

**St Athan Northern Access  
Road (NAR), Vale of  
Glamorgan,  
P/App/2017/0564/FUL  
Post-excavation Summary**

Prepared  
for

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## **Summary**

*Black Mountains Archaeology Ltd/Archaeoleg Mynydd Du Cyf were commissioned by Alun Griffiths (Contractors) Ltd, through their agents TACP (UK) Ltd, to carry out an archaeological Strip, Map, Record (SMR) during pre-commencement ground investigation (geotechnical) and the main ground works for the construction of a new highway called the Northern Access Road on greenfield land between Boverton (B4265) and Eglwys-Brewis, Vale of Glamorgan.*

*The archaeological investigations on-site commenced in January 2018 and were completed in June 2018.*

*The principle prehistoric discoveries were confined to Areas A and D. Area A contained four sets of double post-holes and two single post-holes broadly distributed across the area and Area D contained a single ditch with an enlarged central post-hole.*

*The Roman activity was confined to Area D near Milands Farm and principally consisted of nine ditches divided into five phases of activity, multiple working surfaces and two post-holes. The ditches and associated features have been interpreted as forming the edge of a Romano-British farmstead or villa as yet undiscovered.*

*A small industrial lime manufacturing area was identified at the western end of Area A. Two pre-industrial limekilns were recorded together with a handful of post-holes, areas of fire effected clay and charcoal and a large natural fissure in the limestone bedrock containing small 'fist sized' limestone cobbles. The two kilns were probably Flare Kilns and were most likely used to produce agricultural fertiliser but lime trade with the local area and further afield, such as in North Devon, cannot be discounted.*

*The present report sets out the principle discoveries made during the archaeological Watching Brief and Strip Map Record in response from a request made by AECOM and WYG for an update to inform on further potential development in the area. The content for this report has been taken from the on-going Post-excavation Assessment. All work was undertaken to the professional standards of the Chartered Institute for Archaeologists.*

## 1. Introduction

- 1.1.1. Black Mountains Archaeology Ltd/Archaeoleg Mynydd Du Cyf were commissioned by Alun Griffiths (Contractors) Ltd, through their agents TACP (UK) Ltd, to carry out an archaeological Watching Brief (WB) and Strip, Map, Record (SMR) during pre-commencement ground investigation (geotechnical) and the main ground works for the construction of a new highway called the St Athan Northern Access Road on greenfield land between Boverton (B4265) and Eglwys-Brewis, NGR SS 298230, 168940 to ST 300111,169264 (Figure 1). The proposed highway includes footways and a cycleway, new junctions, lighting, signs, fencing, flood alleviation works, acoustic barriers and other environmental mitigation measures, landscaping, demolition of garage at Rose Cottage, and all associated engineering and building operations (Pl. App. No. 2017/0564/FUL).
- 1.1.2. The archaeological advisors to the LPA (GGAT) indicated the high potential to encounter significant multi-period archaeological deposits across the proposed route (Archaeological Planning Advice Letter VOG1365/HB). Consequently, the archaeological advisors to the LPA (GGAT) required a programme of work in the form of an archaeological Watching Brief and Strip Map Record during ground works for the development, in accordance with an archaeological Written Scheme of Investigation (WSI).
- 1.1.3. The archaeological Written Scheme of Investigation (WSI) was prepared by AECOM (2017b) in response to Condition 11 (Pl. App. No. 2017/0564/FUL), which was approved by the local authority and their archaeological advisors GGAT. An application to discharge Condition 11 has also been made (Pl. App. No. 2017/0564/1/CD).
- 1.1.4. Black Mountains Archaeology Ltd/Archaeoleg Mynydd Du Cyf prepared a specification (Project Design) in January 2018 (Lewis 2018) to deliver the archaeological mitigation strategy set out in the archaeological Written Scheme of Investigation (WSI) prepared by AECOM (2017b).
- 1.1.5. The present report sets out the principle discoveries made during the archaeological Watching Brief and Strip Map Record in response from a request made by AECOM and WYG. The content for this report has been taken from the on-going Post-excavation Assessment. All work was undertaken to the professional standards of the *Chartered Institute for Archaeologists*.

## 2. Background

### 2.1. Archaeology and Previous Investigations

- 2.1.1. The archaeological background for the St Athan NAR has been well established by a number of recent investigations (Entec UK Limited 2009; AECOM 2017a&b) and it is not the intention to repeat that extensive information here. However, a short note is made below of the previous investigations and archaeological potential of the area around the St Athan NAR.
- 2.1.2. In 2001, Cotswold Archaeology carried out an archaeological desk-based assessment of RAF St Athan for a new Welsh Development Agency (WDA) aerospace development (Cotswold Archaeology 2001).

