



St Monans Salt Pans and Wagonway Survey and Excavation, St Monans, Fife

Written Scheme of Investigation for Archaeological Evaluation

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St Monans Salt Pans Survey and Excavation, St Monans, Fife

Written Scheme of Investigation for Archaeological Evaluation

1 INTRODUCTION

1.1 Project background

- 1.1.1 Wessex Archaeology has been funded by Historic Environment Scotland to produce a written scheme of investigation (WSI) for a proposed geophysical survey and archaeological excavation of parts of the former Newark Coal and Salt Company's St Philips saltworks east of St Monans (Scheduled Monument 5529) and a section of the former wagonway connecting the saltworks to coal mines inland around Coal Farm. The survey area covers c. 8.5 ha within two parcels of land, while the overall saltworks site is within a 2 ha parcel of a land on the southern Fife shore. The Site Area is centred on NGR 353315 701806 (**Fig. 1**).
- 1.1.2 This phase of works looks to excavate and record deposits and structures related to the salt pans within areas at direct risk from coastal erosion as well as identify the overall extent and structure of the wagonway that brought coal to the pans, while using archaeology as a vehicle for skills development and increased wellbeing for volunteer participants.
- 1.1.3 Volunteer participants will include wounded, injured and sick (WIS) military veterans coordinated through Breaking Ground Heritage (BGH) for approximately half of the site days and members of YOUthSpace, a Fife Council group dedicated to providing digital skills to young people, for the remaining site days.
- 1.1.4 The geophysical survey will comprise a detailed gradiometer survey of up to 8 ha within two parcels of land: the first being around the former ramp running from the saltworks up to the 2nd parcel of land between Coal Farm and the coast. The survey is intended to confirm the location and layout of the wagonway that was mapped through aerial reconnaissance in the 1990s (Lewis et al 1999).
- 1.1.5 Detailed gradiometer survey has been considered the most appropriate technique in the first instance for the site. Gradiometer survey detects variation in the magnetisation of the subsurface and can detect a wide range of archaeological features. This method is preferable to other techniques, such as earth resistance, due to its ability to efficiently and rapidly map large areas. Other techniques can be justifiable depending upon the results of the gradiometer survey.
- 1.1.6 It is proposed that the entire survey area is subject to detailed gradiometer survey. As much as possible of the survey area will be surveyed but artificial obstructions, such as overgrown vegetation, trees, crops, pylons, hedgerows, drains, road, farming equipment etc. may prevent the total area being surveyed. The survey is completely non-intrusive with no need for survey pegs or grid markers.
- 1.1.7 The evaluation will comprise the excavation, investigation and recording of up to 100 square metres split across four areas of excavation. Two of these, Area 1 and Area 2, are focussed on the two sections of the site where coastal erosion is directly impacting previously

unexcavated structures and deposits: the southern half of salt pan houses 8 and 9 at the eastern end of the complex and the southern ends of salt pan houses 3 and 4 within the western central part of the complex. The remaining two areas, Area 3 and Area 4, will investigate the wagonway running into the complex from the fields to the north-east along the ramp, with Area 3 measuring approx. 3 x 2 m excavated over the line of the wagonway within the scheduled monument and Area 4 measuring approx. 3 x 2 m excavated on the line of the wagonway, which will subsequently be identified through geophysics in the unscheduled field to the north-east.

1.2 Scope of document

- 1.2.1 This WSI sets out the strategy and methodology by which Wessex Archaeology will implement the archaeological works. In format and content, it conforms with current best practice and to the guidance outlined in HES's *Policy Statement* (HES 2019) and the Chartered Institute for Archaeologists' (CIfA) Standards and guidance for field evaluations (CIfA 2023a; b).
- 1.2.2 This document forms part of the Scheduled Monument Consent (SMC) and Metal and Mineral Detecting Consent (MMDC) applications which will be submitted to HES prior to the project beginning. It will be also submitted to the Fife Council Archaeologist, archaeological advisor to the Local Planning Authority (LPA), for approval, prior to the start of the works.

1.3 Location, topography and geology

- 1.3.1 The proposed survey and excavation area is located on the south Fife coast east of St Monans.
- 1.3.2 Existing ground levels range from 1.5 m above Ordnance Datum (OD) for the salt pans themselves on the coast to 13.3 m above OD in the agricultural field to the north up the sharp slope from the coast. The intertidal zone is immediately south of the salt pans.
- 1.3.3 The underlying geology is mapped as sedimentary rocks (limestone) of the Lower Limestone Formation with the overlying superficial geology being marine sands and gravels from the Holocene (British Geological Survey online viewer 2026).
- 1.3.4 The soils on the site are likely to consist of brown earths of the Rowanhill Association which are derived mainly from Carboniferous sandstones, shales and limestones (National Soil Map of Scotland 2026).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

- 2.1.1 A summary of the archaeological background within the immediate surroundings of the site is presented below. Additional sources of information are referenced, as appropriate.

