photograph 16). The external surface of the platform on the west side of the wall was approximately 1.2m higher than the ground level within the Boiler House. In addition, the top of the west wall was approximately 1.2m higher than the external ground surface and hence 2.4m above the ground level within the boiler house. Where this wall adjoined the south-east corner of the Engine House adjacent to the Boiler House Chimney, there was an opening measuring approximately 0.75m wide and 1.2m high comprising the full height of the wall from the external ground level (Photograph 17). Ivy covered brick jambs were recorded on either side of the opening, although only remnants survived on the south side. Given the proximity of this opening to the chimney, it may have been related to the linking flue, although

equally, given its regular geometric form, it may have been a light opening. Unfortunately, no steam pipe/flue hole opening could be found nearby, opposite the chimney, as the Boiler House west wall was densely covered in ivy here.



Photograph 16. West wall of Boiler House looking south-east from atop platform



Photograph 17. Boiler House opening in west wall (ivy covered chimney base in background)

5.41. As in 1998, the floor of the Boiler House was covered in vegetation, ivy and rubble, obscuring any obvious structural features, although an uneven, but nonetheless slight change in ground level between the interior footprint length running alongside the Engine House and that projecting further to the south, would seem to demarcate the space on functional grounds.



Photograph 18. Boiler House floor looking south-west

5.42. The Boiler House was assessed to be in **very poor condition** due to its ruinous condition, many areas of structural instability, and thick vegetation covering.

Recommendations

5.43. The following recommendations are derived principally from the structural survey report prepared by PCA Consulting Engineers (Appendix 1):

- Clear the Site as necessary to provide safe access and to erect low level scaffold.
- Carefully clear ivy and vegetation and control regrowth.
- Following clearance of vegetation, the condition of stonework should be further assessed.
- Allow to infill voids and locally rebuild partially collapsed sections of wall. The extent of this work to be reviewed to ensure that walls are stable.

-
- Consolidate and locally rebuild wall heads where required, ensuring they are fully 'weathered' and repointed as a 'ruin'.
 - Replace rotten lintels and timber grounds and make-good affected stonework.
 - Repoint open jointed stonework and those areas affected by ingrowing ivy and vegetation.
 - Thereafter, monitor condition and control vegetation.

Boiler House Chimney (25)

NGR: 236117 71926

Summary of background and Survey results recorded in 1998 (Buck, C. p.36-37)

- 5.44. The killas chimney was built into the centre of the Engine House's rear gable end wall and was thought to be contemporary with the Engine House, probably dating from the mid-1850s. The central chimney design was a comparatively rare and only suitable for small cylinder engine houses. This was because the location of the chimney precluded the construction of a normal cylinder arch within the gable end rear wall.
- 5.45. The chimney was found to be constructed of killas, and measured approximately 14m high, including a red brick coping course. Further details could not be ascertained with any certainty due to a dense covering of ivy covering the upper three quarters of its surface. The exterior diameter of the chimney measured 2.8m with an interior flue width of 0.9m. The flue entry would have been located on the chimney's east side but could not be surveyed because of the dense vegetation cover. No obvious structural defects were recorded, although rubble was found to have fallen from the top of the chimney, indicating that some consolidations work would be required.

Present Condition

- 5.46. As in 1998 assessing the structural condition of the Boiler House Chimney was all but impossible, given the very thick carpeting of ivy that adheres to it (Photograph 19). Only of the upper brickwork capping courses were visible on the south and west sides of the chimney. Here bricks were clearly missing, and the brickwork open jointed (Photograph 20). From below, in places, it was possible to see daylight through gaps in the brick's mortar bonding. At the base of the chimney, the dense ivy covering still prevented identification of the flue, although what appeared to be a pile of ivy covered masonry, on the east side, most likely represented its position. However, despite the thick covering of ivy, there were no obvious structural failures to the chimney's structure since 1998, and externally the structure appeared to be true to line and reasonably stable.
- 5.47. Internally the chimney also seemed true to line, although there was no support to the hole made through to Engine House, and there was vegetation growth internally at a high level.
- 5.48. On balance, the Boiler House Chimney was assessed to be in **medium condition**.



Photograph 19. Boiler House Chimney looking north-east



Photograph 20. Open jointed brickwork on the Boiler House Chimney brick capping course

Recommendations

5.49. The following recommendations are derived principally from the structural survey report prepared by PCA Consulting Engineers (Appendix 1):

- Clear the Site as necessary to provide safe access to erect full scaffold around the chimney.
- Carefully clear ivy and vegetation and control/prevent regrowth.
- Following clearance of vegetation, the condition of stonework and brickwork should be further assessed.
- Allow to infill voids and locally rebuild and repoint affected areas of stonework, with the extent to be reviewed to ensure that walls are stable.
- Repoint upper courses of brickwork, allowing to rebuild potentially 12 courses of brickwork using reclaimed bricks.
- Ensure wall head is well 'weathered'.
- Stabilise further areas of loose brickwork/stonework and repoint as required.
- Thereafter, monitor condition and control vegetation.

6. COSTED AND PRIORITISED RECOMMENDATIONS

Introduction

- 6.1. Prioritised recommendations have been based on the reported survey and assessment work undertaken by PCA Consulting Engineers (Appendix 1) and Cotswold Archaeology. Detailed costings for the prioritised recommendations have been produced by PCA Consulting Engineers alone and are also included as Appendix 1.
- 6.2. Broad levels of significance have been assigned to allow for the prioritisation of works to the four different structures assessed above, namely the Engine House (**23**), Plinth (**23**), Boiler House (**24**) and Boiler House Chimney (**25**). Given the limited number of structures within the Site, a level of Relative Significance has been assigned broadly to reflect a structures current condition, its historical and evidential value and its historical legibility within the context of the modern landscape setting. The assessment of Relative Significance ranges from Low (1), Medium (2), High (3) and Very High (4). On this basis, and for the purposes of prioritisation alone, the levels of relative significance have been assigned as follows:
- Engine House: Very High (4)
 - Plinth: Low (1)
 - Boiler House: Medium (2)
 - Boiler House Chimney: Very High (4)
- 6.3. However, it should be reiterated Holmbush Mine, Windsor Lane is a heritage asset of the highest significance, located within the Cornwall and West Devon Mining Landscape and separately designated as a Scheduled Monument and Grade II Listed Building.
- 6.4. The level of Relative Significance has been combined with the Condition Rating to derive the Priority Rating. The Priority Rating has been arrived at by multiplying the Condition Rating (1-4) with the Relative Significance (1-4), giving a potential range of 1 through 16. For the Site, Priority Ratings fall between 2 and 12 with the evolved prescriptive categories as follows:
- Low Priority 1 – 4
 - Medium Priority 5 – 9
 - High Priority 10 – 12

6.5. The key to the priority matrix developed by PCA Consulting Engineers is reproduced below as Table 1.

KEY	<u>Significance</u>				
		Low	Medium	High	Very High
<u>Condition</u>		1	2	3	4
Good/Stable	1	1	2	3	4
Medium	2	2	4	6	8
Poor	3	3	6	9	12
Very Poor	4	4	8	12	16

Table 1. Priority Matrix Key

Summary of results

6.6. In summary, all the structures were found to be suffering damage from unchecked vegetation growth, with destructive colonisation directly on structural elements and walls, as well as within and around their footprint. Hence, recommendations and costs are included for vegetation clearance from on and around the remains.

6.7. That said, moving forward with the management and conservation of the monument, and at the earliest opportunity, it is strongly recommended that a programme of regular vegetation clearance is instigated. Ideally, the structures along with their footprints and a surrounding buffer, should be kept clear of destructive vegetation growth. A buffer would allow the remains room to breathe and significantly benefit their ongoing conservation.

6.8. Following consultation between Historic England (Ann Preston-Jones, Heritage at Risk Officer), The Tamara Landscape Project (Gary Lewis, Senior Heritage Officer), PCA Consulting Engineers (Paul Carpenter, MICE Conservation Accredited Engineer) and Cotswold Archaeology (Clive Meaton, Heritage Consultant), it was agreed that a 5m buffer around the structures would provide the requisite conservation space. In addition, the broader area around the buildings should be regularly monitored for trees that may potentially collapse onto the standing remains. These may include trees that have died and/or are leaning precariously towards the buildings. Where and if identified these trees should be felled, without causing damage to the buildings.

-
- 6.9. Prior to the commencement of vegetation clearance, it is recommended that a detailed methodology is agreed with an appropriately qualified ecologist.
- 6.10. In addition to the clearance of unchecked vegetation growth, all the structures require extensive masonry repair, including localised rebuilding, consolidation and repointing. The principal recommended works include the following elements:
- Review the condition of masonry once vegetation clearance is complete to further assess and establish areas of defective stonework
 - Consolidate and locally repair wall heads
 - Repointing walls as appropriate
 - Rebedding of loose masonry
 - Locally repair stonework/brickwork and consolidate defective areas, including those of H&S concern
 - Replace truss and purlin roof structure
- 6.11. A summary transcription of the costed recommendations set out in order of priority is included below as Table 2. However, only total costs for each structure/building are shown. Individual item costs, with a breakdown identifying specific elements of vegetation clearance, masonry repairs, repointing, access works/scaffolding and other works are fully outlined in the report prepared by PCA Consulting Engineers.
- 6.12. It should also be noted that the budget costings provided are approximate and provisional and will need to be reviewed once a full scope of works has been agreed. In addition, no allowance has been made for vegetation cast away.
- 6.13. The full PCA Consulting Engineers report, including detailed costings and priority matrix are included as Appendix 1. This should be consulted for fuller detail.