- 2.1.3. Following the aerospace assessment (Cotswold Archaeology 2001), in 2003 Stratascan undertook several phases of geophysics for the Welsh Development Agency (WDA) and the Defensive Aviation Repair Agency (DARA). The work was carried out to inform proposals to build a new access road and hangar. The survey (at the western end of the St Athan NAR) identified a field system (MAG14 – Entec UK Limited 2009) and enclosure (MAG15), potentially of Roman date, a possible medieval ditched enclosure and a trackway (MAG12) and mill race off Llanmaes Brook (MAG13) (Stratascan 2003).
- 2.1.4. A comprehensive EIA was undertaken of the proposed NAR and the wider area of RAF St Athan in 2009 for a Defence Technical College and Aerospace Business Park (Entec UK Limited 2009). The ES assessed previous investigations and set out the rationale for future trenching of areas of high archaeological potential.
- 2.1.5. Following the submission of the ES (Entec UK Limited 2009), a comprehensive archaeological field evaluation of 187 trenches was undertaken by Wessex Archaeology (2010). In the Tremains Farm area (western end of the St Athan NAR between B4265 and the Llanmaes Brook) 66 trenches were excavated. Archaeological deposits were identified in 20 of the 66 trenches. The earliest remains identified were two Early to Middle Bronze Age cremation burials buried beneath a low cairn of stones. These were radiocarbon dated to 1640 cal. BC to 1450 cal. BC. A second potential cairn was identified close by, suggesting that these features may be spread over the wider area (see GGAT HER 04114s-04116s). At least two Bronze Age ring-ditches lie some 500 m to the north, overlooking the Llanmaes Brook, and may form part of a wider ritual landscape, along with the Late Bronze Age and Early Iron Age midden site found nearby at Llanmaes. Several ditches were identified and were considered to be Romano-British (MAG14&15) and medieval field boundaries (GGAT HER 04117s and 04118s), the latter associated with a concentration of medieval activity around the supposed mill leat identified by geophysics (MAG13).
- 2.1.6. AECOM commissioned Archaeology Wales Ltd (Rigby 2016) to undertake a watching brief on geotechnical test pitting along the route in 2016. Test Pit SK501.1 was located in the Tremains Farm area (see above) at the western end of the proposed route and encountered a walled feature at 0.5m below the present ground level and was moved slightly and re-excavated. The moved test pit SK501.2 also encountered what appeared to be a walled feature at 0.5m in depth. These were thought to relate to the fieldsystems identified on geophysics and tested by Wessex Archaeology in 2010. However, the walled features shown in Plates 1 and 2 (SK501.1) and Plates 3 and 4 (SK501.2) did not appear convincing from the photographs as built features as the natural carboniferous limestone in this area of the Vale of Glamorgan often tabulates on its surface and this can easily lead to misinterpretation, especially with only small areas opened up for inspection (Rigby 2016). Consequently, the SMR established the walled features SK501.1 and SK501.2 as natural tabulated carboniferous limestone bedrock.
- 2.1.7. AECOM incorporated the results of the Archaeology Wales Ltd watching brief into an Historic Environment Desk-based Assessment (2017a) for the proposed St Athan Northern Access Road. This assessment reviewed existing knowledge to create an archaeological baseline for the proposed route. The assessment identified 24 heritage assets (archaeological sites) within the 500m study area of the proposed

route. These include one Scheduled Ancient Monument (Bedford Castle Motte SAMGm113), seven Listed Buildings (see AECOM 2017a, Appendix A) and two conservation areas (Llanmaes CA104 and Boverton CA88). While no physical impacts were noted on existing sites, the report noted *“The archaeological potential within the footprint of the development is considered to be high for archaeological deposits from the prehistoric and Roman periods. Several assets of prehistoric and Roman date have been identified... Any ground clearance or construction work within the extant road corridor would potentially have a major adverse magnitude of impact on any surviving archaeological remains. Due to this significant potential, a detailed programme of strip map and record [is suggested]”*.

### 3. Location, Topography and Geology

3.1.1. The route for the Northern Access Road is positioned across open farmland and Ministry of Defence land north of RAF St Athan and the lane from Boverton to Eglwys-Brewis (NGR SS 298230, 168940 to ST 300111,169264). The road intersects both the Boverton Brook, which it follows for a considerable length, and the Llanmaes Brook to the west and Nant y Stepsau in the east. The general height of the existing agricultural landscape along the proposed route is 35m-40mOD.

3.1.2. The general geology is interbedded carboniferous limestone and mudstone bedrock of the Porthkerry Member Formation formed approximately 190-200 million years ago in the Jurassic Period. Superficial deposits of alluvium, sands and gravels are sporadically recorded in areas of river terrace, river/stream channels and glacial outwash (British Geological Survey). The soils are generally well-drained silty clays and coarse loams.

### 4. Objectives

4.1.1. The *definition* of an archaeological **Watching Brief** as set out by the *Chartered Institute for Archaeologists* (CIfA) is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

4.1.2. The *purpose* of an archaeological watching brief (as defined CIfA 2014) is:

- to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works.
- to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard.

- 4.1.3. A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.
- 4.1.4. The objective of a watching brief is to establish and make available information about the archaeological resource existing on a site.
- 4.1.5. *Chartered Institute for Archaeologists Standard and guidance for an archaeological watching brief*. Published 2014.
- 4.1.6. The *definition* of archaeological **Excavation** as set out by the *Chartered Institute for Archaeologists* (CIfA) is a programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological deposits, features and structures and, as appropriate, retrieves artefacts, ecofacts and other remains within a specified area or site on land, inter-tidal zone or underwater. The records made and objects gathered during fieldwork are studied and the results of that study published in detail appropriate to the project design.
- 4.1.7. The *purpose* of excavation is to examine the archaeological resource within a given area or site within a framework of defined research objectives, to seek a better understanding of and compile a lasting record of that resource, to analyse and interpret the results, and disseminate them.
- 4.1.8. *Chartered Institute for Archaeologists Standard and guidance for an archaeological excavation*. Published 2014.

## 5. Legislative Framework

- 5.1.1. *Planning Policy Wales* (PPW 10th Edition) sets out the land use planning policies of the Welsh Government. Chapter 6 sets out the Welsh Government's policy towards the historic environment. It states "The historic environment of Wales is made up of individual historic features, archaeological sites, historic buildings and historic parks, gardens, townscapes and landscapes, collectively known as historic assets. The most important of these historic assets have statutory protection through scheduling, listing or designation as a conservation area. Other assets are included in formal registers, which identify them as being of special historic interest. Many others make a positive contribution to local character and sense of place. Some, such as buried archaeological remains, have still to be identified. It is important to protect what is significant about these assets and sustain their distinctiveness. Historic assets should be the subject of recording and investigation when they are affected by proposals that alter or destroy them. Historic assets are a non-renewable resource." (PPW 2018, 123-129).
- 5.1.2. Underpinning PPW are a series of legislative powers and TANs. The *Planning (Wales) Act 2015* sets out a series of legislative changes to deliver reform of the planning system in Wales, to ensure that it is fair, resilient and enables development. The 2015 Act also introduces a mandatory requirement to undertake pre-application consultation for certain types of development. The *Town and Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016* defines in *Schedule 4(l)* the parameters and definitions for the requirement of pre-application