2.2 Archaeological and historical context

- 2.2.1 The Newark Coal and Salt Work Company was established in 1771, and began construction of the St Philips salt works to the east of St Monans in 1772. The salt works was made up of nine pan houses in a gently curved line along the coastline, with further structures including a reservoir for salt water between the pan houses and a cliff edge to the north. At the top of the cliff north of pan house 4 was a wind mill that pumped water from two rock-cut ponds in the intertidal zone through wooden water pipes within a rock-cut trench (the brine tunnel) that ran between pan houses 4 and 5. A wagonway brought coal from the

company's coal mine at Coal Farm, and may have carried the salt product away, although it may also have been taken by cart to St Monans. The complex demonstrates the connections necessary to make sea salt profitable during this period, with a nearby source of coal to fire the pans being a key requirement, along with easy export routes. The saltworks continued to produce salt into the 19th century, until the whole Scottish salt industry was broken by the removal of duty on imported salt which led to the cheaper rock salt from mines in Cheshire and elsewhere taking over the market.

- 2.2.2 Extensive studies into Scottish saltmaking during this period have been completed in recent years, as well as the publication of the previous studies on the St Philips site (Lewis *et al* 1999). Excavations completed by the 1722 Waggonway Heritage Group in Cockenzie, East Lothian on part of one pan house identified features discussed by a pamphlet extolling the efficiencies of the Scottish industry produced in the mid-18th century (Brownrigg 1748), and also operate their own small-scale salt pan as part of an ongoing experiment archaeology project. A study of the Scottish industry, sites and technological developments was recently published, including reference to the St Philips works (Whatley & Hambly 2023).

2.3 Previous investigations

- 2.3.1 Conservation and studies of the saltworks were begun in the 1980s by Prof. Colin Martin and members of the East Neuk Preservation Society (ENPS). These studies included inter-tidal surveys of the two large tidal ponds south of the salt pans, as well as extensive aerial reconnaissance during the cropmark-rich summers of 1984 and 1989. Coastal erosion was threatening the seaward edge of the complex and the ENPS had concerns about the future preservation of the wind mill on the ridge immediately north. In 1985 the easternmost pan house 9 was excavated to record it prior to any further loss by coastal erosion. A series of further surveys and excavations across the salt works complex were completed by Scotia Archaeology from 1990 – 1996, sponsored by Fife Council and Historic Scotland (Lewis *et al* 1999). These included clearance of up to 1 m of overburden from the extant pans to confirm their locations, excavation of pan houses 4 and 7 down to the floor levels and additional trenches around the complex to investigate other structures. The excavation entirely cleared pan house 7 but only the northern half of pan house 4 (see **Appendix 1** for site plan from these excavations, and the Project Design document for a layout of trenches on this plan).
- 2.3.2 In total ten trenches were completed across the complex, identifying a reservoir for salt water, additional buildings, the presence of wooden pipes within a rock-cut trench to bring water up from the ponds in the intertidal and confirming the location of the wagonway within the ramp down from the fields to the north. The interior and exterior of the windmill was excavated. A resistivity survey was completed in 1994 within the area between the pans and the cliff base, however this was done before the clearance of the 1.2 m of rubble overburden that had previously levelled the field and so results were inconclusive.
- 2.3.3 One trench investigated the wagonway (trench 8) however it was excavated in poor weather conditions and was inconclusive, although it did identify two linear features which may have been rail tracks along with a ledge of ashy clay which may relate to ballast along the wagonway line.

3 AIMS AND OBJECTIVES

3.1 Grant objectives

3.1.1 This project has the following objectives as agreed with HES's Grants Team:

- To identify, record and report on the at-risk archaeology within the areas of the St Monans salt pans site under threat from coastal erosion in order to preserve such structures, deposits, artefacts and other archaeological information by record prior to its damage or destruction;
- To provide archaeological skills training and support to military veterans and young people from the Fife area, working alongside our project partners Fife Field Archaeology Network, St Monans Pool and Pans SCIO, Archaeology Scotland and YOUNGSPACE Fife;
- To encourage participants from these groups to get involved in local heritage societies and further their interest in history and archaeology; and
- To full disseminate the results of the survey and excavation work through a variety of different and accessible mediums.

3.2 General aims

3.2.1 The general aims (or purpose) of the excavation, in compliance with the ClfA's standard and universal guidance for archaeological excavation (ClfA 2023a; b), are to examine, record and interpret the archaeological resource within the specified area or site, and to disseminate the results, in accordance with methods and research objectives defined in the approved project design.

3.3 General objectives

3.3.1 In order to achieve the above aims, the general objectives of the excavation are:

- To determine the presence or absence of archaeological features, deposits, structures, artefacts or ecofacts within the specified area;
- To establish, within the constraints of the excavation, the extent, character, date, condition and quality of any surviving archaeological remains;
- To place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance; and
- To make available information about the archaeological resource within the site by reporting on the results of the excavation.

3.4 Site-specific objectives

3.4.1 Following consideration of the archaeological potential of the site and the Scottish Archaeological Research Framework (<https://scarf.scot/national/>), the site-specific objectives of the excavation and survey works are:

- To investigate the structure and layout of the pan houses in comparison to recently excavated examples elsewhere and historical records;
- To examine and record previously unexcavated areas between the pan houses to check for further structures or features related to the operation of the complex; and
- To identify the structure and construction of the wagonway in comparison to other recently excavated examples.

4 GEOPHYSICAL SURVEY METHODS

4.1 Introduction

- 4.1.1 All works will be undertaken in accordance with the detailed methods set out within this WSI. Any significant variations to these methods will be agreed in writing with the Fife Council Archaeologist and HES, prior to being implemented.