Table 2: Costed and Prioritised Summary Table (to be consulted in conjunction with Appendix 1)

No.	Structure	Condition	Significance	Priority	Summary of Proposed Works	Anticipated Costs
23	Engine House	3 Poor	4 Very High	12 High	Extensive vegetation clearance on and around the structure. Review condition of remaining areas of roof structure and record, prior to removal. Further assess and establish areas of defective stonework. Consolidate and locally repair wall heads. Locally repair stonework/brickwork and consolidate/repoint defective areas including areas of H & S concern. Replace rotten timber lintels and ground beams. Provisional allowance for replacing the truss & purlin roof structure sufficient to support corrugated iron roof covering.	
24	Boiler House	4 Very Poor	2 Medium	8 Medium	Extensive vegetation clearance on and around the structure. Review and further assess areas of defective stonework. Locally repair stonework and consolidate/repoint defective areas including areas of H & S concern. Consolidate and locally repair wall heads, and fully 'weather'.	
25	Boiler House Chimney	2 Medium	4 Very High	8 Medium	Vegetation clearance on and around the structure. Review and further assess areas of defective stonework. Locally repair stonework/brickwork and consolidate/repoint defective areas including areas of H&S concern. Allow to rebuild top 12 courses of brickwork including flaunching and 'weathering' top of chimney.	
23	Plinth	2 Medium	1 Low	2 Low	Vegetation clearance on and around plinth, including cutting down trees. Locally rebed stones and consolidate stonework. Repoint open jointed stonework.	
Sub Total						
15% Contingency						
Total (Excluding VAT)						

Philosophy of Repair

- 6.14. In addition to the Costed and Prioritised Recommendations set out above (Table 2), it is recommended that a more general ethos to conservation priorities and desired outcomes is considered. Although a stated 'philosophy of repair' is generally more appropriate for a larger site, with multiple elements, the remains at Windsor Lane, Holmbush Mine would clearly benefit from this type of defined approach. Indeed, a well-considered 'philosophy of repair' would be important for helping assess future management and conservation priorities, especially once initial stabilisation works are completed.
- 6.15. Given likely finite resources and funds, combined with the ever present threats from vegetation and general weathering, it is suggested that those elements of the site that are best preserved, and the most readily legible within the modern landscape are targeted and prioritised for ongoing conservation and maintenance. However, by prioritising works to the most significant elements of the Site, in this instance the Engine House and Boiler House Chimney, it may be the case that there are insufficient funds left for stabilisation, and/or future maintenance works to the considerably more ruinous Boiler House. If this is likely to be the case, then early consideration should be given to allowing these remains to decline naturally, subject to health and safety considerations, without further sustained intervention. That said, if so, further detailed building recording is recommended, in the first instance, to help mitigate their potential future loss.
- 6.16. For Holmbush Mine, Windsor Lane, it seems that the most important factor to establish for future management is whether - when there is no clear ascendant Priority Rating - the level of significance, on balance, outweighs the condition of a structure, or, vice versa, given likely limited resources and funds.
- 6.17. Furthermore, if adequate resources and/or funds are secured, then a pre-emptive assessment of the approach to any proposed structural reinstatements should also be considered. The obvious example in this instance is the re-roofing of the Engine House, which would clearly benefit the long-term conservation of the building. However, should this come at the cost the cost of stabilising the surviving Boiler House ruins? This decision would best be arrived at through consultation between the landowner, Historic England and relevant stakeholders; then set out in a formalised 'philosophy of repair'.

-
- 6.18. However, in our opinion, at present, the upstanding remains form a coherent and readily legible group, and therefore, all surviving remains should be stabilised, before consideration is given to non-essential stabilisation works, such as the reinstatement of the Engine House roof. It should be noted though, that a preliminary cost is provided by PCA Williams for the replacement of the roof, on the basis that the expensive scaffolding element would already be in place for other essential stabilisation works. Should the replacement roof happen at a later date, then additional scaffolding/access costs would need to be considered.
- 6.19. In summary, the Site would clearly benefit from a formalised ‘philosophy of repair’, with identification of those elements/structures best suited for conservation, as opposed to those that might best serve the overall conservation of the Site by being allowed to decline naturally. The ‘philosophy of repair’ should be considered prior to agreeing the scope of proposed works to any specific element of the Site.

Heritage Constraints and Scheduled Monument Consent

- 6.20. The Site is legally protected as a Scheduled Monument, and as such, subject to the provisions of the Ancient Monuments and Archaeological Areas Act 1979, which controls works affecting Scheduled Monuments. It is predicted that most, if not all, of the recommended works that directly affect buildings and structures within the Site will require Scheduled Monument Consent (SMC). It is possible that historic building recording, or an associated watching brief with associated reporting may be required as a part of any SMC. However, given that the scope and/or extent of any such mitigation, at this point, is not known, no costs are provided.
- 6.21. Providing there are no sub-surface impacts, or potential to damage upstanding structures/features, then it is considered that general vegetation clearance from on, within and around structures and features would be permitted under Class 1 Scheduled Monument Consent of The Ancient Monuments (Class Consents) Order 1994. However, it is recommended that HE are consulted in the first instance, prior to any work being undertaken.
- 6.22. Further consents may be required, as the Engine House and attached building is Grade II Listed (HE Listing Ref: 1220770). Although SMC would normally take precedence, prior to the implementation of any structural repairs, conservation or general recommendations, relevant authorities and stakeholders should be consulted at the earliest opportunity.

Ecological Constraints

6.23. Appropriate ecological mitigation, pertaining to the proposed conservation and stabilisation works, is set out fully in Appendix 2: Preliminary Ecological Appraisal. This is summarised in Section 4: Summary of Ecological Survey Work. Estimated costs (provided at the time of writing) associated with the proposed ecological mitigation are also included within the Preliminary Ecological Appraisal. These are repeated below for ease of reference. All necessary ecological mitigations should be costed from available funds and undertaken, or put in place, prior to the commencement of Site works. No conservation or vegetation clearance works should be commenced on the Site without reference to the Preliminary Ecological Appraisal.

General Low Level Vegetation Clearance

Avoiding/Minimising Impacts to Dormice and Nesting Birds

6.24. Costing to provide onsite toolbox talk and orientation to dormice and breeding birds would be **£XXX** per site visit.

Avoiding Impact to Badgers and their Setts

6.25. Costing to provide onsite toolbox talk and orientation to badgers would be **£XXX** per site visit.

Clearance of Vegetation on Specific Structures

6.26. There is potential for roosting bats to be associated with several structures, and depending on the level of potential, one of two mitigation plans should be adopted. These are set out below in Table with their associated costs.

Building	Conservation Priority	Potential for Bats	Mitigation Plan	Costings
Boiler House Chimney	Medium	Moderate	3	WB ¹ - £XXX EM ² - £XXX
Engine House	High	High	3	WB - £XXX EM - £XXX
Boiler House	Medium	Negligible	1	-
Plinth	Low	Negligible	1	-

Table 3. Mitigation to be adopted during proposed works

¹ WB - close-inspection of buildings by a suitably qualified and licenced bat ecologist prior to removal of ivy

² EM - two bat emergence surveys completed in the bat active period (May to September) where evidence of bats is found during close inspection

6.27. The relevant associated mitigation plans are detailed below:

Mitigation Plan 1: Structures with negligible potential for roosting bats

1. No timing constraints to works
2. Vegetation removal, including ivy, can proceed with negligible risk to bats and would not require further mitigation for bats.

Mitigation plan 3 - Structures with moderate to high potential for roosting bats

1. Ideally completed in winter months when bats are less likely to be associated with the structures.
2. Cutting the base of ivy less than 1.5 metres above ground level to kill it can be completed at any time of the year following a toolbox talk by a suitably qualified ecologist explaining the protection afforded to bats and their roosts, and how to identify signs of bats.
3. Removal of ivy to be completed after close-inspection by a suitably qualified and licenced bat ecologist. This should be done in winter months when bats are less likely to be present.
4. If Ivy is found to conceal cracks or crevices with potential for roosting bats, or evidence of use by bats is found, bat emergence/re-entry surveys (EM) will be required to determine if bats are roosting in association with this structure. Mitigation would be developed following these additional surveys.

7. SUMMARY DISCUSSION

- 7.1. Holmbush Mine, Windsor Lane is legally protected as a Scheduled Monument (HE Monument Ref: 1020327). The Engine House and attached Chimney is also Grade II Listed (HE Listing Ref: 1220770). Furthermore, the Site is situated within the Cornwall and West Devon Mining Landscape World Heritage Site and is listed on the Heritage at Risk register, where it is described as being in deteriorating condition (Historic England, 2021).
- 7.2. The Boiler House, Engine House, and attached chimney at Windsor Lane powered mid to later 19th century winding operations. These were part of the larger Holmbush Mine complex, which focussed on copper, lead and arsenic production during the 19th century. In heritage terms, the 19th century mining remains at Holmbush Mine, Windsor Lane are considered to be of national, if not international significance, and as such, the Site is protected as a designated heritage asset.
- 7.3. In 1998 an archaeological assessment was prepared for the Holmbush Mine complex, encompassing both the Windsor Lane and Hitchen's Shaft sites (Buck, C. 1998). This was undertaken as part of a Land Reclamation Scheme of Safety Works. The current report presents an update to the reported condition assessment and management recommendations contained in the earlier work, specifically in respect of the Windsor Lane Site. The current work has included and been informed by a drone and photographic survey with resultant 3D modelling, a phase 1 ecological and bat survey, and separate archaeological and structural condition surveys.
- 7.4. The reported outputs in Section 5 comprise an updated Site Gazetteer for the relevant elements identified in 1998, with their original identifying references retained (**23 – 25**). These are as follows:
- Engine House and Plinth (**23**)
 - Boiler House (**24**)
 - Boiler House Chimney (**25**)
- 7.5. For each structure the following information has been included:
- Summary of description and condition provided in 1998
 - Assessment of current condition
 - Management recommendations

7.6. The desk-based assessment and reported field surveys have in turn allowed for the production of costed and prioritised recommendations, targeted at the specific structures on Site. These have been derived from a consideration of heritage significance set against an assigned condition rating. The level of significance has been assigned broadly to reflect a structures current condition, its historical and evidential value and its historical legibility within the context of the modern landscape setting. The derived Priority Rating has then been arrived at by multiplying the Condition Rating (1-4) with the Relative Significance (1-4), giving a potential range of 1 through 16. The following priorities were concluded:

- High Priority - Engine House (**23**)
- Medium Priority – Boiler House Chimney (**25**)
- Medium Priority – Boiler House (**24**)
- Plinth (**23**)

7.7. The principal threat to the Site was found to be unchecked vegetation growth and general deterioration due to weathering and lack of maintenance. Of most immediate concern were the trees, ivy and shrubs, which have widely colonised the footprint of the buildings and their surroundings, as well as walls and wall heads. In general, tree, shrub and ivy roots are likely to be undermining the structural integrity of the upstanding masonry and footings.

7.8. Management recommendations for the specific structures and features are set out in the updated Site Gazetteer, Section 5. These have been informed by the Phase 1 Ecological and Bat Survey, the results of which are summarised in Section 4.