- consultation by Welsh Ministers, particularly in response to the effect of statutory designated monuments, buildings, and parks and gardens.
- 5.1.3. Advice on archaeology and buildings in the planning process was contained in *Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology* and *Welsh Office Circular 1/98 Planning and the Historic Environment*, which updated *Welsh Office Circular 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas* following the *Shimizu (U.K.) Ltd. v. Westminster City Council* Judgement (February 1997). Detailed advice on Environmental Impact Assessment is contained within *Welsh Office Circular 11/99 Environmental Impact Assessment*. Following adoption of the *TAN 24 Historic Environment* on 31st May 2017, *Welsh Office Circulars 60/96 Planning and the Historic Environment: Archaeology*; *61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas*; and *1/98 Planning and the Historic Environment* have been cancelled.
- 5.1.4. Any works affecting an ancient monument and its setting are protected through implementation of the *Ancient Monument and Archaeological Areas Act 1979*. In Wales the 1979 Act has been strengthened by *The Historic Environment (Wales) Act 2016*. The 2016 Act makes important improvements for the protection and management of the Welsh historic environment. It also stands at the centre of an integrated package of secondary legislation (Annexes 1-6), new and updated planning policy and advice, and best-practice guidance on a wide range of topics (*TAN 24 Historic Environment*). Taken together, these will support and promote the careful management of change in the historic environment in accordance with current conservation philosophy and practice.
- 5.1.5. The *Ancient Monument and Archaeological Areas Act 1979* and *The Historic Environment (Wales) Act 2016* sets out a presumption in favour of preservation *in-situ* concerning sites and monuments of national importance (scheduled/listed), and there exists in the current *Planning Policy Wales (Chapter 6)* a presumption in favour of preservation *in-situ* of all types of heritage assets.

## 6. Methodology

### 6.1. Fieldwork

- 6.1.1. The archaeological investigations on-site commenced in January 2018 and were completed in June 2018. Following discussions with the main contractor it was decided that the best way to de-risk the route of the proposed road, without delaying the main construction programme, was to undertake an archaeological strip map record of all areas ahead of main construction. The route of the proposed road was stripped under archaeological supervision using multiple large (average 20t) 360 degree back acting excavators with 1.8 and 2m wide grading buckets. Areas of archaeological potential were identified and cordoned off for full excavation and recording by hand. The route of the proposed route was divided by fields into fourteen discrete Strip Map Record areas for the purposes of recording (see Figure 1). All archaeological discoveries and areas were recorded using a Geomax Zenith 35 Pro GNSS/Glonass (GPS) Receiver and data logger. The investigations were conducted to Ordnance Survey National Grid and Datum with a 20mm tolerance.
- 6.1.2. All areas archaeological potential, features, structures and deposits were cleaned by hand and recorded in detail in both plan and section. The archaeological recording techniques conformed to the best industry standard; all deposits were recorded



using a single continuous context numbering system pro forma. All areas archaeological potential, features, structures and deposits were photographed in digital using a Fujifilm FinePix S4800 super wide (30x) 24-720mm camera at 16mp. All areas of archaeological potential were surveyed with a Garrett Euro Ace metal detector with a 28cm x 22cm DD PROformance coil. All plans and sections were hand drawn at an appropriate scale, usually at 1:20 and 1:10. When no archaeological horizons were encountered during the machine excavation of the Strip Map Record areas then the excavations were taken down to the natural limestone bedrock and gravels.

- 6.1.3. No items were recovered that are subject to *The Treasure Act 1996* (2003 as amended).
- 6.1.4. All classes of finds have been retained (cleaned and catalogued) in appropriate conditions until arrangements for final deposition have been agreed, in line with the requirements of the Chartered Institute for Archaeologists' *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014). Ownership will be transferred to the institution receiving the archive unless other arrangements are agreed with the LPA.
- 6.1.5. When substantial quantities of undiagnostic, residual or modern material were recovered, an on-site recording and discard policy for these classes of find was employed. However, sufficient material was retained to understand the nature, date and function of the deposit from which it was recovered. Specialist contingency artefact advice, analysis and conservation is necessary for finds assemblages and this is being carried out by specialists such as Cardiff University and the National Museum Wales.
- 6.1.6. Environmental recording and sampling followed the principles Historic England's *Guidelines for Environmental Archaeology* (2011). All deposits were assessed for high potential for the preservation of palaeoenvironmental material. Sampling of such deposits was carried out by column, bulk etc., for subsequent analysis. In accordance with professional guidelines sampling and recording was the responsibility of an identified member of the field team with relevant experience at MCIfA grade.
- 6.1.7. The archaeological excavations were carried out to the standards of the *Chartered Institute for Archaeologists*

## **6.2. Post-excavation**

- 6.2.1. Following completion of the fieldwork programme all artefacts, ecofacts and samples are being processed, assessed and packaged in accordance with Chartered Institute for Archaeologists' *Standards and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014), and *Museums and Galleries Commission Standards in the museum care of archaeological collections* (1994). The archive of archaeological records and artefacts are being prepared to the guidelines set out in Historic England's *Management of Archaeological Projects* (1991) Appendix 3.
- 6.2.2. A formal post-excavation assessment is currently being undertaken following the completion of the fieldwork to inform on a full post-excavation analysis with the final written report incorporating all of the evidence and material recovered during the investigations. The final report will consider all available archaeological and historical

sources in order to place the results of the fieldwork in an appropriate archaeological and historical framework.

- 6.2.3. Subject to the landowner's permission the site archive, including all artefacts, ecofacts, samples and records will be deposited whole with the National Museum Wales in accordance with ClfA Guidelines (*Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (2011)). An accession number will be generated on completion of the project. A digital copy of the report and archive will also be offered to the regional HER (GGAT) and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW). The digital report will also be offered to the Archaeology Data Service (ADS). The final archive of records relating to the preparation of the reports will be prepared to Historic England's guidelines set out in the *Management of Archaeological Projects* (1991), Appendix 6.