4.2 Access

- 4.2.1 Wessex Archaeology will make all access arrangements for the geophysical survey works. The geophysical survey areas are presented in **Figure 1**.
- 4.2.2 Any areas which are not accessible during the survey, or which are deemed by Wessex Archaeology staff to be unsafe to access, will not form a part of this survey work. Any such areas will be documented for future reference.

4.3 Survey specification

- 4.3.1 The navigation display on cart-based system provides real time positioning enabling full site coverage without the need to set up individual grid nodes across the site. However, in order to ensure survey accuracy, the boundaries of the survey extent will be established using a Leica Captivate RTK GNSS or similar instrument.
- 4.3.2 All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a horizontal precision of at least 50 mm (target precision 20 mm).
- 4.3.3 Digital mapping and archaeological information gathered during any previous work by Wessex Archaeology on the site will be used to support the interpretation of the geophysical data.
- 4.3.4 An interpretation of the geophysical anomalies will be presented identifying likely and possible archaeological features, along with linear trends and areas of increased magnetic response.
- 4.3.5 Further details of the geophysical and survey equipment, methods, processing, and interpretation are described in **Appendix 2** and **Appendix 3**.

4.4 Instrument specification

Gradiometer survey specification

- 4.4.1 The detailed gradiometer survey at St Monans will be conducted using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously with an effective sensitivity of 0.03 nT over a ± 100 nT range.
- 4.4.2 Data will be collected at 0.08 m intervals along transects spaced 1 m apart, in accordance with European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015). Data will be collected in the zigzag method.
- 4.4.3 Where necessary, data from the survey will be subject to minimal correction processes. The precise steps required will be determined after data collection but would typically comprise a zero-mean traverse function (± 5 nT thresholds) to correct for variations in the calibration between the SenSys sensors used and a de-step function to account for variations in

traverse position due to varying ground cover and topography. The data will be processed using commercially available and in-house software which allows greyscale and trace plots to be produced. All efforts will be made during data collection to limit required processing and no further filtering will be applied.

5 EXCAVATION METHODS

5.1 Introduction

- 5.1.1 All works will be undertaken in accordance with the detailed methods set out within this WSI. Any significant variations to these methods will be agreed in writing with the Fife Council Archaeologist and HES, prior to being implemented.
- 5.1.2 The evaluation will comprise the excavation, investigation and recording of up to approx. 80 square metres split across two trenches (Areas 1 and 2).
- 5.1.3 Area 1 will cover the seaward southern halves of pan houses 3 and 4, and the spaces in between them, while Area 2 will cover the southern halves of pan houses 8 and 9, and the spaces in between the two, all within the scheduled monument. Both of these areas are within the extent of the previously opened area covering all the salt pan houses, but they focus on the seaward halves of two salt pan houses (3 and 8) that were not fully excavated beyond clearance of the wall tops. As salt pan houses 4 and 9 were previously excavated, at least in part, the uncovering of the seaward halves of these structures will allow for an inspection of the impact of excavation and reburial on the structures, providing additional information on long-term conservation. Within salt pan houses 3 and 8, the excavation will be working through unexcavated archaeological deposits under threat of partial or complete removal, rather than inspected the condition of parts of the structures previously excavated. A third trench (Area 3) within the scheduled monument measuring approx. 2 x 3 m will be opened across the suspected route of the wagonway, and will attempt to partially cover some of the previous excavation's trench 8, if this can be located.
- 5.1.4 A final trench of a similar size (Area 4) will be opened over the route of the wagonway outside the scheduled monument within the field to the north-east.
- 5.1.5 The approximate layout of the trenches (Area 1 - 3) within the scheduled monument are presented within **Figure 1**. The location of the fourth trench outside the scheduled area will be informed by the geophysical survey.

5.2 Setting out of the trenches

- 5.2.1 All trenches will be set out using GNSS or TST in the positions shown in **Figure 1**. Minor adjustments to the layout may be required to take account of any on-site constraints such as vegetation or located services. The trench locations will be tied into the Ordnance Survey (OS) National Grid and Ordnance Datum (OD) (Newlyn), as defined by OSGM15 and OSTN15.

5.3 Service location and other constraints

- 5.3.1 We will work with HES, the landowner and Fife Coastal & Countryside Trust to identify the presence of any below/above-ground services, and any ecological, environmental or other constraints.

- 5.3.2 Before excavation begins, the evaluation area will be walked over and visually inspected to identify, where possible, the location of any below/above-ground services. All trenches and their immediate surroundings will be scanned before excavation with a Cable Avoidance Tool (CAT) in order to verify the absence of any live underground services.