7.9. Further detail, including budget costings for recommended works are included in Section 6: Costed and Prioritised Recommendations, with summary findings set in out in Table 2. The main forms of recommended works include the following:

- Vegetation clearance
- Review the condition of masonry once vegetation clearance is complete to further assess and establish areas of defective stonework
- Repoint walls and wall heads for consolidation
- Rebuild and consolidate localised masonry collapses or failures
- Rebed loose masonry
- Cap wall heads
- Replace roof structure

-
- 7.10. Within Section 6, costs are also included for vegetation clearance within and on buildings. In addition, indicative costs, are included for recommended ecological mitigation, including potential briefing visits, watching briefs and bat emergence surveys. It has also been recommended that a 5m buffer around the footprint of the structures is cleared of vegetation threats, and maintained clear, so that the remains are given adequate room to 'breathe'.
- 7.11. Prior to any specific works being undertaken, it is also recommended that a formal 'philosophy of repair' is considered within the context of limited funds and/or resources. This would identify those elements/structures best suited for conservation, as opposed to those that might best serve the overall preservation of the Site by being allowed to decline naturally. Such an approach would mean that funds and resources could be better directed across the Site and thereby allow for more sustainable conservation of this designated heritage asset overall.
- 7.12. Taken together, the recommendations set out in this 'Costed and Prioritised Proposal for Capital Works' are designed to help arrest the declining condition of the four main surviving structural elements of Holmbush Mine, Windsor Lane, and to establish a targeted and appropriate management framework within which the Site can be stabilised. The work has also sought to integrate archaeological and ecological objectives wherever possible and to optimise the potential for enhancing the ecological resource through sympathetic management of the nationally important and statutorily protected historical remains.

8. REFERENCES

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**APPENDIX 1: PCA CONSULTING ENGINEERS: LIMITED
STRUCTURAL SURVEY REPORT: HOLMBUSH MINE, WINDSOR
LANE, KELLY BRAY, CORNWALL**



LIMITED STRUCTURAL REPORT

Holmbush Mine Kelly Bray Cornwall



**For: Cotswold Archaeology
and
The Tamara Landscape Partnership**

Our ref: Report/16287

December 2022

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- D Budget costing for works

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Introduction

Holmbush Mine is a site comprising many buildings and structures. This report looks at the four structures surviving on the Windsor Lane site, also titled site AC2. It is designated as a scheduled monument with the main building within this site, the Engine House, Grade II Listed.

For continuity with other reports produced for the site, the buildings have retained the reference numbers assigned in the 1998 Archaeological Assessment.

PCA has been commissioned to produce a report in collaboration with Cotswold Archaeology on the Engine House and Plinth, Boiler House and Boiler House Chimney, at the Holmbush Mine Windsor Lane Scheduled Monument.

A limited visual survey of all accessible areas of the assigned buildings was undertaken to produce this report. No destructive or intrusive investigations have been carried out. This report contains observations of the buildings' current condition, recommendations for future work, and approximate budget costings for suggested work.

Photographs taken by PCA Consulting and Aerial-Cam have been used within the report to illustrate specific areas or issues as identified in this report.

A matrix was created by using the level of importance allocated as in the report created by Cornwall Archaeology (2022), and by assigning a level of general condition from 1 to 4, with 1 being good and or stable and 4 being very poor. This can be found in Appendix B

It should be recognised that the 'philosophy of repair' to ruinous elements should be considered in more detail for each structure prior to finally agreeing the scope of works required.

In addition, the methodology for vegetation clearance should be further discussed and agreed, as required, with the Ecologists.

Site 23a Engine House
Condition: 3, Significance: 4



Figure 23.01 – North elevation of Engine House.

- 23a.01 1998 Recommendations:
Ivy and rubble removal followed by further structural surveys. Consolidation and repair works. Lintels replaced and collapsed stonework above rebuilt. Complete repointing likely not necessary. Wall capping required to weatherproof them. Re-timber and re-slate entire building.
It is apparent that no repair works have been undertaken since the 1998 survey.
- 23a.02 Current condition:
The Engine House measures approximately 8.25m x 6.00m. This building is Grade II Listed and was likely constructed in the 1850s, but may have been extended afterwards to accommodate new machinery.
It is heavily covered in ivy, making a proper assessment of its structural condition difficult. The engine house has been classed as in poor

condition due to areas of structural instability, high levels of vegetation growth, and areas of loose stone/brickwork. It is clear that without intervention, this structure will continue to deteriorate.

The following reviews the condition of each elevation and the roof structure in greater detail.

23a.03 West Elevation

External

This elevation is very heavily covered with ivy growth. There are two ground level arched openings with brick/stone reveals, with the reveals to the central pier being splayed. These two lower-level openings are just visible in figure 23.02. The central opening is similarly brick arched, as is the probable opening above this central one, but the heavy ivy covering makes this difficult to verify. The original timber lintels to the northern opening have rotted out. The masonry appears to be generally reasonably stable; however, there are several original roof timbers hanging down from the top of the wall, some of which are potentially unsafe. There are also loose slates.

Internal

As viewed internally, it is evident that there is a further opening in this elevation with an additional small opening above, as shown in figure 23.03. These openings are above and to the south of the central high-level arched opening, though the larger of the two openings has been blocked with timber panels. The lintel to the larger, blocked opening appears to have rotted out on the south bearing, but the level of ivy growth makes assessment of the smaller opening difficult. There are loose or missing bricks in the internal reveals to most openings in this elevation, with more missing from the two lower openings; as an example see 23.04.



Figure 23.02 – West elevation showing two lower-level openings



Figure 23.03 – Boarded opening in west elevation



Figure 23.04 – Loose and missing bricks in reveals.

23a.04 North Wall

External

This wall (shown in figure 23.01) is also extensively covered with ivy, making structural assessment difficult.

A number of original timbers have rotted out at low level, with voids in the stonework local to the central opening.

The external lintel over the lowest opening is missing, shown in figure 23.01. The internal lintel, whilst still in place, is significantly rotted. This leaves the external veneer of stonework largely unsupported, and support to the stonework above the lintels is compromised.

The opening above the lintel includes a brick arch which extends the full width of the wall. The external part of the arch is infilled with masonry, probably originally supported on timber lintels. The internal lintel has since rotted out, leaving the masonry panel and opening unsupported (shown in 23.05). This could likely fall out at any time, and without intervention, elements of this wall could further collapse and fail.

Internal

As outlined previously, the internal lintel to the low-level opening has rotted bearings, affecting the stability of the stonework. In addition to this, the west reveal to this opening is potentially unstable, with a void to the west through the whole wall thickness. The lintel bearing and hole in the wall can be seen in 23.06. Local to the internal crown of the central

arched opening are some loose bricks, which have dropped, shown clearly in figure 23.05.

At a high level internally, vegetation is taking hold, with trees growing from wall heads.



Figure 23.05 – Loose masonry local to arch crown



Figure 23.06 – Rotting internal lintel and hole through wall.

23a.05 East Elevation

External

There is a heavy ivy covering over the whole of this elevation. The arrangement of the openings on this elevation is quite complicated but they are mostly externally obscured by ivy. At the intermediate level, there is one opening towards the southern end with three substantial timber lintels appearing to be in fair condition, seen in figure 23.07. South of that, there is a smaller opening with timber lintels which seem to be largely in place. Above this, there is an arched central opening. This arrangement is also likely to relate to the opposite west side, but confirming opening positions and assessing their condition is not possible due to the extensive ivy growth.

Internal

As is often normal practise for engine house construction, the wall reduces in thickness at the approximate height of the north wall.

The lintels to the intermediate opening extend towards the north and stop below the central arched window with brick reveals and brick arch; this bearing can be seen in figure 23.08.

Figure 23.08 also shows the layout of openings internally visible in this elevation, with joist pockets evident at first floor level and further voids higher up over the shelf, though these are hard to determine due to ivy growth.

Towards the southern end of the building, part of the first floor remains with three joists and some of the original boards still in place, as seen in figure 23.09. These joists are in varying condition with one joist reasonably intact, one appears to have been cut off and one is mostly rotted.

Ivy is taking over at a high level, affecting the wall heads and displacing slates and timbers.



Figure 23.07 – East elevation intermediate opening



Figure 23.08 – East elevation openings, joist pockets, and lintel bearing for south intermediate level opening.



Figure 23.09 – Internal of east elevation intermediate opening with timber lintels.

23a.06 South Elevation (with Chimney)

External

There is a heavy covering of ivy, preventing assessment of the external elevation. The chimney is attached to this elevation, the assessment for which can be found in the section for Site 25.

Internal

There is also heavy internal ivy growth at the upper levels of the structure.

A hole has been knocked through from the internal of the engine house (figure 23.10) into the base of the chimney, with no support to the stonework evident.

Just above first floor, there is a timber ground beam which has rotted to the western end, leaving stonework unsupported.

At the next level, there are four recessed voids with timber lintels shown in figure 23.11. The lintels to these voids appear to be in a fair condition, though assessment is difficult due to ivy growth. Generally, the masonry to the internal face of this elevation seems to be in a reasonable condition.



Figure 23.10 – Internal of south elevation and remaining floor structure.



Figure 23.11 – Four high-level recessed voids.

23a.07 Roof Structure

The roof pitches from east to west and was originally of a truss and purlin configuration. The 'A'-frame timber trusses included a half-lapped apex joint, collar and tie, with a ridge and two intermediate purlins per slope bearing off them. The roof structure that remains can be seen in figure 23.12 and consists of one principal A-frame truss at the southern end with purlins and some common rafters. Towards the north of the building the roof has failed completely. On the parts of the roof still remaining, some original roof slates are still in place on both east and west sides, with a greater number on the east side. Some of these could slip and drop at any time, with large slates and rotted roof timbers hanging out over the ivy, such as in figure 23.13. There are fallen slates and timbers evident on the engine house floor, some of which are shown in figure 23.14.



Figure 23.12 – Remaining roof structure.



23.13 Timbers and slates hanging from walls



Figure 23.14 – Fallen roof slates on the floor of the Engine House

- 23a.08 Recommendations:
- Clear site as necessary to provide safe access to erect full scaffold around the building, (including the chimney)
 - Carefully clear ivy and vegetation and control
 - Review condition of remaining elements of the truss and purlin roof structure
 - Remove loose timbers and slates and record
 - Consolidate and locally rebuild wall heads where affected by vegetation ensuring they are fully 'weathered'
 - Following clearance of vegetation, condition of stonework to be further assessed
 - Allow to infill voids and locally rebuild and repoint affected areas. Extent to be reviewed
 - Replace rotten lintels and timber grounds and make-good affected stonework
 - Repoint open jointed stonework and those areas affected by ingrowing ivy and vegetation
 - Consideration to be given to reconstructing the truss and purlin roof structure, modelling on the existing and re-covering the building in corrugated steel sheeting
 - Monitor condition and control vegetation

Site 23b**Plinth****Condition: 2, Significance: 1****Figure 23.13 – Plinth with vegetation**

23b.01

1998 Recommendations:

The plinth was included in the 1998 survey for Site 23a, the Engine House. See previous for Site 23 a, for recommendations following the 1998 report.