## 7. Strip Map Record (SMR)

### 7.1. Prehistoric

- 7.1.1. The principle prehistoric discoveries were confined to Areas A and D. Area A contained four sets of double post-holes and two single post-holes broadly distributed across the area (Figure 2). Area D contained a single ditch with an enlarged central post-hole (Figure 3).



Plate 1. Area A, view SE of the general area of prehistoric post-holes.

- 7.1.2. The four sets of post-holes in Area A (**006** and **007**; **010** and **012**; **016** and **018**; and **020** and **022**) were confined to the eastern side of the area and 160m northeast of the two Bronze Age cremations excavated by Wessex Archaeology (2010). The double post-holes were broadly consistent in overall dimensions averaging c0.4m in diameter and between 0.05m to 0.15m in depth. The spacing between post-holes averaging 0.8m to 1.2m apart from each centre point. The upper deposits of the

post-holes have been truncated by historic (medieval and post-medieval) ploughing leaving just the base of each post-hole surviving. Preliminary interpretation of these double post-holes is that they represent all that is identifiable from a prehistoric fieldsystem, notably the gateposts into discrete fields, possibly associated with the cremations identified by Wessex Archaeology (2010). One assumes that there is a farmstead very close by, possibly in the unexcavated fields either immediately to the south or north of the road in Area A and B.



Plate 2. Area A, view W of prehistoric post-holes 016 and 018.

- 7.1.3. Very degraded prehistoric pottery together with fire effected clay and charcoal was identified in post-hole **016** (fill **017**) in Area A. All post-holes in this area produced some charcoal and heat affected clays.
- 7.1.4. Area D produced a single ditched feature (**030**) and post-hole (**032**). The ditch measured 35m in length, c0.4m wide and averaged 0.12m in depth. The central post-hole measured 0.8m by 0.9m with a depth of 0.3m containing a post-pad of around 0.3m in diameter. The upper deposits of the ditch and post-hole have been truncated by historic (medieval and post-medieval) ploughing leaving just the basal deposits surviving.
- 7.1.5. A total of three pieces of worked flint were recovered from Area A, two cores and one flake all broadly prehistoric. Area E produced two pieces of flint, probably natural and Area I a single Mesolithic core. By far the greatest number of worked

flint was recovered from Area D with 33 pieces, including many worked forms, all broadly prehistoric.



Plate 3. Prehistoric flint arrow head (left – 060, lower fill of post-hole 058) and flint knife (right – Δ002; 114; Area D). Scale 5cm in 1cm sections.

7.1.6. Nine contexts in Area D produced prehistoric pottery (120 sherds). There are a number of rim sherds present and several fabric types. Almost all of the assemblage is accompanied by finds of later date indicating later intrusions into prehistoric deposits.

## 7.2. Roman

7.2.1. The Roman activity is confined to Area D near Milands Farm and principally consists of nine ditches (**098, 109, 107, 100, 111, 123, 105, 113/104** and **102**) divided into five phases of activity, multiple working surfaces (**143, 147** and **149**) and two post-holes (**141** and **131**) (Figure 4). The upper deposits of the ditches and post-holes have been truncated by historic (medieval and post-medieval) ploughing leaving just the basal deposits surviving, which may also explain the patchy nature of the survival of the working surfaces. The ditches and associated features have been interpreted as forming the boundary (southern?) of a Romano-British farmstead or villa.

7.2.2. Pottery of Roman date forms the largest component of the assemblage at 740 sherds, weighing 7519g. This appears to be a utilitarian assemblage, dominated by coarse ware jars. Very few fine wares were recorded, with 2nd-century Samian occurring in just four contexts. All of the Roman pottery was recovered from Area D. Of interest is a coarse ware jar, now in many pieces, which has multiple piercings. A single sherd of blue coloured Roman glass (**144**) was also recovered from Area D.

7.2.3. Of the animal bone recovered, 98% of fauna remains from the whole site came from the Roman site at Milands Farm (635 fragments of animal bone). Cattle and sheep represent the bulk of the archive together with dog, pig and horse.

- 7.2.4. Ferrous and copper alloy material recovered from the Roman site included 25 hobnails, three nails and six pieces of as yet unidentified copper alloy fragments.



Plate 4. Roman Site viewed W towards Milands Farm, Area D.



Plate 5. Roman decorated textile comb (left –  $\Delta$ 003; 140) and Roman Mortarium (right – 029) from the Roman Site, Area D. Scale 5cm in 1cm sections.

### 7.3. Post-medieval

- 7.3.1. At the western end of Area A, a small industrial lime manufacturing area was identified (Figure 5). Two pre-industrial limekilns were recorded together with a handful of post-holes, wide areas of fire effected clay and charcoal and a large

natural fissure in the limestone bedrock containing small 'fist sized' limestone cobbles.



Plate 6. Three flued Limekiln 065, Area A, view to the S.

- 7.3.2. The first limekiln (**065**) comprised three flues and a central bowl-shaped kiln. The whole structure was rock-cut into the bedrock with the side walls of the bedrock improved with randomly coursed block work standing from five to seven courses. The central chamber consisted of four courses of stonework and three larger single lintel stones to provide access to flues. The western flue had a significant volume of fire effected clay and charcoal extending outwards (west) into the immediate surrounding area indicating that the last firing of the kiln was possibly cleared out in this direction. The walls of the bowl (kiln) retained a moderate quantity of hardened quicklime in patches. The eastern flue contained moderate quantities of charcoal and significant quantities of small (<0.05m) lime fragments. Within the eastern flue a near complete Post-medieval vessel was recovered (**073**). The vessel was probably complete when deposited but now shattered. The pottery type has a broad date range of 17th to 19th century but the style of the bowl suggests a slightly earlier date of 17th/18th century. The rim is distorted and the vessel was probably a 'second'.



Plate 7. Quarried fist-sized stones in natural bedrock fissure 063 (centre), Area A, view to the SE. Limekiln 065 to left and Limekiln 066 top right.



