PROJECT DESIGN

Introduction

This project design considers the application for limited excavation within the Scheduled Monument at the Beorgs of Uyea (SM Index No 890), Northmavine, Mainland Shetland in the context of the wider research programme of the North Roe Felsite Project (NRFP). It sets out to establish a justification of the proposed excavation at the Beorgs of Uyea and how the work to be done in the scheduled area builds on work already done there and elsewhere in the felsite quarry complex. It details how the work is relevant to and aligns with Scottish historic environment policy and guidance, ScARF as the national research framework and the conservation and management of the Beorgs of Uyea Scheduled Monument itself.

Section 1: This details the background of the project and work to date. It introduces the proposed excavation at the Beorgs of Uyea and sets out how it will align with wider national historic environment policies and research frameworks.

Section 2: This details the methodology to be adopted in relation to the proposed excavation, recording techniques, sampling strategy, post-excavation analysis and reporting.

Section 3: This section provides details of the team working on the ground, their experience and capacity to deliver the project. The work environment will be outlined (Health and Safety, Risk Assessment and other relevant issues).

SECTION 1

Introduction

Shetland is the northernmost part of Europe where farming was practiced during the Neolithic (3800-2500 BC). However, as has been identified in the Scotish Archaeological Research Framework (Brophy and Sheridan 2012, 79; see also Sheridan 2012) there are major gaps in our understanding of this period. The North Roe Felsite Project is addressing a central research issue; the role of a visually distinctive stone; felsite, which during the Neolithic period people transformed into polished axes and knives. The source is at North Roe, mainland Shetland where there is a spectacularly well-preserved major quarry complex. Archaeological and geochemical/petrological survey with targetted excavation is identifying the scale, character and date of extraction processes. A project GIS integrates data from the quarry with analysis and mapping of felsite artifacts from across the Shetland archipelago, facilitating uniquely detailed and integrated insights into the life path and role of these objects in Neolithic Shetland.

In 2016 fieldwork will have specific foci. Characterization of felsite axes and knives in museum collections will continue. A programme of experimental work to understand the processes of working felsite is ongoing. As part of the field season a programme of workshops will be organised in collaboration with Shetland Museum and Archives, recording axes in private collections and providing local people with information and active participation in the project. Geochemical and petrological prospection will be completed with a particular focus on Ronas Hill, the highest point of Shetland and the western coastal central part of the complex. The focus of survey will be the Beorgs of Uyea where important features were discovered in 2014. It is planned that targetted excavation will take place at Grut Wells and the Beorgs. This project design focuses on the rationale and justification for the proposed excavation within the area of the Scheduled Monument at the Beorgs of Uyea (SM Index Number 890).

Project Background

Shetland is the nothernmost part of Europe where farming was practiced during the Neolithic (3800-2500 BC, see Mahler 2011). But as Sheridan (2012) has recently pointed out the framework of Neolithic chronology and understanding of key developments is very poor. The objective of the North

Roe Felsite Project is to address a central research question identified by the Scottish Archaeological Research Forum (Brophy and Sheridan 2012, 76); the role of a visually distinctive island stone source; (riebeckite) felsite, which Neolithic people transformed into polished axes and the distinctive objects termed Shetland knives. These are found across the archipelago but not outside it. Contexts and find circumstances indicate that the felsite objects had both a functional and ceremonial context (Ballin 2011a; 2013; 2014). In a wider European context (see Cooney 2015) the Shetland felsite project provides a unique opportunity to trace the cultural life of felsite objects from source through their use-life and deposition, examining their wider social roles as they were moved from the quarry across this island world.

The source is at North Roe, mainland Shetland where grey-blue felsite dykes stand out against red granite bedrock (**Fig. 1**). The spectacular quarry complex extends over some 60km square and is the best preserved such complex in Britain or Ireland. The project also provides a detailed case study for comparison with the use of island lithic sources elsewhere in northwest Europe (Cooney 2015) and the role of axes and related objects in the development of the Neolithic (Whittle et al. 2011). It complements the principal investigator's research on two other island sources (Cooney et al. 2012a; 2012b; 2013a).