It is apparent that no repair works have been undertaken since the 1998 survey.

23b.02

Current condition:

As figure 23.13 shows, this is a small structure and only measures approximately 2m x 2.5m.

This structure was likely built at the same time as the Engine House in the 1850s.

The plinth is classed as in fair condition, despite the high level of vegetation covering, due to the structure being reasonably stable.

The plinth is mostly constructed of partially coursed granite, built with a lime mortar which includes a course gritty sand. There are extensive areas of open joints in the stonework, as seen in figures 23.13 & 23.14.

There are various trees surrounding the plinth and more growing from the top, clearly shown in figure 23.15. Otherwise, the structure is heavily covered in ivy and vegetation with the sides largely obscured. However, despite the vegetation growth, this structure appears to be reasonably stable.

23b.03 Recommendations:

- Cut down trees and clear vegetation from around the structure
- Clear ivy and vegetation from the stonework
- Locally rebed loose stones and consolidate stonework where required
- Repoint open jointed stonework
- Monitor condition and control vegetation



Figure 23.14 – Potential high-level opening on south side.



Figure 23.15 – Trees on western side of plinth.

Site 24 **Boiler House**
Condition: 4, Significance: 2



Figure 24.01 – Boiler House Internal.

24.01 1998 Recommendations:
 Vegetation, rubble, and tree clearance on house floor. Walls require vegetation clearance and stability check.

It is apparent that no repair works have been undertaken since the 1998 survey.

24.02 Current condition:
 The Boiler House measures 2.8m x 19m and, as with the other structures, was probably constructed in the mid-19th century. This building has been classified as in very poor condition due to the generally ruinous condition and the many areas of structural instability.

This structure is very ruinous, with lots of the walls either partially or completely collapsed, and the roof is not present (see figure 24.01). There are elements of the building still standing, but collapse of elements of the ruin is imminent without intervention. There are some areas where the veneer has failed and stonework collapsed, for example, at the north end as in figure 24.02.

Whilst some vegetation had been cleared to a degree for the survey, it is still heavily overgrown with plants including ivy, holly, established shrubs, and small trees growing out of the walls, also shown in figure 24.02.

Internally there are more areas of unstable stonework, such as the internal veneer for the pier at the north end, which is about to fail, as shown in figure 24.03.

The internal of the building is also heavily covered in vegetation, and there are trees growing within the building, including a holly bush growing from a wall head.

24.03

Recommendations:

- Clear site as necessary to provide safe access and to erect low level scaffold
- Carefully clear ivy and vegetation and control
- Following clearance of vegetation, condition of stonework to be further assessed
- Allow to infill voids and locally rebuild partially collapsed sections of wall. Extent to be reviewed to ensure walls are stable
- Consolidate and locally rebuild wall heads where required, ensuring they are fully 'weathered' and repointed as a 'ruin'
- Replace rotten lintels and timber grounds and make-good affected stonework
- Repoint open jointed stonework and those areas affected by ingrowing ivy and vegetation
- Monitor condition and control vegetation.



Figure 24.02 – Collapsed brick quoining and stonework with trees growing from wall head.



Figure 24.03 – Failed veneer at north end.

Site 25 **Engine House Chimney**
Condition: 2, Significance: 4



Figure 25.01 – Full length of chimney with heavy vegetation covering.

- 25.01 1998 Recommendations:
 Ivy removal. Repoint uppermost brick section of chimney with the opportunity to install a lightning conductor at the same time. Consider inserting a grille at the flue base. A more detailed structural survey to be carried out after vegetation removal.

It is apparent that no repair works have been undertaken since the 1998 survey.

- 25.02 Current condition:
 The Engine House Chimney measures approximately 3m in diameter at its base and was likely constructed in the 1850s, along with the Engine House and Plinth.

The chimney has been classified as in fair condition due to the apparent general reasonable stability, despite the heavy covering of vegetation shown in figure 24.01.

External

The lower levels of the chimney are built from stone, which transitions to brickwork for the upper levels, though the transition point is not clear, due to the heavy vegetation covering. The upper brick levels

which can be seen appear to be very open jointed (shown in figure 25.02), and it is probable that a lot of the high-level brickwork is loose. There is heavy ivy growth over the full extent of the chimney, though less at the upper levels. There is also evidence of old roots at the higher levels hanging out of the walls. Despite the extensive vegetative covering, the chimney appears to be stable and reasonably true to line.

Internal

Internally, the chimney still seems relatively true to line, as seen in figure 25.03. There is no support evident over the hole made from the engine house through to the internal of the chimney.

There is also vegetation growth at a high level internally, clearly shown in figure 25.04.

25.03

Recommendations:

- Clear site as necessary to provide safe access to erect full scaffold around the chimney
- Carefully clear ivy and vegetation and control
- Following clearance of vegetation, condition of stonework and brickwork to be further assessed
- Allow to infill voids and locally rebuild and repoint affected areas of stonework. Extent to be reviewed
- Repoint upper courses of brickwork, allowing to rebuild potential 12 courses of brickwork using reclaimed bricks
- Ensure wall head is well 'weathered'
- Stabilise further areas of loose brickwork/stonework and repoint as required
- Monitor condition and control vegetation



Figure 25.02 – Open jointed brickwork at upper levels of chimney



Figure 25.03 – Chimney internal showing condition and high-level vegetation



Figure 25.04 – Chimney head and open jointed brickwork.

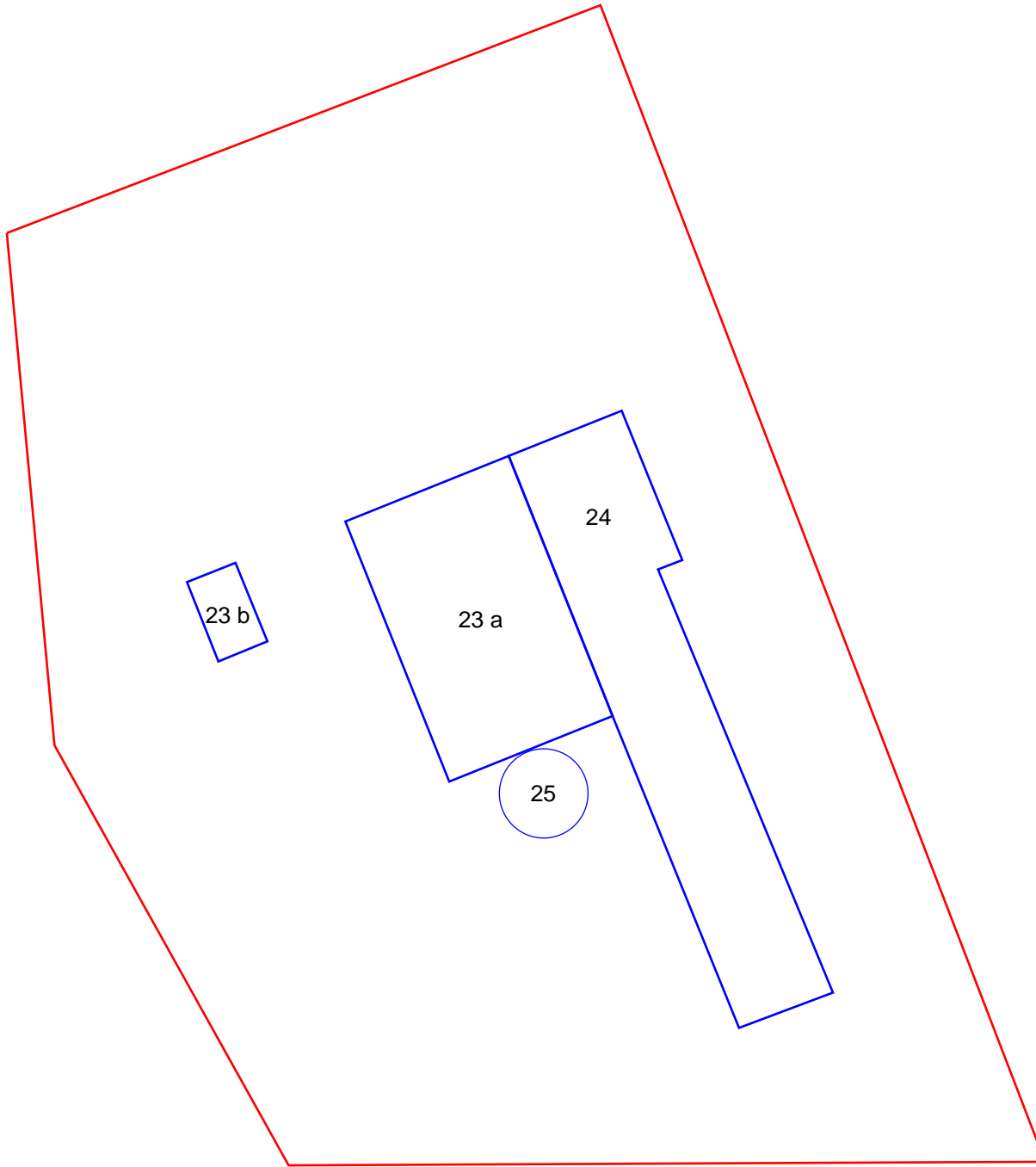
Conclusions

- i. All the structures surveyed are suffering from the extensive vegetation growth which has significantly affected the condition of the masonry.
- ii. Vegetation clearance and the methodology of this work should be agreed with an Ecologist prior to the commencement of works.
- iii. It important that a management plan for controlling vegetation and carrying out remedial work is developed going forward. This should include appropriate monitoring of structures.
- iv. All the structures require extensive masonry repair, including locally rebuilding elements, consolidation and repointing as generally described for each structure.

Reservations

As instructed, we have only carried out a limited survey of the various structures and have not inspected the foundations, or structures which we were not instructed to review. In addition, we have not inspected woodwork or other parts of the structures which were covered, unexposed or inaccessible and are therefore unable to report that any such part is free from defect. As a result, this report does not in any way constitute or can be construed as constituting a representation or warranty, actual or implied, regarding such parts.