Plate 8. Double flued Limekiln 066, Area A, view to the W.

7.3.3. The second limekiln (066) comprised two flues and a central more cylindrically-shaped kiln. In parallel to the first kiln, the second kiln was also rock-cut into the

bedrock with the side walls also improved with blockwork stone courses (from six to eight courses). Both flues had a more acute angle into the kiln but flared out (away) from the kiln much wider than the flues in Limekiln **065**. Possibly creating a more usable working area when raking out. The bowl of the kiln was a much steeper inverted cone shape and constructed with eight courses of blockwork and two large lintel stones giving access to the flues. Lime in significant amounts was found fanning out from the kiln in the southern flue suggesting the last raking out had occurred in this direction.



Plate 9. S rock-cut flu, blockwork and lime rake out residue. Limekiln 066, Area A, view to the S.

7.3.4. The kilns were cited next to a natural fissure (**063**) in the limestone that was filled with large fist sized pieces of limestone, which would have provided the raw material at roughly the correct size for firing in the kilns without the need for any further reduction of the cobbles. The kilns were charcoal fed as evidenced by the areas of raking out and no identification of any coal/coke as a fuel was made. Significant volumes of wood/charcoal would have been required to fire the kilns as the burning of calcium carbonate requires temperatures above 900°C to produce lime. When mixed with water (slaking), calcined lime becomes calcium hydroxide (hydrated lime), which has been used in building construction (since at least Roman times). Permanently constructed limekilns (as opposed to clamp kilns) fall into two basic types, Flare Kilns, or Draw Kilns. Flare kilns used a single charge and firing method and raking out of lime occurred after firing. Draw Kilns were continuously fired and fed with limestone and fuel with the raking out of lime also occurring continuously as lime falls through the kiln to the hearth floor. The form of both types of kiln is very similar, with the Draw Kilns usually having a grate above the hearth for the lime to



fall through. The absence of any grates in either kiln would appear to suggest that they were both Flare Kilns.

- 7.3.5. The Post-medieval period in South and West Glamorgan saw an acceleration in trade supplying agricultural lime to north Devon to improve the acidic soils there and the flow of ceramics (North Devon Gravel tempered Ware) and other goods came back the other way. This period also saw the industrialisation of agriculture with lime used more to fertilise and improve soils. Walter Davies (1814) noted the following in his 'Review of the Domestic Economy of South Wales':
- 7.3.6. *"In the extensive limestone tract of the Vale of Glamorgan, there are but few public kilns for the sale of lime: every farmer is a lime-burner; raising the stone in the field to be manured; so that there is scarcely an arable field to be found without having, either at present or formerly, a lime kiln within it. ...In many instances, kilns might be made, with equal feasibility, in the more useless corners, or on the slopes of small dingles, places inaccessible to the plough but more accessible to the limestone strata. These kilns, built of limestone, require to be rebuilt or repaired frequently; once in a season, where the farmer useth much lime: one new kiln is about two day's work for a mason. Fuel - On the maritime side of the vale a farmer commonly buys a sloop load of culm from Neath and Swansea, which is unloaded at the most convenient creek, from whence he conveys it to his farm"* (Davies 1814, 169).

## 8. Acknowledgements and Copyright

- 8.1.1. The report and illustrations were prepared by Richard Lewis BA MCIfA. The fieldwork was undertaken by Richard Lewis, Dr Graham Eyre-Morgan, Ross Cook, James Toseland, Iulia Rusu, Issica Baron, Jon Burton and Sophie Lewis. The copyright of this report is held by Black Mountains Archaeology Ltd, who have granted an exclusive licence Alun Griffiths (Contractors) Ltd and their clients enabling them to use and reproduce the material it contains. Ordnance Survey maps are reproduced under licence 100058761. Black Mountains Archaeology Ltd retains copyright of any annotations.

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*Wessex Archaeology, 2010, Defence Technical College and Aerospace Business Park, St Athan, Glamorgan: Archaeological Evaluation Report.*