5.4 Excavation methods

- 5.4.1 All areas will be hand excavated. Where possible the turf will be cut and piled up within a part of the spoiling areas distinct from the soil/rubble to enable returfing to be completed after backfilling. After removal of turf the deposits will be removed using hand tools down to the first archaeological deposits.
- 5.4.2 The two trenches covering the pan houses (Areas 1 and 2) will be hand excavated to the floor level of the structures inside the pan houses, while externally they will be excavated to the former ground surface related to the operation of the pan houses, and a sample of any cut features within this surface will be excavated. This sample will comprise up to 50% of any discrete features and up to 10% of any linear features.
- 5.4.3 The trench investigating the wagonway within the scheduled monument (Area 3) will be hand excavated down to the first archaeological deposits relating to the wagonway. These will be cleaned and recorded but not further excavated in order to preserve the scheduled monument. Any investigation into the construction and development of the wagonway will be completed in the trench outside the scheduled area.
- 5.4.4 If an exceptional number and/or complexity of archaeological deposits are identified, sample excavation will aim to be minimally intrusive, but sufficient to resolve the principal aims of the excavation, to a level agreed with the Fife Council Archaeologist and HES.
- 5.4.5 If human remains are uncovered, the specific methods outlined below (section 5.10) will be followed.
- 5.4.6 Where complex archaeological stratification is encountered, deposits will be left *in situ* and alternative measures taken to assess their depth, as agreed with the Fife Council Archaeologist and HES. Where modern features are seen to truncate the archaeological stratification, these may be removed, where practicable, in a manner that does not damage the surrounding deposits in order to enable the depth of stratification to be assessed.
- 5.4.7 Excavated spoil heaps may be metal detected for finds recovery, however metal detectors will not be used within stratified deposits.

5.5 Recording

- 5.5.1 All exposed archaeological deposits and features will be recorded using Wessex Archaeology's pro forma recording system.
- 5.5.2 A complete drawn record of excavated archaeological features and deposits will be made. This will include plans and sections, drawn to appropriate scales (generally 1:20 or 1:50 for plans, 1:10 for sections) and tied to the OS National Grid. The OD heights of all principal features will be calculated (as defined by OSGM15 and OSTN15) and the levels added to the drawings.
- 5.5.3 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 10 megapixels. This will record both the detail and the general context of the principal features and the site as a whole. Digital images will be subject to

managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs will also be taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the evaluation.

5.6 Survey

- 5.6.1 The real time kinematic (RTK) survey of all trenches and features will be carried out using a Leica GNSS connected to Leica's SmartNet service. All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a three-dimensional accuracy of at least 50 mm.
- 5.6.2 Should the use of a GNSS not be available, the survey of all trenches and features will be carried out using a Leica Total Station Theodolite set up within a site grid tied into the OS National Grid and heights above OD (Newlyn). The grid will be established, with a three-dimensional accuracy of at least 50 mm, using a Leica GNSS connected to Leica's SmartNet service to receive RTK corrections.

5.7 Monitoring

- 5.7.1 Wessex Archaeology will inform the Fife Council Archaeologist of the start of the excavation and survey and their progress. Reasonable access will be arranged for the Fife Council Archaeologist to make site visits in order to inspect and monitor the progress of the excavation. Any variations to the WSI, if required to better address the project aims, will be agreed in advance with the client and the Fife Council Archaeologist.

5.8 Reinstatement

- 5.8.1 Trenches completed to the satisfaction of HES and the Fife Council Archaeologist will be backfilled using excavated materials in the order in which they were excavated, and left level on completion. The backfilling may be assisted by a mechanical excavator where appropriate. Where turf was cut successfully it will be placed back as the upper layer of backfilling. No other reinstatement or surface treatment will be undertaken.

5.9 Finds

- 5.9.1 All archaeological finds from excavated contexts will be retained, although those from features of modern date (20th century or later) may be recorded on site and not retained, depending on the site-specific objectives. Where appropriate, soil samples may be taken and sieved to aid in finds recovery. Any finds requiring conservation or specific storage conditions will be dealt with immediately in line with *First Aid for Finds* (Watkinson and Neal 1998).

5.10 Human remains

- 5.10.1 Every discovery of readily identifiable human remains made during archaeological excavations will be reported by the excavation director to the local police or Procurator Fiscal's office within 24 hours.
- 5.10.2 Where identified during the excavation phases of this work, any human remains will be fully recorded, excavated and removed from the site in compliance with terms imposed by the Procurator Fiscal's office. Excavation procedures relating to human remains will comply with Scots Law as set out in HES's (2016) *Operational Policy Paper 5: The Treatment of Human Remains in Archaeology*.

- 5.10.3 Any excavation and post-excavation processing of human remains will be undertaken in accordance with Wessex Archaeology protocols and guidelines, and in line with current guidance documents (e.g. McKinley 2013) and the standards set out in ClfA *Technical Paper 13 Excavation and post-excavation treatment of cremated and inhumed remains*. Appropriate specialist guidance/site visits will be undertaken if required.
- 5.10.4 The final deposition of human remains subsequent to the appropriate level of osteological analysis and other specialist sampling/examinations will be in accordance with the terms agreed with the Procurator Fiscal's office.

5.11 Environmental sampling

- 5.11.1 All sampling will be undertaken following Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015).
- 5.11.2 Bulk environmental soil samples, for the recovery of plant macrofossils, wood charcoal, small animal bones and other small artefacts, will be taken as appropriate from well-sealed and dateable contexts or features. In general, features directly associated with particular activities (eg, pits, latrines, cesspits, hearths, ovens, kilns, and corn driers) should be prioritised for sampling over features, such as ditches or postholes, which are likely to contain reworked and residual material.
- 5.11.3 If waterlogged or mineralised deposits are encountered, an environmental sampling strategy will be devised and agreed with the Fife Council Archaeologist as appropriate. Specialist guidance will be provided by a member of Wessex Archaeology's geoarchaeological and environmental team, with site visits undertaken if required.
- 5.11.4 Any samples will be of an appropriate size – typically 40 litres for the recovery of environmental evidence from dry contexts, and 10 litres from waterlogged deposits.
- 5.11.5 Following specialist advice, other sampling methods such as monolith, Kubiena or contiguous small bulk (column) samples may be employed to enable investigation of deposits with regard to microfossils (eg, pollen, diatoms) and macrofossils (eg, molluscs, insects), soil micromorphological or soil chemical analyses.