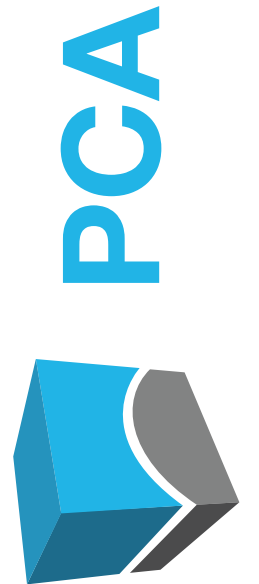
APPENDIX A
KEY PLAN



**HOLMBUSH MINE
SITE AC2**


KEY PLAN

NOT TO SCALE



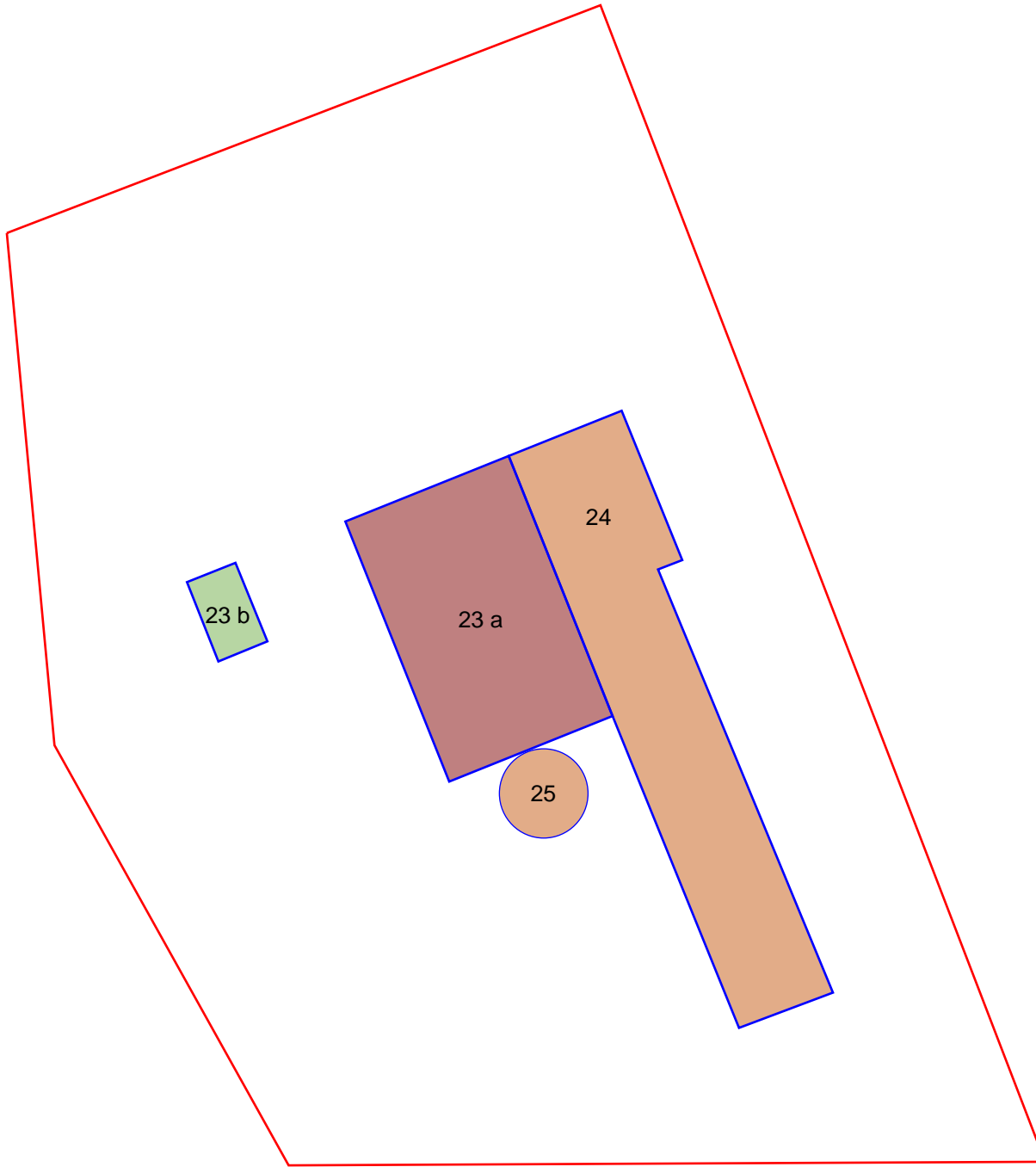
APPENDIX B
PRIORITY MATRIX




PRIORITY MATRIX

No.	Structure	Condition	Significance	Result	Proposed Works/Recommendations
Site 23 a	Engine House	3	4	12.0	Vegetation clearance. Consolidate and repair stonework. Replace rotten lintels. Provisionally allow for new roof structure and covering. Make good areas of H+S concern.
Site 23 b	Plinth	2	1	2.0	Vegetation clearance on and around plinth. Consolidate and repair stonework.
Site 24	Boiler House	4	2	8.0	Vegetation clearance. Consolidate, repair and locally rebuild stonework. Make good areas of H & S concern.
Site 25	Engine House Chimney	2	4	8.0	Vegetation clearance. Consolidate and repair stonework. Repair and rebuild brickwork local to top of chimney.
					

KEY	Significance	Low	Medium	High	Very High
		Condition	1	2	3
Good/Stable	1	1	2	3	4
Medium	2	2	4	6	8
Poor	3	3	6	9	12
Very Poor	4	4	8	12	16

APPENDIX C
KEY PLAN HIGHLIGHTING PRIORITY AREAS

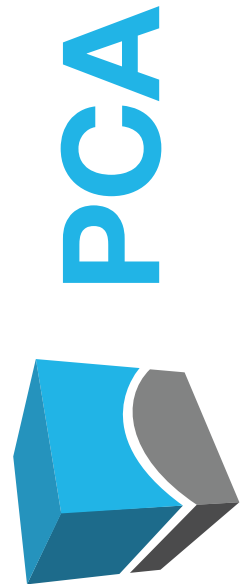


Priority	
	10 - 12
	5 - 9
	1 - 4

**HOLMBUSH MINE
SITE AC2**

**KEY PLAN
HIGHLIGHTING
PRIORITY AREAS**

NOT TO SCALE



APPENDIX D
BUDGET COSTING FOR WORKS

BUDGET COSTING FOR WORKS

Building Reference	Summary of Works	Structure	Vegetation Clearance		Masonry Repairs		Repointing		Access Works/Scaffolding		Other Works		Sub-totals
			3 man days @£	Cost	2 man days @ £	Cost	2 man days @ £	Cost	Budget	Cost	Description	Budget	
23 a	Extensive vegetation clearance on and around the structure. Review condition of remaining areas of roof structure and record, prior to removal. Further assess and establish areas of defective stonework. Consolidate and locally repair wall heads. Locally repair stonework/brickwork and consolidate/repoint defective areas including areas of H & S concern. Replace rotten timber lintels and ground beams. Provisional allowance for replacing the truss & purlin roof structure sufficient to support corrugated iron roof covering.	Engine House	7	£	20	£ 1	20	£	£	£	Materials including oak lintels, mortar, new roof structure & covering. Further assessment of stonework condition. <i>Total est. new roof cost inc labour = £25,000</i>	£	£
23 b	Vegetation clearance on and around plinth, including cutting down trees. Locally rebed stones and consolidate stonework. Repoint open jointed stonework.	Plinth	0.5	£	2	£	2	£	£	£	Materials	£	£
24	Extensive vegetation clearance on and around the structure. Review and further assess areas of defective stonework. Locally repair stonework and consolidate/repoint defective areas including areas of H & S concern. Consolidate and locally repair wall heads, and fully 'weather'.	Boiler House	3	£	10	£	10	£	£	£	Materials & further assessment of stonework condition.	£	£
25	Vegetation clearance on and around the structure. Review and further assess areas of defective stonework. Locally repair stonework/brickwork and consolidate/repoint defective areas including areas of H & S concern. Allow to rebuild top 12 courses of brickwork including flaunching and 'weathering' top of chimney.	Engine House Chimney	4	£	10	£	10	£	£	£	Materials & further assessment of stonework condition.	£	£
TOTAL EXCLUDING VAT				£		£		£		£		£	£
15% CONTINGENCY													£
NETT TOTAL													£
GROSS TOTAL including VAT													£

RESERVATIONS - These budget costs are approximate and provisional, and should be reviewed following the agreement of the full detailed scope of works. No allowance has been made for vegetation cart away, and the detailed methodology of vegetation clearance should be agreed with the Ecologist



APPENDIX 2: WESTERN ECOLOGY: PRELIMINARY ECOLOGICAL APPRAISAL, HOLMBUSH MINE ENGINE HOUSE, WINDSOR LANE, KELLY BRAY, CORNWALL

Preliminary Ecological Appraisal
Holmbush Mine, Cornwall
November 2022

A report by

Chris Ayre BSc (Hons)

Report details

Site name: Holmbush Mine
Grid reference: SX 36113 71929
Survey date: July 18th 2022
Report date: 11th November 2022
Report author: Chris Ayre BSc (Hons)

Report reference: WOR-3181

Declaration of compliance

BS 42020:2013

This study has been undertaken in accordance with British Standard 42020:2013 Biodiversity, Code of practice for planning and development.

Code of Professional Conduct

The information which we have prepared is true and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

Validity of survey data and report

The findings of this report are valid for 12 months from the date of survey. If work has not commenced within this period, an updated survey by a suitably qualified ecologist will be required.

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1. Introduction

Western Ecology has been commissioned to complete a Preliminary Ecological Appraisal of land known as Holbush Mine, near Kelly Bray in Cornwall.

1.2. Survey aims

The survey and this report identify features of conservation importance that could constitute a constraint to the proposals for this site. Where appropriate, recommendations for impact avoidance, mitigation and post-development enhancement are made to ensure compliance with wildlife legislation and relevant planning policy.

This survey has been prepared in accordance with the 'Guidelines for Preliminary Ecological Appraisal' produced by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017).

1.3. Site location

The land surveyed is an historic mining area to the northeast of Kelly Bray in Cornwall.

2. Survey methodology

2.1. Desktop survey

The desktop survey collated existing biological records for the site and adjacent areas, and identified any nature conservation sites that may be affected by the proposals. This comprises an important part of the assessment process, providing information on ecological issues that may not be apparent during the site survey.