10. Appendix I Figures

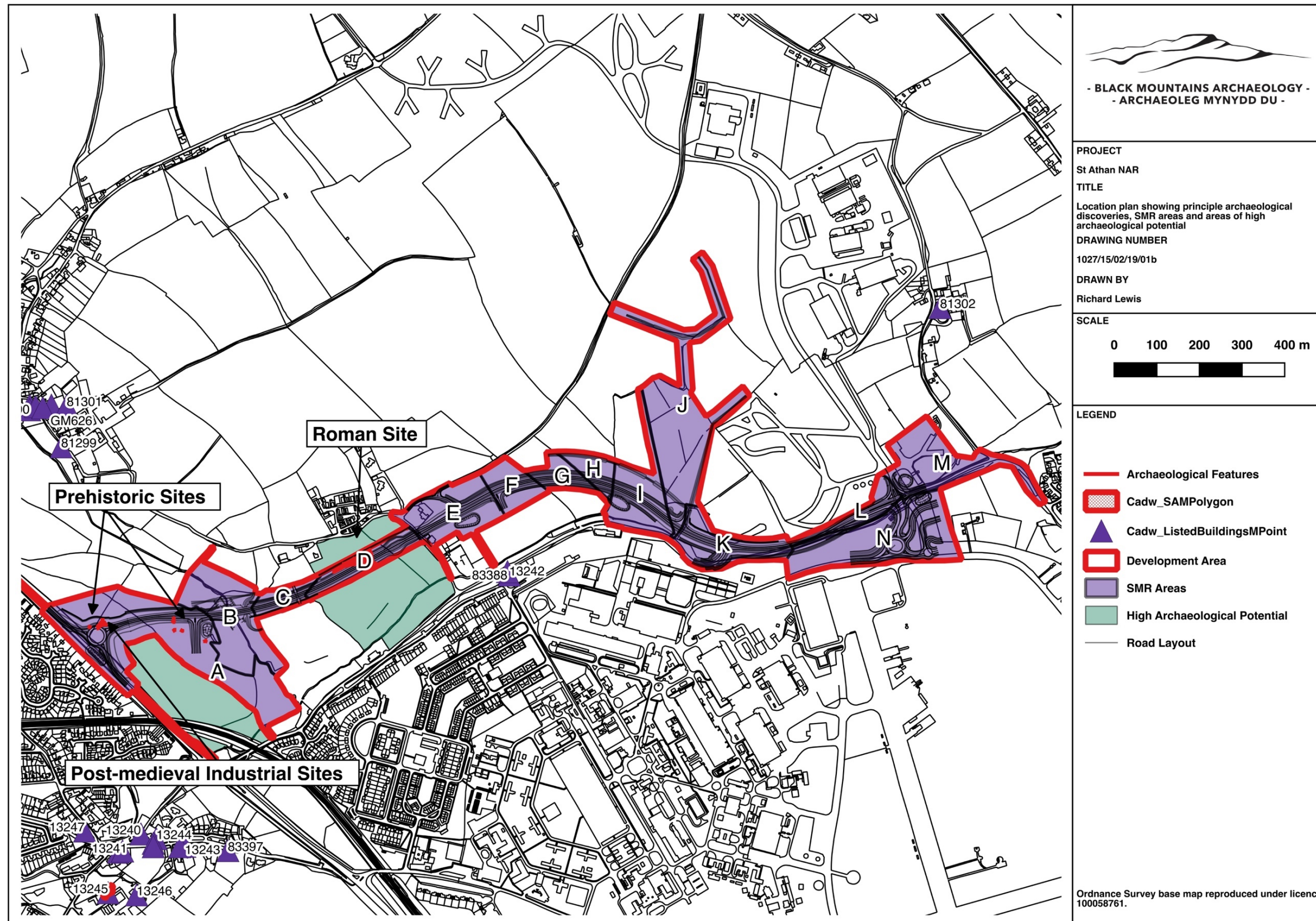


Figure 1. Location of St Athan Northern Access Road (NAR), archaeological Strip Map Record areas and areas of high archaeological potential.

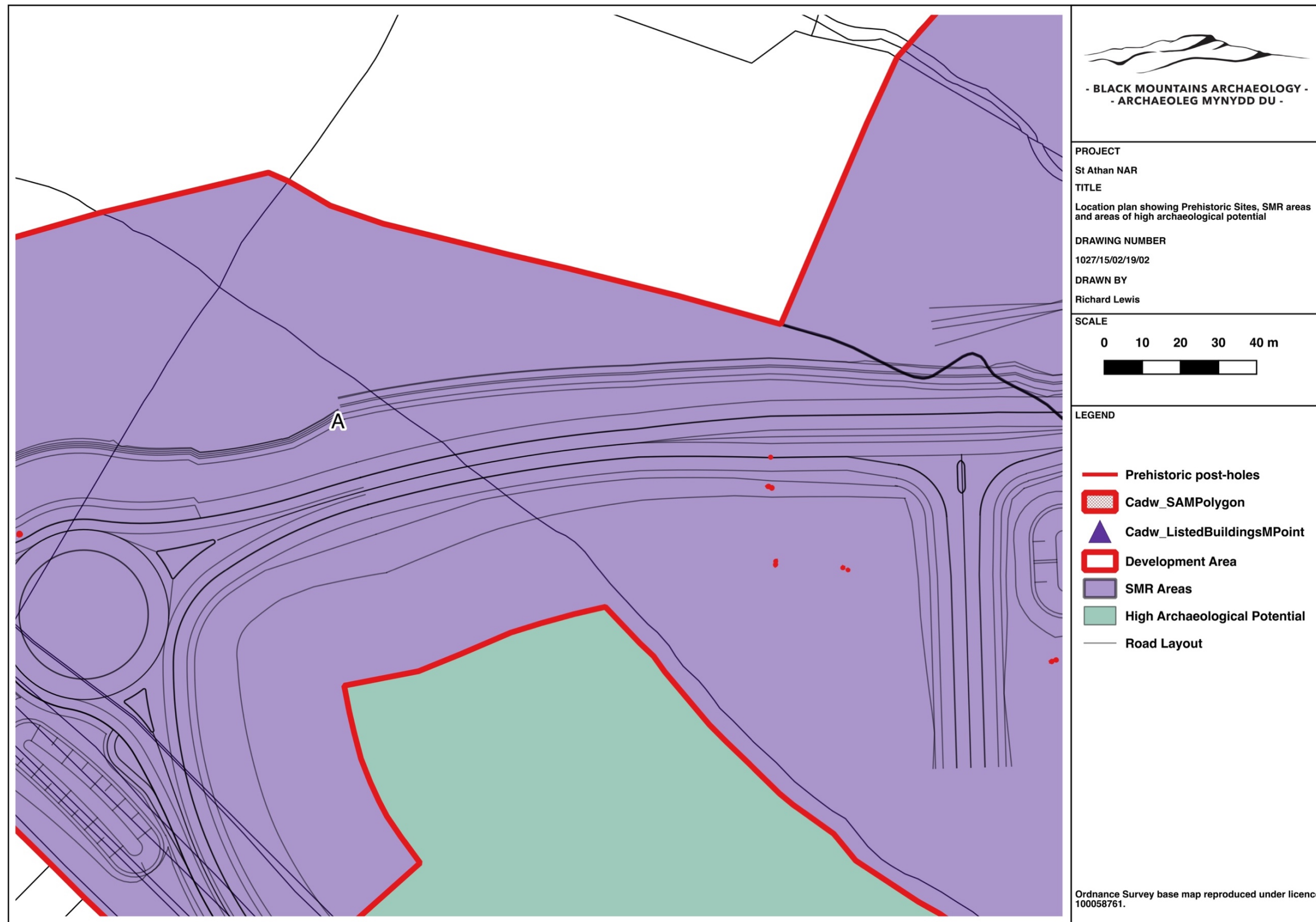


Figure 2. Location plan showing Prehistoric Sites, SMR Area A and areas of high archaeological potential.