6 POST-EXCAVATION METHODS AND REPORTING

6.1 Stratigraphic evidence

- 6.1.1 All written and drawn records from the evaluation will be collated, checked for consistency and stratigraphic relationships. Key data will be transcribed into a digital database, which can be updated during any future analyses. Archaeological features and deposits will be preliminary phased using stratigraphic relationships and the spot dating from finds, particularly pottery.
- 6.1.2 A written description will be made of all archaeologically significant features and deposits that were exposed and excavated, ordered either by trench or by period as appropriate. Detail of all contexts will be provided in trench tables in the appendix of the report.

6.2 Excavated finds evidence

- 6.2.1 All retained finds from the excavations will, as a minimum, be washed, weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the evaluation. The report will include a table of finds by feature/context or trench.



6.2.2 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by Wessex Archaeology in-house conservation staff, or by another approved conservation centre.

6.2.3 Finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014a).

6.3 Environmental evidence

6.3.1 Bulk environmental soil samples including those that may contain human bone will be processed by standard flotation methods and scanned to assess the environmental potential of deposits. The flot will be retained on a 0.25 mm mesh, with residues fractionated into 5.6/4 mm, 2 mm, 1 mm and 0.5 mm and dried if necessary. Coarse fraction (>5.6/4 mm) will be sorted, weighed and discarded, with any finds recovered given to the appropriate specialist. Finer residues will be retained until after any analyses and discarded following final reporting (in accordance with the Selection policy, below).

6.3.2 In the case of samples from cremation-related deposits the flots will be retained on a 0.25 mm mesh, with residues fractionated into 4 mm, 2 mm and 1 mm. In the case of samples from inhumation deposits, the sample will be artefact sieved through 9.5 mm and 1 mm mesh sizes. The coarse fractions (9.5 mm) will be sorted with any finds recovered given to the appropriate specialist together with the finer residues.

6.3.3 Any waterlogged or mineralised samples will be processed by standard waterlogged flotation methods.

6.4 Reporting

General

6.4.1 Following completion of the fieldwork a draft data structure report will be submitted for approval to the client and the Fife Council Archaeologist, within 12 weeks. Once approved, a final version will be submitted.

6.4.2 The data structure report will include the following elements:

- a non-technical summary;
- project number, planning reference numbers, dates of fieldwork and National Grid Reference;
- an account of the background to the project and circumstances of work;
- the methodologies used;
- a description of the archaeology identified;
- a summary of the artefactual/environmental material recovered from the site;
- recommendations for further work, should this be warranted;
- plans and sections at an appropriate scale locating the site, geophysical plots; location of known archaeological structures, architectural features and observations, and deposits and their extent;
- details of the archive and its proposed location
- Appendices inclusive of:

- a detailed context index subdivided by trench number;
- tabulation of finds data by context and by material type;
- tabulation of small finds;
- tabulation of environmental samples by context and potential;
- tabulation of the graphics record; and
- tabulation of the photographic archive.

6.4.3 A copy of the archive report(s) and surveyed spatial digital data (.dxf or shapefile format) relating to the archaeological findings will be deposited with HES.

Publication

6.4.4 Following the completion of all fieldwork, the need for additional post excavation work and any other forms of publication will be assessed, in consultation with the Fife Council Archaeologist and HES.

OASIS and DES

6.4.5 An OASIS online record (<http://oasis.ac.uk/pages/wiki/Main>), including an entry for Discovery and Excavation in Scotland (DES) will be created, with key fields completed, and a .pdf version of the final report submitted. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service ArchSearch catalogue (a paper copy will also be included with the archive).

7 ARCHIVE STORAGE AND CURATION

7.1 Treasure Trove

7.1.1 Upon completion of all fieldwork details of the site name, location, excavating unit, point of contact for the project and composition/size of archaeological assemblage will be submitted to the Treasure Trove Unit via the 'Standard organised fieldwork reporting' and 'Reporting of finds for Treasure Trove Assessment' forms.

7.1.2 Under the laws of Treasure Trove and *bona vacantia*, all material recovered by archaeological intervention in Scotland belongs to the Crown. Material may not be removed from Scotland without the prior written permission of the Queen's and Lord Treasurer's Remembrancer. Should it be necessary to transport finds outside of Scotland then permission will be sought via an '*Application form for authority to borrow unallocated Treasure Trove for research purposes*'.

7.2 Museum

7.2.1 The archive will be deposited with HES and the Fife Historic HER. The final deposition of any artefacts/ecofacts will be allocated through the Treasure Trove Unit panel, with the assumption being that the St Andrews Museum will be the final point of deposition.

7.2.2 Provision has been made for the cost of long-term storage in the post-fieldwork costs. The museum will receive notification following review by the Treasure Trove Unit panel and an accession number will be obtained.



7.3 Preparation of archive

- 7.3.1 The complete project archive, which may include paper records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by St Andrews Museum, and in general following nationally recommended guidelines (SMA 1995; ClfA 2014b; Brown 2011; ADS 2013). The archive will usually be deposited within one year of the completion of the project, with the agreement of the client.