Consultees for the data search included:

- Environmental Records Centre for Cornwall and Isles of Scilly provided biological records for protected/notable species and non-statutory sites within 1 km of the site.
- Natural England - GIS dataset of SSSI Impact Risk Zones, statutory nature conservation sites and Ancient Woodland.

Species data was examined for protected and notable species records. An assessment was then made, based on known habitat preferences, as to whether these species might be present within the site and how they might be affected by the proposal.

The location of nature conservation sites was examined to determine their ecological and landscape relationships with the proposed site. An assessment was then made of how the sites may be affected by the proposal, taking into account these relationships, and the species and/or habitat types for which the nature conservation site was chosen.

SSSI Impact Risk Zones are areas where the proposed planned change to the environment could either create significant damage to a local SSSI or might require additional planning and consultation in order to avoid impacting such sites. The assessments are made according to the particular sensitivities of the features for which the SSSI is notified and specifies the types of development that have the potential for adverse impacts.

In compliance with the terms and conditions relating to its commercial use, the full desk study data is not provided within this report.

2.2. Field survey

A Preliminary Ecological Appraisal of the site was completed by Chris Ayre BSc (Hons) on 18th July 2022 between 09:30am and 11:00am with an air temperature of 27°C, a 7mph easterly winds, with clear skies.

Habitats were classified using the Phase 1 Habitat Survey methodology developed by the Joint Nature Conservation Committee (JNCC, 2010) and modified by the Institute of Environmental Assessment (IEA, 1995). The main plant species were recorded, and broad habitat types mapped. Habitats encountered are described within the Results section, with a map included within the report. Plant species were identified according to Stace (1997). A search for potential access points and cavities capable of providing a roosting space for bats, was made as well.

This survey method complies with guidelines produced by the Bat Conservation Trust (Collins, 2016).

2.3. Method for valuation of habitats

The ecological value of habitats present is provided in line with Guidelines for Ecological Impact Assessment (CIEEM, 2016), and those which are important in terms of legislation or policy are identified. Table 1 summarises this information and details the extent of each habitat recorded here.

The nature conservation value, or potential value, of the habitat is determined within the following geographic context:

- International importance (e.g. internationally designated sites such as Special Areas of Conservation, Special Protection Areas, Ramsar sites);
- National importance (e.g. nationally designated sites such as Sites of Special Scientific Interest or species populations of importance in the UK context);
- County importance (e.g. SNCI, habitats and species populations of importance in the context of Cornwall);
- Local importance (e.g. important ecological features such as old hedges, woodlands, ponds);
- Site importance (e.g. habitat mosaic of grassland and scrub which may support a diversity of common wildlife species);
- Negligible importance. Usually applied to areas such as built development or areas of intensive agricultural land.

The examples are not exclusive and are subject to further professional ecological judgment.

2.4. Survey constraints

All areas of the site were readily accessible. Although some plant species would have not been visible during the survey period, within such a small, simple site comprising common and widespread habitat types, the timing of this survey is not a significant constraint to a robust initial site assessment.

It should be noted that habitats, and the species they may support, change over time due to natural processes and because of human influence. In line with current guidelines, the survey on which this report is based is valid for two years, after which time it will need updating. This report is valid until 18th July 2023.

2.5. Study area

The study area for the desktop survey is within 1km. The study area for the Preliminary Ecological Appraisal was the footprint of the proposed development, hereafter referred to as the 'Site', and its immediate boundaries. This is the area included within the line described as "Survey area" within the legend of Map 1.

3. Results

3.1. Site description

The Site comprises areas of woodland and scrub with some scattered trees. The remnants of several built features were present within the site.

3.2. Phase 1 habitats

Habitats have been classified using the Phase 1 Habitat Survey methodology and are described below and detailed in Map 1. Habitats which are important in terms of legislation or policy are identified and the extent of all habitats associated with the survey area is given in Table 1. Plant species that characterise each of these habitats are identified, although this is for descriptive purposes, and comprehensive inventory is not provided.

Semi-natural broadleaved woodland

Woodland borders the northern and western edges of the site. The tree coverage comprises of mature and semi-mature trees, with scattered understory species. Species include Pedunculate oak, ash, sycamore, harts tongue fern, hawthorn, nettles, male fern, ivy, hazel, and bramble. Whilst not encroaching too much into the site, should any vegetation works take place within the site, mitigation is required to prevent any accidental damage to this habitat.

Semi-natural broadleaved woodland is a Habitat of Principal Importance (JNCC and Defra, 2012) and Local Biodiversity Action Plan Priority Habitat (CBI, 2011).



1. Woodland habitat encroaching into the site

Buildings

Part of the mining buildings remain in situ, with the Engine House and chimney being most prominent. Other building remnants, including the Boiler House and the Plinth, are little more than some stone walls, flooring and rubble. Much of the stonework is heavily covered in ivy,

with species such as bramble, nettles, elder, hazel, male ferns, harts tongue fern, red campion, hawthorn, nettles, ash saplings and ground elder growing at the base or emerging from it.



2. Engine House and chimney

Scrub

In the east and south of the site, thick scrub is dominated by bramble, nettles, ground elder, male fern, ivy, red campion, hawthorn, sycamore, hazel and marsh valerian. Some of the scrub is butting up against the building remnants.



3. Scrub on east of site

Scattered hazel stands

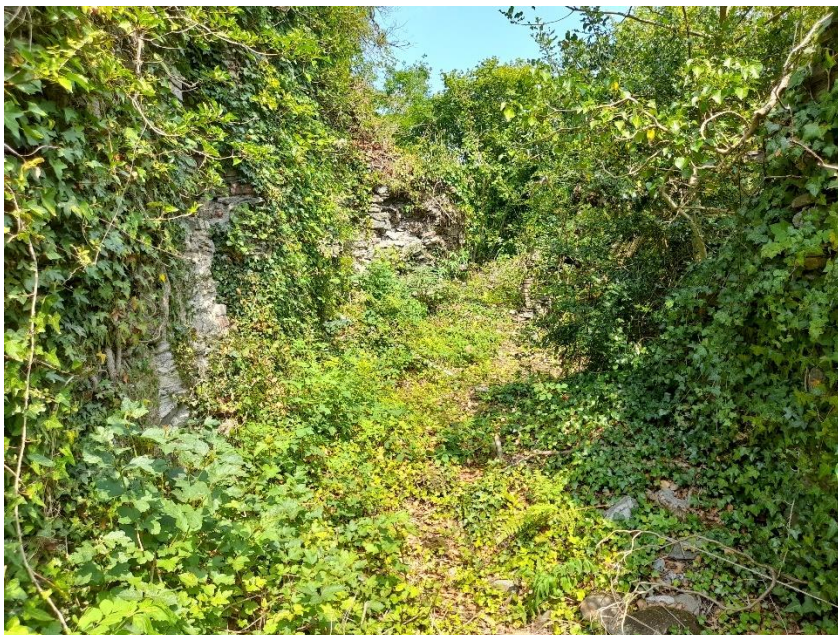
On the northern extent of the site, there is a line of hedgerow shrubs which is running along a post and wire fence. It doesn't form a hedgerow, as there are clear gaps between each plant. Hazel stands dominate with other species such as bramble, elder, nettles, ivy and male ferns growing at their base.



4. Hazel strip on fence line

Tall Ruderal

Some scattered ruderal plants are growing within the building footprints and around the edge of the site. Wood chippings from scrub clearance at the base of the buildings has suppressed much of the growth of some emergent species, which include male fern, red campion, nettles, marsh valerian, hogweed, ground elder and ivy.



5. Ruderal growth within building footprints

3.3. Desktop survey

The biological records search found a number of notable species within 1 km of the Site. Due to the broad scale of many records, it is not possible to determine if they relate to the Site.

Table 2. Notable biological records within 1km

Taxon	Common name	Number of records
Amphibian	Common Frog	4
	Common Toad	2
	Palmate Newt	3
	Badger	1
	Brown Long-eared	5
	Brown Rat	2
	Common Pipistrelle	2
	Eastern Grey Squirrel	29
	Eurasian Common Shrew	3
	Eurasian Pygmy Shrew	1
	European Rabbit	28
	Greater Horseshoe	2
	Harvest mouse	1
	Hazel Dormouse	1
	House mouse	1
	Lesser Horseshoe	11
	Otter	4
	Polecat	1
	Roe Deer	3
	Soprano Pipistrelle	2
	Stoat	2
	Weasel	5
	West European Hedgehog	27
Whiskered Bat	7	
Birds	Blackbird	53
	Blue Tit	51
	Brambling	7
	Bullfinch	14
	Buzzard	4
	Carrion Crow	4
	Coal Tit	45
	Collared Dove	7
	Dunnock	37
	Fieldfare	2
	Goldcrest	1
	Goldfinch	8
	Golden Plover	1
	Great Spotted Woodpecker	6
	Great Tit	41
	Greenfinch	12
	Herring Gull	3
	House Martin	2
	House Sparrow	25
	Jackdaw	30
	Jay	19
	Kestrel	1

	Magpie	43
	Mistle Thrush	2
	Nuthatch	22
	Pied Wagtail	3
	Redwing	3
	Reed Bunting	1
	Robin	53
	Rook	4
	Sedge Warbler	1
	Siskin	6
	Song Thrush	33
	Sparrowhawk	1
	Starling	47
	Stock Dove	6
	Swallow	1
	Tawny Owl	1
	Treecreeper	4
	Tree Pipit	1
	Woodpigeon	11
	Wren	6
	Yellowhammer	1
Fern	<i>Asplenium obovatum subsp. lanceolata</i>	2
Flatworm	<i>Australoplana sanguinea</i>	2
Reptiles	Grass Snake	8
	Slow Worm	6
Invertebrates	August Thorn	2
	Autumnal Rustic	18
	Beaded Chestnut	54
	Blood-vein	12
	Brindled Beauty	17
	Broom Moth	9
	Buff Ermine	58
	Centre-barred Sallow	1
	Cinnabar	2
	Dark-barred Twin-Spot Carpet	1
	Dot Moth	18
	Dusky Brocade	3
	Dusky Thorn	14
	Flounced Chestnut	23
	Galium Carpet	1
	Garden Tiger	6
	Ghost Moth	5
	Green-brindled Crescent	26
	Grey Dagger	4
	Harlequin Ladybird	2
	Heath Fritillary	1
	Hedge Rustic	12
	Knot Grass	14
	Larch Case-bearer	3
	Lily Beetle	1
	Mottled Rustic	2
	Neglected Rustic	1
	Oak Hook-tip	1
	Pied Grey	4
	Powdered Quaker	15
	Rosy Rustic	67