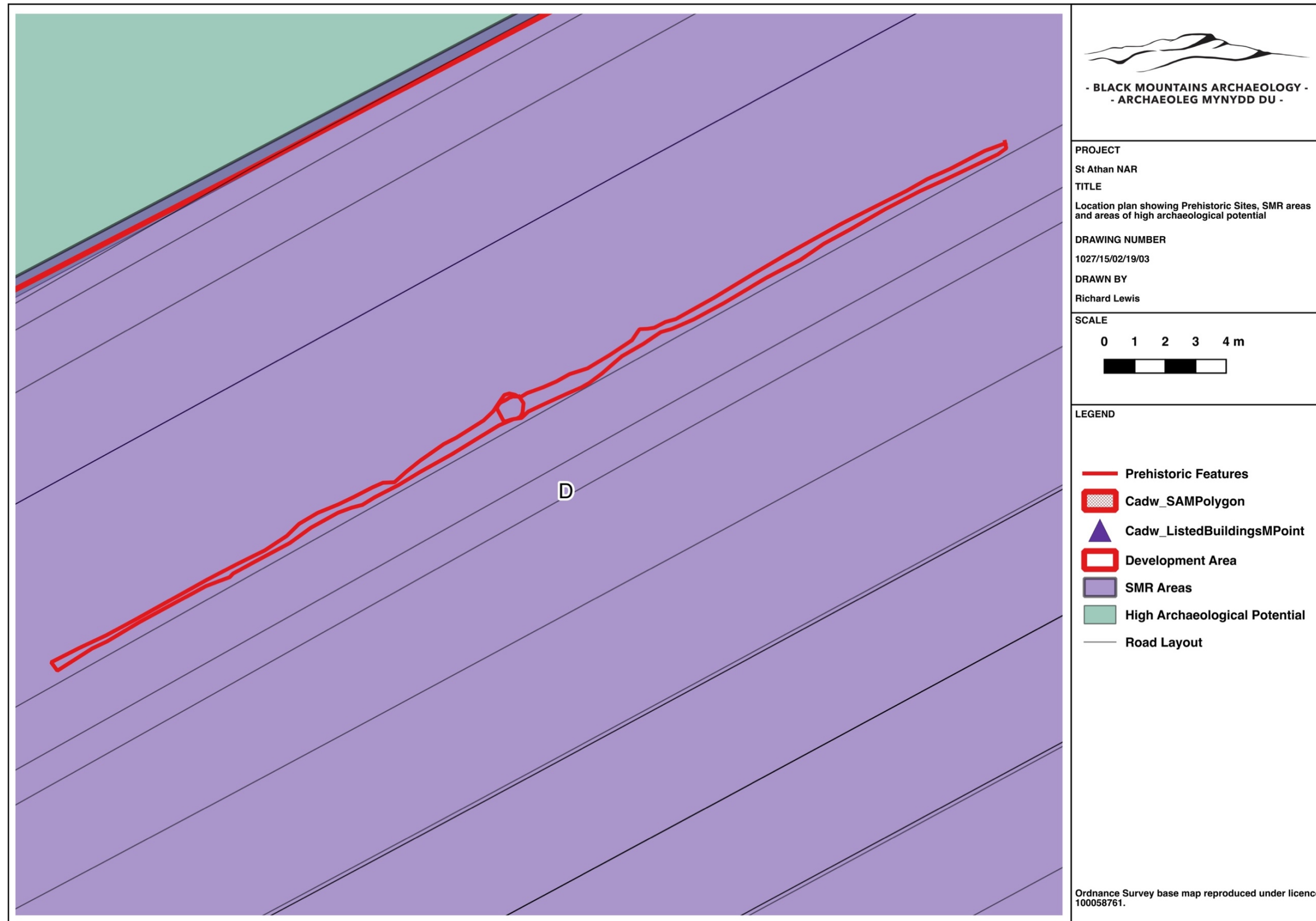


Figure 3. Location plan showing Prehistoric Sites, SMR Area D and areas of high archaeological potential.