7.4 Selection policy

- 7.4.1 Wessex Archaeology follows national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum, and fully documented in the project archive. Material not selected for retention may be used for teaching or reference collections by the museum, or by Wessex Archaeology.

7.5 Security copy

- 7.5.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

8 OUTREACH AND SOCIAL MEDIA

- 8.1.1 In line with its charitable aims, Wessex Archaeology will, where possible and in consultation with HES, seek opportunities to disseminate the results of the evaluation and engage with the local community through social media, press releases, open days and volunteer involvement, while taking into account issues such as Health & Safety, confidentiality and vandalism. A draft communications plan for this work has been submitted to HES.

9 COPYRIGHT

9.1 Archive and report copyright

- 9.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*. In some instances, certain regional museums may require absolute transfer of copyright, rather than a licence; this should be dealt with on a case-by-case basis.
- 9.1.2 Information relating to the project will be deposited with the HER where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research, or development control within the planning process.

9.2 Third party data copyright

- 9.2.1 This document, the evaluation report and the project archive may contain material that is non-Wessex Archaeology copyright (e.g., Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

10 WESSEX ARCHAEOLOGY PROCEDURES

10.1 External quality standards

- 10.1.1 Wessex Archaeology is registered as an archaeological organisation with the Chartered Institute for Archaeologists (CIfA) and fully endorses its *Code of conduct* (CIfA 2014c) and *Regulations for professional conduct* (CIfA 2019). All staff directly employed or subcontracted by Wessex Archaeology will be of a standard approved by Wessex Archaeology, and archaeological staff will be employed in line with the CIfA codes of practice and will normally be members of the CIfA.

10.2 Personnel

- 10.2.1 The fieldwork will be directed and supervised by an experienced archaeologist from Wessex Archaeology's core staff, who will be on site at all times for the length of archaeological fieldwork as required. The overall responsibility for the conduct and management of the project will be held by one of Wessex Archaeology's project managers, who will visit the fieldwork as appropriate to monitor progress and to ensure that the scope of works is adhered to. Where required, monitoring visits may also be undertaken by Wessex Archaeology's Health and Safety manager. The appointed project manager and fieldwork director will be involved in all phases of the investigation through to its completion.
- 10.2.2 The analysis of any finds and environmental data will be undertaken by Wessex Archaeology core staff or external specialists, using Wessex Archaeology's standard methods, under the supervision of the departmental managers and the overall direction of the project manager. A complete list of finds and environmental specialists can be provided on request.
- 10.2.3 The following key staff are proposed:
- Project Manager Dr Andrew Bicket (Wessex Archaeology);
 - Fieldwork Director Ben Saunders (Wessex Archaeology);
 - Wagonway and saltworks expert Ed Bethune (1722 Waggonway Heritage Group);
 - Geophysical Surveyor Jack Trueman (Wessex Archaeology).
- 10.2.4 Wessex Archaeology reserves the right, due to unforeseen circumstances (e.g. annual leave, sick leave, maternity, retirement etc) to replace nominated personnel with alternative members of staff of comparable expertise and experience.

10.3 Internal quality standards

- 10.3.1 Wessex Archaeology is an ISO 9001 accredited organisation (certificate number FS 606559), confirming the operation of a Quality Management System which complies with



the requirements of ISO 9001:2015 – covering professional archaeological and heritage advice and services. The award of the ISO 9001 certificate, independently audited by the British Standards Institution (BSI), demonstrates Wessex Archaeology's commitment to providing quality heritage services to our clients. ISO (the International Organisation for Standardisation) is the most recognised standards body in the world, helping to drive excellence and continuous improvement within businesses.

- 10.3.2 Wessex Archaeology operates a computer-assisted project management system. Projects are assigned to individual project managers who are responsible for the successful completion of all aspects of the project. This includes monitoring project progress and quality; controlling the project budget from inception to completion; and all aspects of Health and Safety for the project. At all stages the project manager will carefully assess and monitor performance of staff and adherence to objectives, timetables and budgets, while the manager's performance is monitored in turn by the team leader or regional director.
- 10.3.3 All work is monitored and checked whilst in progress on a regular basis by the project manager, and all reports and other documents are checked (where applicable) by the team leader/technical manager, or regional director, before being issued. A series of guideline documents or manuals form the basis for all work. The technical managers in the Graphics, Finds & Analysis, GeoServices and IT sections provide additional assistance and advice.
- 10.3.4 All staff are responsible for following Wessex Archaeology's quality standards but the overall adherence to and setting of these standards is the responsibility of the senior management team in consultation with the team leaders/regional directors who also ensure projects are adequately programmed and resourced within Wessex Archaeology's portfolio of project commitments.

10.4 Health and Safety

- 10.4.1 Health and Safety considerations will be of paramount importance in conducting all fieldwork. Safe working practices will override archaeological considerations at all times. Wessex Archaeology will supply trained, competent and suitably qualified staff to perform the tasks and operate the equipment used on site. All work will be carried out in accordance with the *Health and Safety at Work Act 1974* and the *Management of Health and Safety at Work Regulations 1999*, and all other applicable Health and Safety legislation, regulations and codes of practice in force at the time.
- 10.4.2 Wessex Archaeology will supply a copy of the company's Health and Safety Policy and a Risk Assessment to the client before the commencement of the evaluation. The Risk Assessment will have been read, understood and signed by all staff attending the site before any fieldwork commences. Wessex Archaeology staff will comply with the Personal Protective Equipment (PPE) requirements for working on the site, and any other specific additional requirements of the principal contractor.
- 10.4.3 All fieldwork staff are certified through the Construction Skills Certification Scheme (CSCS) or UK equivalent and have had UKATA Asbestos Awareness Training. Key staff also have qualifications in the use of CAT and Genny equipment and as banksmen/Plant Machinery Marshalls through the National Plant Operators Recognitions Scheme (NPORS).