	Ruddy Rustic	19
	Ruddy Streak	19
	Rustic	12
	Shoulder-striped Wainscot	11
	Small Heath	2
	Small Pearl-bordered Fritillary	1
	Small Square-spot	45
	Small Phoenix	64
	Violet Oil-beetle	2
	<i>Volucella inflata</i>	1
	Wall	10
	White Ermine	43
	White-letter Hairstreak butterfly	2
	Woundwort Pearl	1
Flowering plants	<i>Betula pubescens subsp. pubescens</i>	3
	Bell Heather	1
	Bitter-vetch	2
	Bluebell	5
	Butcher's-broom	1
	Cherry Laurel	2
	Common Valerian	3
	Common Vetch	1
	Corn Mint	3
	Corn Marigold	2
	Corn Spurrey	1
	Cross-leaved Heath	1
	Cultivated Vetch	1
	Devil's-bit Scabious	1
	Entire-leaved Cotoneaster	2
	Field Woundwort	1
	Greater Butterfly-orchid	1
	Heather	2
	Himalayan Cotoneaster	1
	Japanese Knotweed	15
	Japanese Rose	1
	<i>Lamium galeobdolon subsp. argentatum</i>	3
	Little Kneeling Eyebright	1
	Lousewort	1
	Montbretia	2
	Pink Purslane	1
	Rock Stonecrop	2
	Spanish Bluebell	1
	Three-cornered Garlic	2
	Tormentil	2
	Welsh Poppy	2
	Wood-sorrel	1
Lichens	<i>Agonimia repleta</i>	2
	<i>Cladonia portentosa</i>	1
	<i>Fellhanera bouteillei</i>	1
	<i>Lecanora subaurea</i>	1
	<i>Phaeographis lyellii</i>	1
	<i>Rinodina biloculata</i>	1
	<i>Stereocaulon leucophaeopsis</i>	1
	<i>Stereocaulon nanodes</i>	1
Liverworts	Greater Copperwort	

Moss	Gravel Thread-moss	3





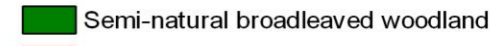


Statutory Nature Conservation Sites

The site is not part of a Statutory Nature Conservation Site and they do not need to be considered further.

Non-statutory Nature Conservation Sites

The site is not part of a Non-Statutory Nature Conservation Site and they do not need to be considered further.

Legend

-  Scattered trees
-  Survey area (Approximate)
-  Tall ruderal
-  Scrub
-  Semi-natural broadleaved woodland
-  Building
-  Track



Title: Map 1. Phase 1 habitats

Project: Holmbush

Checked by: CDH Version: 01
Date: 11/11/2022

Map 1. Phase 1 habitats

3.4. Potential for species of nature conservation importance

Habitats have been assessed from the results of the field survey for their potential to support the following protected species. Where there is no potential for a species or species group to be present within the site, or where habitats with the potential to support this species or species group will not be impacted by the proposals, they may be scoped out at this stage.

Table 3. Potential for species of nature conservation importance

Species	Assessment	Presence/likely value
Amphibians	No aquatic habitat was found within the Site that has the potential to support breeding amphibians, although there is a lake less than 50m north of the site. It is likely that common toad is active in this woodland.	Likely – common and widespread species
Badgers	No evidence of Badgers was found within the Site, although they are very likely to be active in this area.	Likely to be present
Bats (roosting/hibernating)	The Engine House and Chimney have potential for day roosting and hibernating bats to be associated with lintel gaps and larger gaps in stonework. Most of the adhering ivy does not provide suitable roosting habitat.	Likely to be present in structural gaps
Bats (foraging/commuting)	Woodland habitats with tracks and glades provide near optimal foraging habitat for a wide range of bats.	Likely to be present
Dormouse	Woodland and scrub supports a diversity of tree and shrub species with abundant hazel along with bramble, hawthorn and bramble, all of which provide food for Dormice.	Likely to be present
Nesting birds	Trees, scrub and buildings all provide suitable habitats for a range of common and widespread nesting bird species	Certain to be present
Reptiles	Some open areas close to the buildings could provide opportunities for reptiles and they may be associated with the scrub and vegetated margins.	Low probability to be present
Otter	It is probable that Otters are present along the Lynher and nearby woodland would provide good couching opportunities, although they would be absent from most other areas of the site	Likely to be present along the Lynher
Water Vole	The site does not provide suitable habitats for Water Vole	Unlikely to be present
Notable invertebrates	Habitats at this site are likely to support common and widespread invertebrates.	Low probability to be present
Notable plants	Thin soils on built walls have potential for Cornish Moneywort, a Cornish red data book species.	Moderate potential on building remnants
Invasive non-native plants	No non-native species was discovered on survey.	Not present

4. Evaluation of ecological features and potential impacts

Ecological features that have the potential to be present have been assessed in light of current nature conservation policy, planning policy and wildlife legislation by an experienced ecologist (see Appendix 1). Where necessary, the ecological value of an ecological feature is given along with the potential effect of the proposed development.

If it is considered that the proposed development is likely to have no effect on features that have been identified as present, or potentially present, they may be scoped out at this stage.

4.1. Habitats of nature conservation importance

Protected habitats

Habitats are protected under international and national legislation including The Conservation of Habitats and Species Regulations 2017, and Wildlife and Countryside Act 1981 (as amended). These have been formulated into policy measures, with many examples protected under formal site designations such as SSSIs and SACs.

No habitats of European Community Importance as defined within The Conservation of Habitats and Species Regulations 2017 were present within this site. Protected habitats of this type are not a consideration for this project.

Notable habitats

Sixty-five habitats are listed as being of principal importance, in the Secretary of State's opinion, for the purposes of conserving biodiversity. Under section 41 (England) of the NERC Act (2006) there is a need for these habitats to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. These habitats are the subject of National and Local Biodiversity Action Plans.

Hedgerows are given particular protection under the Protection of Hedgerows Act 1997.

Semi-natural broadleaved woodland

Semi-natural broadleaved woodland is a Local Biodiversity Action Plan Priority (CBI, 2011) and Habitat of Principal Importance (JNCC & Defra, 2012).

Mitigation should be adopted to minimise any loss in extent of woodland habitat.

4.2. Species of nature conservation importance

Overview

Many native wild plants and animals are protected by law with the two main legal instruments being the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. The latter consolidates amendments to the Conservation (Natural Habitats, &c) Regulations 1994 which transposed into UK Law the EU Habitats Directive.

One thousand, one hundred and fifty species of fungi, plant or animal are listed as being of principal importance, in the Secretary of State's opinion, for the purposes of conserving biodiversity. Under section 41 (England) of the NERC Act (2006) there is a need for these species to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. These species are the subject of National and Local Biodiversity Action Plans.

Badgers

Badgers are protected from persecution or ill-treatment under the Protection of Badgers Act 1992. Under the Act, it is an offence to:

- wilfully kill, injure or take, or attempt to kill, injure or take, a badger;
- damage a badger sett or any part of it;
- destroy a badger sett;
- obstruct access to, or any entrance of, a badger sett;
- cause a dog to enter a badger sett; or
- disturb a badger when it is occupying a badger sett.

Badgers are very likely to be active in this area but no setts or evidence of activity were found during the survey.

Natural England has provided guidance of which activities may need licencing as they risk an offence¹. The following would be unlikely to need a license:

- work with hand tools or machinery above or below ground close to a sett
- clear vegetation near setts, including felling small trees or shrubs, provided they are not uprooted and don't block access to the sett

On offence is unlikely during works, although precautionary mitigation should be adopted.

Roosting bats

Bat species and their breeding or resting places (roosts) are protected under the Wildlife and Countryside Act 1981 (as amended), and The Conservation of Habitats and Species Regulations 2017. They are identified as European Protected Species. Under these laws it is an offence to:

- capture, kill, disturb or injure bats (on purpose or by not taking enough care);
- damage or destroy a breeding or resting place (even accidentally);
- obstruct access to their resting or sheltering places (on purpose or by not taking enough care); or
- possess, sell, control or transport live or dead bats, or parts of them.

Seven species of bat are listed as species "of principal importance for the purpose of conserving biodiversity".

¹ <https://www.gov.uk/guidance/badgers-protection-surveys-and-licences>

Buildings have been assessed for their potential to support roosting bats both within their structure (lintel gaps, cracks, fissures, etc) and behind vegetation adhering to walls (mainly ivy). In addition, they were also assessed for the potential for the Ivy to provide a roosting habitat.

Buildings are valued as follows (Collins et al, 2016) (Table 4):

- **Negligible suitability** - Negligible habitat features on site likely to be used by roosting bats
- **Low suitability** - A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
- **Moderate suitability** – A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
- **High suitability** - A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Table 4. Assessment of potential for features to support roosting bats

Feature name	Description of features with potential for bats	Potential for bats
Chimney and Engine House	The chimney is extensively covered in Ivy, which may conceal potential features. The brickwork exposed at the top may provide roosting opportunities.	Moderate
	The wheelhouse is also covered in thick ivy which may conceal potential roosting areas. Inside the structure, some cavities are visible, providing good roosting potential for bats	High
Boiler House	The remnants of the boiler house include the floor and the lower half of the walls with the rest of the building missing or in rubble. Very little in the way of potential for roosting bats.	Negligible
Plinth	A small remnant of a building to the west of the wheelhouse. Cavities present but they may be to exposed and low down to be of benefit to roosting bats.	Negligible



6.The Chimney and Engine House, viewed from the south



7.The interior of the Engine House



8. The Boiler House view south to north



9. Part of the Boiler House wall left in situ



10. The Plinth

Foraging bats

Woodland provides optimal habitat for foraging bats. Provided works do not result in the significant loss of woodland extent, it is likely that the opening of glades around buildings would enhance the site for foraging bats through the creation of edge habitat

No mitigation for foraging bats will be required.

Birds

All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended) from being killed, injured or captured whilst their nests and eggs are protected from being damaged, destroyed or taken. Birds which are listed under Schedule 1 of the Act are given additional protection against disturbance.

Fifty-nine species of bird are listed as species “of principal importance for the purpose of conserving biodiversity”.

It is certain that common and widespread bird species nest within scrub and woodland. It is likely that the built features will be used by nesting birds at different times, and this includes vegetated/collapsing walls and standing buildings although chimneys are unlikely to be used. Mitigation for nesting birds is recommended during proposed works.

Any activities that expose invertebrates, such as earth worms and grubs, will provide an additional food resource for local birds and will have a positive temporary effect, particularly when adults are feeding nested chicks.