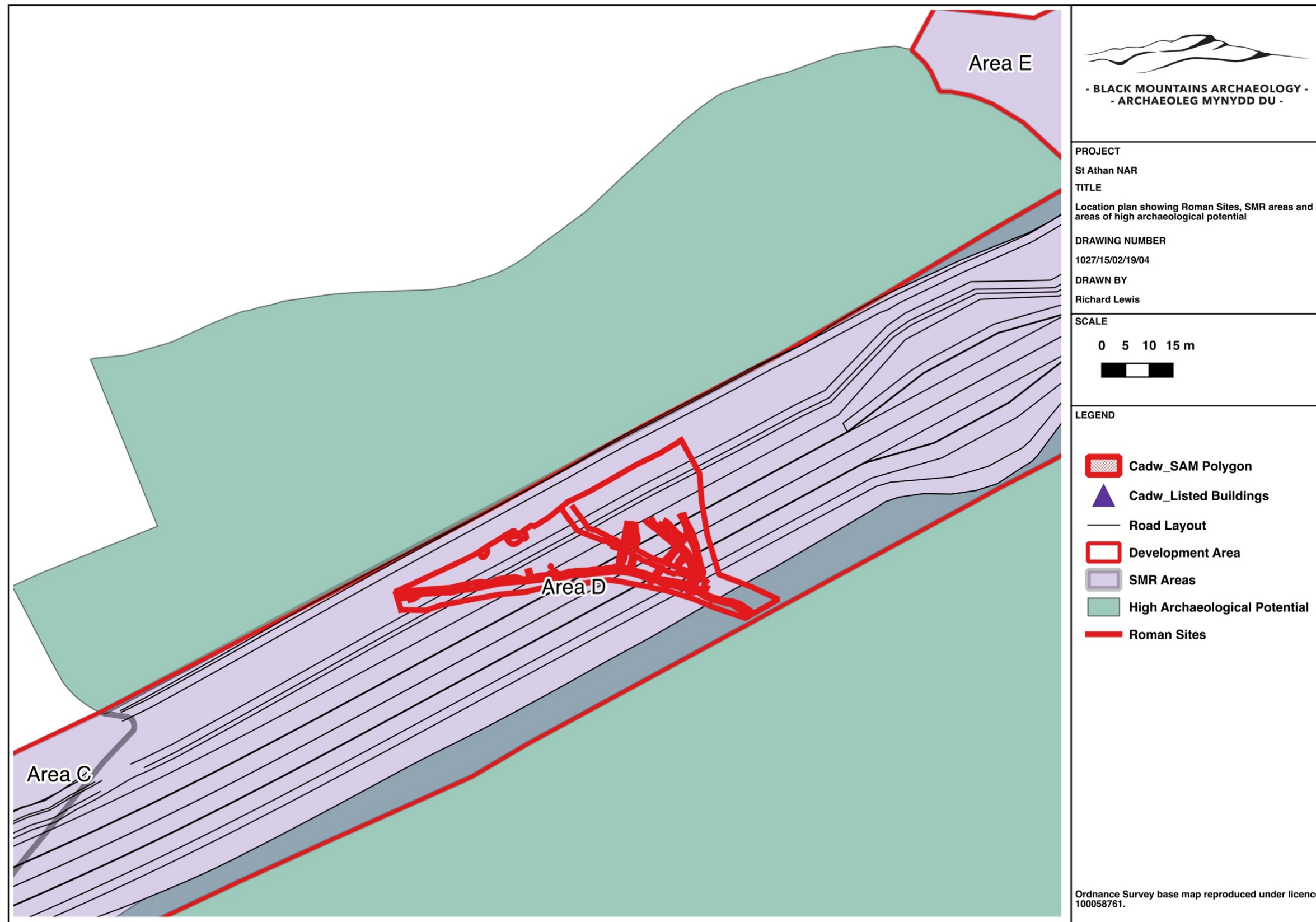


Figure 4. Location plan showing Roman Site, SMR Area D and areas of high archaeological potential).

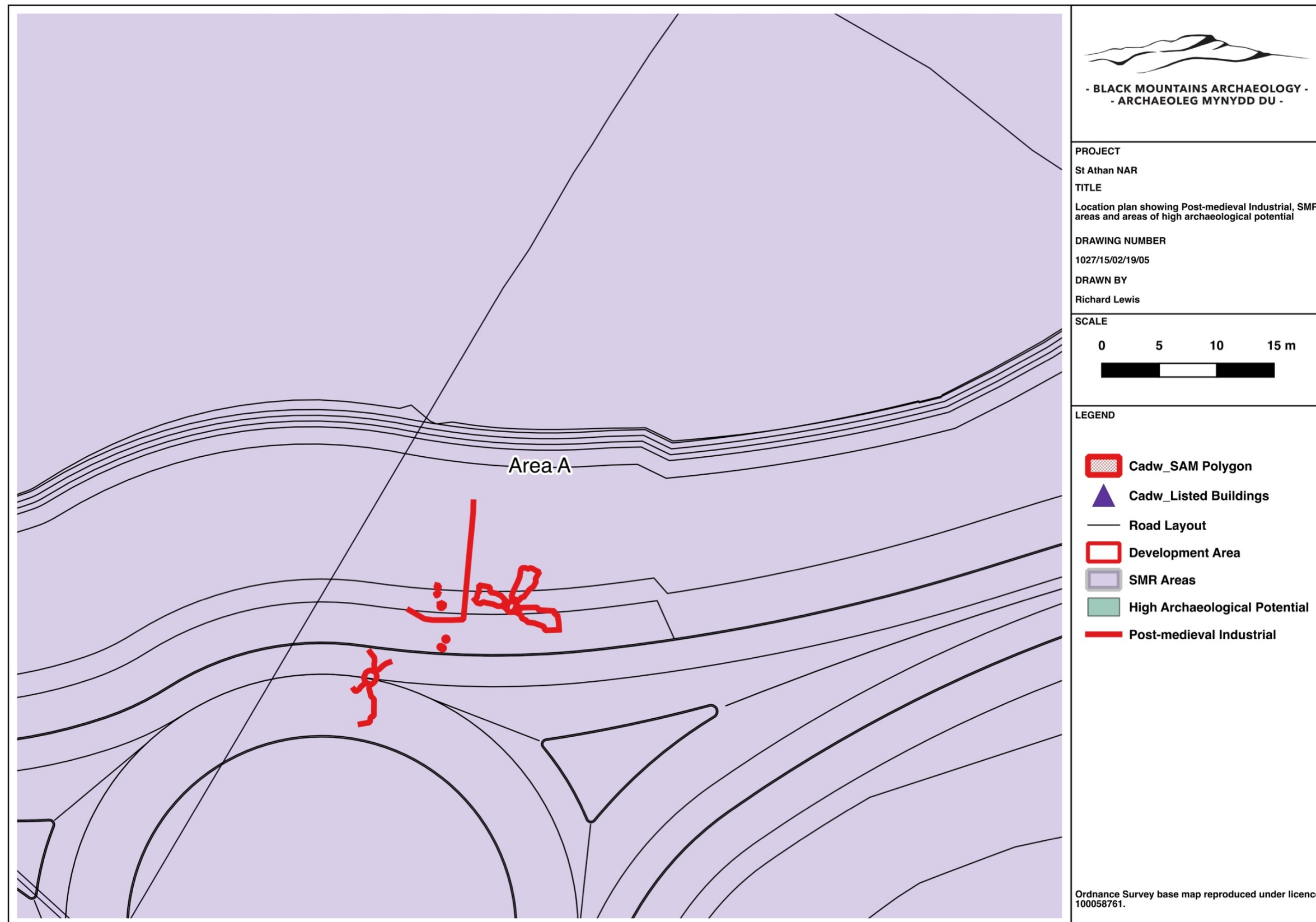


Figure 5. Location plan showing Post-medieval Industrial Sites in SMR Area A.



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