10.5 Insurance

- 10.5.1 Wessex Archaeology has both Public Liability (£15,000,000) and Professional Indemnity Insurance (£10,000,000).

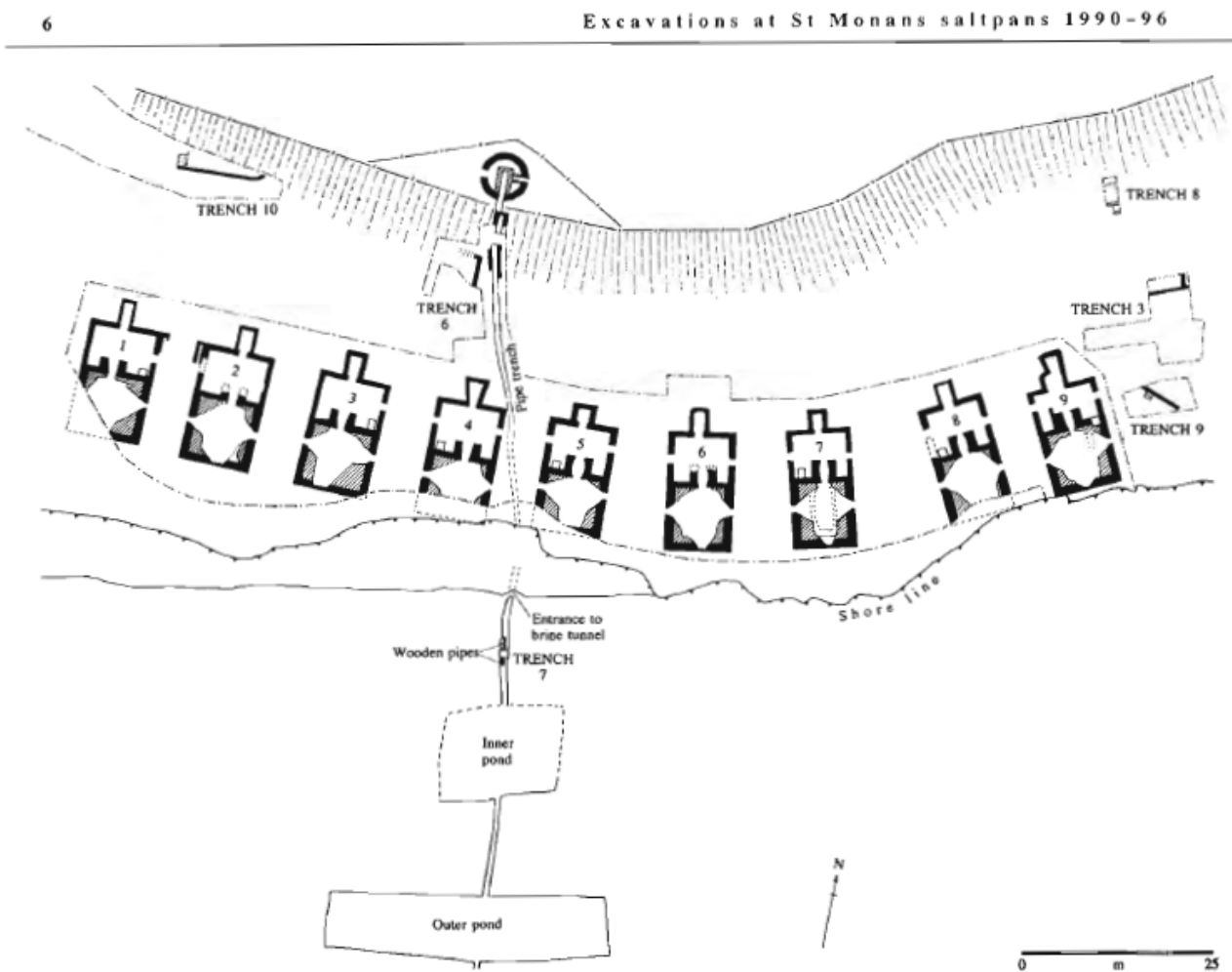
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APPENDICES

Appendix 1: Site Plan for Lewis *et al* 1999



Illus 2.1. Plan of the excavation trenches and the principal structures and features.

Appendix 2: Survey equipment and data processing

CART-BASED GRADIOMETER SURVEY

Survey methods and equipment

The magnetic data for this project will be acquired using a non-magnetic cart fitted with four SenSys FGM650/3 magnetic gradiometers. The instrument has four sensor assemblies fixed horizontally 1 m apart allowing four traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1m separation and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03 nT over a ± 100 nT range, and measurements from each sensor are logged at intervals of 0.08 m. All of the data are then relayed to a Leica Viva CS35 tablet, running the MLgrad601 program, which is used to record the survey data from the array of probes at a rate of 20 Hz. The program also receives measurements from a GPS system, which is fixed to the cart at a measured distance from the sensors, providing real time locational data for each data point.