Dormice

Dormice and their breeding or resting places are protected under the Wildlife and Countryside Act 1981 (as amended), and The Conservation of Habitats and Species

Regulations 2017. They are identified as European Protected Species. Under these laws it is an offence to:

- capture, kill, disturb or injure dormice (on purpose or by not taking enough care);
- damage or destroy a breeding or resting place (even accidentally);
- obstruct access to their resting or sheltering places (on purpose or by not taking enough care); or
- possess, sell, control or transport live or dead dormice, or parts of them.

Dormice are also listed as a species “of principal importance for the purpose of conserving biodiversity”.

While no evidence of nesting or activity was found, it is likely that dormouse are present within this area. The Hazel stands and scrub provide good foraging and nesting habitat.

Precautionary mitigation for dormice is recommended during proposed works.

Flora

A range of plants are protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended), with nine species protected under The Conservation of Habitats and Species Regulations 2017. The latter are identified as European Protected Species. Under the Wildlife and Countryside Act 1981 (as amended) offences include:

- intentional picking, uprooting or destruction
- selling, offering for sale, possessing or transporting for the purpose of sale (live or dead, part or derivative)
- advertising (any of these) for buying or selling

A range of vascular plants are listed under Species of Principal Importance (JNCC and Defra, 2012) along with lichens, and mosses and liverworts.

Thin soils found on building remnants and walls have the potential to support plants of restricted distribution.

5. Vegetation clearance plan

Mitigation

Where there is potential that vegetation management will have a significant² effect on a valued ecological feature of nature conservation interest, recommendations for mitigation are made based on the mitigation hierarchy suggested in Paragraph 118 of the National Planning Policy Framework and detailed in Paragraph: 018 Reference ID: 8-018-20140306 of National Planning Practice Guidance;

- Avoidance – significant harm to wildlife species and habitats should be avoided through design.
- Mitigation – where significant harm cannot be wholly or partially avoided, it should be minimised by design, or by the use of effective mitigation measures that can be secured by, for example, conditions or planning obligations.
- Compensation – where, despite whatever mitigation would be effective, there would still be significant residual harm, as a last resort, this should be properly compensated for by measures to provide for an equivalent value of biodiversity.

5.1. General low level vegetation clearance

The following mitigation should be adopted during general vegetation clearance around structures.

Avoiding/minimising impacts to dormice and nesting birds

Woodland and scrub management within and around building footprints should be completed annually in the period November to January to avoid the majority of nesting birds and minimise impacts on dormice, if they are present. Only a single visit per annum would be required.

Prior to the start of works, a toolbox talk should be provided on both nesting birds (some species can nest in winter months) and dormice. This should include their protected status and how to identify them.

If an active bird nest is found, an area of vegetation with 5 meters should be left unmanaged and only removed once it is certain that any nested chicks have fledged.

If dormice are found, all works should stop within 10 metres of the dormouse nest and a suitably qualified ecologist consulted on how best to proceed.

Costing to provide onsite toolbox talk and orientation to dormice and breeding birds would be £XX per site visit.

² For the purposes of this report, a practical approach has been taken to define the term 'significant'. If an effect is sufficiently important to be given weight in the planning process or to warrant the imposition of a planning condition, it is likely to be 'significant' in the context of the level under consideration (BSI, 2013).

Avoiding impact to badgers and their setts

No evidence of badgers were found but it is likely they are present in the local area.

Provided the following mitigation is adopted, an offence is unlikely during vegetation works:

- Prior to the start of works, a suitable toolbox talk will be given explaining the protection afforded to badgers and their setts, and how to identify a badger sett entrance.
- If larger trees that have the potential to damage tunnels are to be felled, a licence may be required.
- Only hand held power tools, including strimmers and chainsaws, can be within 10 metres of an active sett entrance.
- If a chipper is required it should be sited at least 20 metres from a tunnel entrance.
- At the beginning of the work period, any tunnel entrances likely to be affected by clearance should be identified by the team leader.
- At the end of each working shift, each entrance should be checked to ensure vegetation does not obstruct an entrance.
- Great care must be taken not to collapse tunnels when working around or above entrances. If this does occur, a tunnel mouth must be re-instated immediately.
- All arising should be left in such a way that they do not obstruct tunnel entrances.
- All fuels, oils and chemicals should be stored at least 20 metres from the tunnel entrances whilst any refilling of power tools should also be completed at least 20 metres from entrances.
- Resultant stumps should not be treated with chemicals.

Costing to provide onsite toolbox talk and orientation to badgers would be £XX per site visit.

Minimising loss of woodland habitat

- Removal of woodland habitat should be planned to minimise loss, with only areas required to complete the works being removed.
- Where practicable, existing tracks and pathways should be used for plant and machinery movement, and vehicles should be suitable for the terrain and soil types present.
- To minimise the potential for pollution, spill kits should be carried, fuels and oils stored in suitable containers and only suitably experienced staff should re-fuel machinery.
- Machinery repairs should only complete onsite if no other options exist.
- Hazel shrubs should be coppiced where practicable.
- Deciduous arisings should not be chipped onsite but stacked haphazardly to create deadwood habitat.
- Conifer arisings should be removed from site.
- Older trees should be retained where possible and may need to be pollarded.

5.2. Clearance of vegetation on specific structures

Avoiding impact to bats and their resting places - There is potential for roosting bats to be associated with several structures. Depending on the potential for a given structure to support roosting bats, one of three mitigation plans should be adopted during vegetation clearance (Table 5).

Table 5. Mitigation to be adopted during proposed works

No	Building names	Priority	Potential for bats	Mitigation plan for bats	Costings
1	Chimney	Medium	Moderate	3	WB ³ - £XX EM ⁴ - £XX
2	Engine House	High	High	3	WB - £XX EM - £XX
3	Boiler House	Medium	Negligible	1	-
4	Plinth	Low	Negligible	1	-

Mitigation plan 1: Structures with negligible potential for roosting bats

1. No timing constraints to works
2. Vegetation removal, including ivy, can proceed with negligible risk to bats and would not require further mitigation for bats.

Mitigation plan 2: Structures with low potential for roosting bats

1. No timing constraints to these works.
2. Following a suitable toolbox talk explaining the protection afforded to bats and their roosts, and how to identify signs of bats, any vegetation removal, including ivy, can proceed with negligible risk to bats and would not require further mitigation for bats.
3. If signs of bats are encountered, all works must stop and a suitably qualified ecologist consulted on how best to proceed.

Mitigation plan 3 - Structures with moderate potential for roosting bats

1. Ideally completed in winter months when bats are less likely to be associated with the majority of structures.
2. Cutting the base of ivy less than 1.5 metres above ground level to kill it can be completed at any time of the year following a toolbox talk by a suitably qualified ecologist explaining the protection afforded to bats and their roosts, and how to identify signs of bats.
3. Removal of ivy to be completed after close inspection by a suitably qualified and licenced bat ecologist. This should be done in winter months when bats are less likely to be present.

³ WB - close-inspection of buildings by a suitably qualified and licenced bat ecologist prior to removal of ivy.

⁴ EM – two bat emergence surveys completed in the bat active period (May to September) where evidence of bats is found during close inspection

4. If Ivy is found to conceal cracks or crevices with potential for roosting bats, or evidence of use by bats is found, bat emergence/re-entry surveys will be required to determine if bats are roosting in association with this structure. Mitigation would be developed following these additional surveys.

Avoiding impact on nesting birds – All buildings have some potential for nesting birds. Vegetation removal from built structures in the accepted bird nesting season (February to August inclusive) should be avoided. If this is not practicable, works should be preceded by a check for nesting birds by a suitably experienced person. If nesting birds are found an area of vegetation with 5 meters should be left unmanaged and only removed once it is certain that any nested chicks have fledged.

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Appendix 1:

Legislation and Policy used to assess habitats and species

European Habitats and Species Directive (CEC, 1992)

The main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

European Red Data lists (IUCN, 2000)

International Union for Conservation of Nature (IUCN) and the European Commission have been working together on an initiative to assess around 6,000 European species according to IUCN regional Red Listing Guidelines. Through this process they have produced a European Red List identifying those species which are threatened with extinction at the European level so that appropriate conservation action can be taken to improve their status.

European Council Birds Directive (CEC, 1979)

The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. An important part of this Directive is the identification and classification of Special Protected Areas (SPAs) to protected vulnerable bird species listed in Annex 1 of the Directive and regularly occurring migrating species.

The Wildlife and Countryside Act (WCA) 1981 (as amended)

This Act is the primary legislation that protects animals, plants and certain habitats in the UK.

The Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 consolidate and update the Conservation of Habitats and Species Regulations 2010, and transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) and elements of Directive 2009/147/EC on the conservation of wild birds (“the Birds Directive”) in England, Wales, and to limited extent, Scotland and Northern Ireland.

The objectives of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.

The Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species. These sites form a network termed Natura 2000 and include Special Areas of Conservation and Special Protection Areas.

Protection of Badgers Act 1992

The Protection of Badgers Act 1992 consolidated and improved previous legislation. Under the Act it is an offence to kill, injure or take a Badger, or to damage or interfere with a sett used by a Badger unless a licence is obtained from a statutory authority.

[The Hedgerow Regulations 1997](#)

The Hedgerows Regulations 1997 protect certain hedgerows from being removed (uprooted or destroyed) if they meet certain criteria.

[The Countryside and Rights of Way \(CROW\) Act 2000](#)

This Act increases measures for the management and protection for Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation.

[Circular 06/2005 Biodiversity and geological conservation – statutory obligations and their impact within the planning system](#)

This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the national planning policy in the National Planning Policy Framework and the Planning Practice Guidance.

[Natural Environment and Rural Communities \(NERC\) Act 2006](#)

The Act made amendments to the both the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way (CROW) Act 2000. For example, it extended the CROW biodiversity duty to public bodies and statutory undertakers.

[UK Post-2010 Biodiversity Framework, 2012](#)

The 'UK Post-2010 Biodiversity Framework', published in July 2012, succeeds the UK BAP and 'Conserving Biodiversity – the UK Approach', and is the result of a change in strategic thinking.

[National Planning Policy Framework, 2012](#)

The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. It contains a number of policies relating to ecology including "minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures".

[The natural choice: securing the value of nature \(2011\) \(Natural Environment White Paper\)](#)

This White Paper outlines the Governments vision for the future of landscape and ecosystem services.

[Biodiversity 2020](#)

This is a national strategy for England's wildlife and ecosystem services based on the White Paper.

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