The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. This receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by European Archaeologiae Consilium recommendations (Schmidt *et al.* 2015) for geophysical surveys.

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125 m intervals along traverses spaced up to 0.25m apart.

Post-processing

The magnetic data collected during the detailed survey are downloaded from the SenSys cart system for processing and analysis using in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

The cart-based system generally requires a lesser amount of post-processing than handheld gradiometer instruments. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error; caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps may include:

- GPS DeStripe – Determines the median of each transect and then subtracts that value from each datapoint in the transect. May be used to remove the striping effect seen within a survey caused by directional effects, drift, etc.
- GPS Base Interpolation – Sets the X & Y interval of the interpolated data and the track radius (area around each datapoint that is included in the interpolated result).
- Discard Overlaps - Intended to eliminate a track(s) that have been collected too close to one another. Without this, the results of the interpolation process can be distorted as it tries to accommodate very close points with potentially differing values.

Typical displays of the data used during processing and analysis:

- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies. XY plots can be made available upon request.
- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

Appendix 3: Geophysical interpretation

The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural, and uncertain or geological origin.

The archaeological category is used for features when the form, nature, and pattern of the anomaly are indicative of archaeological remains. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into two groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Possible archaeology – used for features which give a response, but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

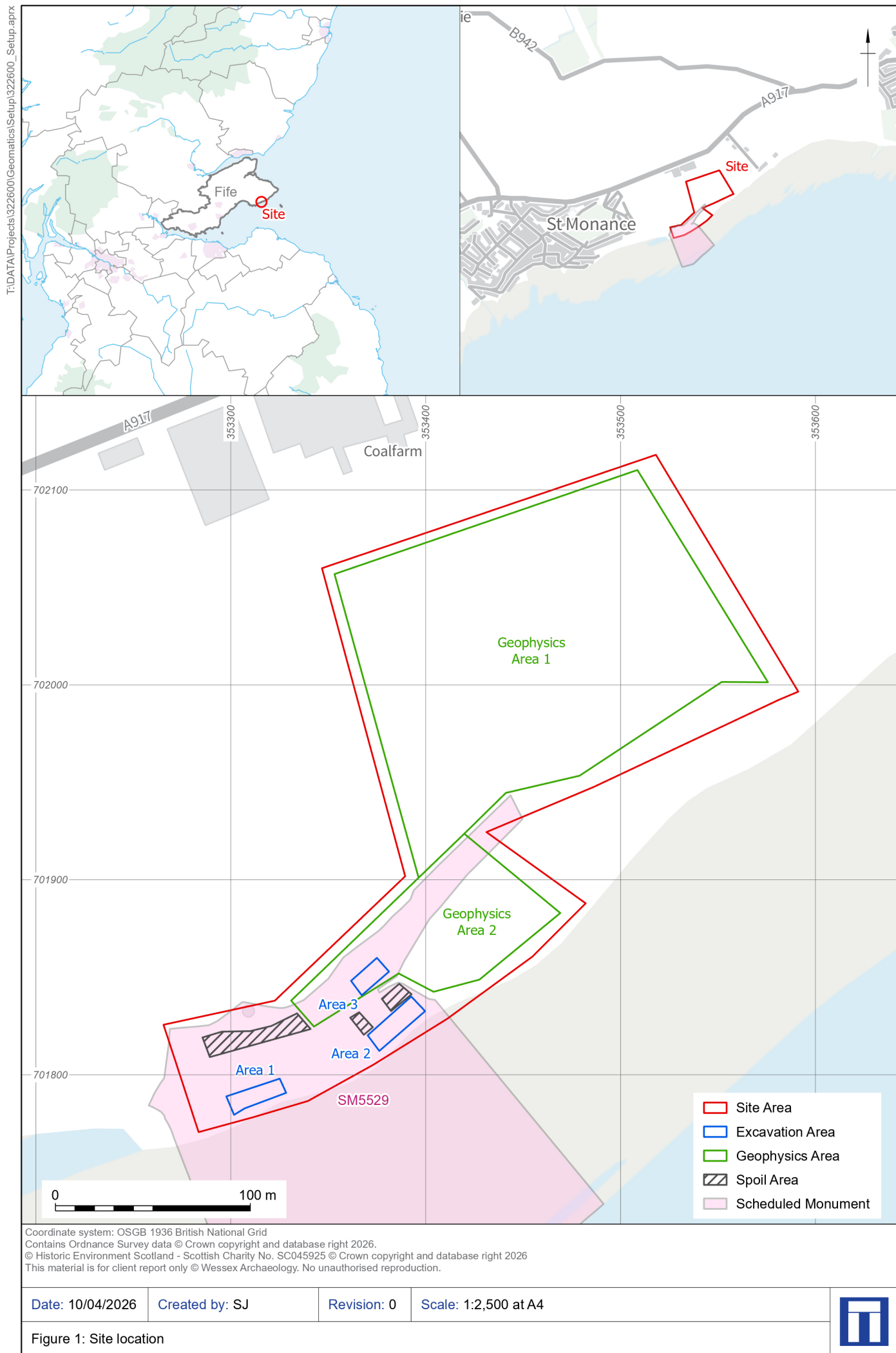
- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Agricultural ditches – used for ditch sections that are aligned parallel to existing boundaries and former field boundaries that are not considered to be of archaeological significance.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.



- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative, or broad bipolar (positive and negative) anomalies.





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