Based on Phemister's work (Phemister et al. 1952), the (riebeckite) felsite from North Roe has been defined as Group XXII in the British scheme for the petrological grouping of stone axes (Ritchie and Scott 1988). Reibeckite is a sodium-rich member of the amphibole group of silicate minerals and typically forms dark blue elongated to fibrous crystals. Its occurrence in felsic volcanic rock is very unusual, as is the spherulitic form of crystals that can occur in the North Roe reibeckite felsite (Davis 2012), which provides visually striking material when used for axe and knive production. Ritchie (1968; 1994) provided the first archaeological assessment of objects from this source. The project is developing the reconnaissance work and reviews of the current state of knowledge by Ballin (2011a; 2011b; 2012, 2013; 2015; forthcoming).

Project design and 2013-4 seasons

A project Geographical Information System (GIS) is the central methodological axis in the research programme. This facilitates the

integration of and interrogation of a range of data sets (archaeological, geochemical and petrological) at different scales of analysis. At a site-specific level the focus is on understanding individual quarrying events and the production processes involved in working felsite. At a quarry-wide level archaeological, petrological and geochemical data is being gathered that will provide the basis for characterising and differentiating production areas within the complex. On a regional scale the focus is on the processes by which objects made of felsite were moved, used and deposited across the Shetland archipelago and their roles in Neolithic society.

The key results from the first seasons of fieldwork in 2013 (carried out with grant aid from the NGS Global Exploration Fund Northern Europe – GEFNE54-12; Cooney et al. 2013b: NRFP Report 1) and 2014 (funding from a range of sources, including self-funding; for results of museum analysis see Ballin 2015: NRFP Report 2) were:

• PXRF (portable x-ray fluoresence) readings and detailed petrologicial mapping and collection of samples for microscopic petrological analysis with a focus on the Beorgs of Uyea and Midfield areas of the quarry complex (see **Figs. 2 and 3**; Cooney et al. 2013b: NRFP Report 1, 2013). Associated work took place in the Shetland Museum (Lerwick; see Ballin 2015: NRFP 2, 2014) and National Museums Scotland (Edinburgh). PXRF analyses were undertaken at outcrop, debitage from tool production episodes and polished stone knives and axes from museum collections. Of almost 500 implements described as Group XXII the project has analysed over 250. Over 2,000 PXRF analyses have carried out. Over 150 rock samples were collected in the field and initial analysis on 40 thin sections prepared for microscopic petrological analysis has been carried out. This provides the basis for a differentiation between areas and dykes within the complex and to trace the origin of objects back to particular locations in the complex.

• Detailed survey of an area at Grut Wells (Midfield) demonstrated the presence of pits apparently following the line of a reibeckite felsite dyke (**Fig 4**). The quarry pits fall into two distinct groups with a clear spatial relationship between large blocks of felsite and the pits. A sampling strategy was utilised to understand the surface accumulation of felsite debitage. In 2014 the excavation of two trenches was undertaken (**Fig. 5**). While no trace of the felsite dyke was found in Trench 1 (Pit 8) it demonstrated a complex sequence of deposits with large quantities of struck felsite flakes

from the quarrying of material. The results of the initial excavation of Trench 2 (Pit 7) was important in revealing the felsite dyke with direct evidence of quarrying of the felsite (**Fig. 6**). Initial survey was also carried out at the Beorgs of Uyea.

•Analysis of the collections of the Shetland Museum demonstrated the dominance of felsite as a lithic source for these artifact types in Shetland. Almost 75% (94/126) of axes are made of felsite and 95% (57/60) of the knives. Analysis of the knives and axes suggests that there may have been two distinct production lines; one for well-made and highly polished artifacts intended for ritual use and deposition and one for general use (Ballin 2013; Ballin 2014: NRFP Report 2, 2014).

•Work in the field demonstrated that the impact of weathering, particularly freeze/thaw weathering, has be addressed to definitively identify worked material and to distinguish between debitage from axe/adze and knife production. An ongoing programme of work is being undertaken in the UCD School of Archaeology Experimental Archaeology Centre to experimentally replicate the knapping of felsite (Gilhooly et al. 2014). This reference collection is being used to identify specific features to assist in the identification of worked material in the field. In addition the impact of weathering on felsite is also being replicated in laboratory conditions to assess its impact (physical and chemical).

•In the spring of 2014 Shetland Museum and Archives organised a small exhibition on the project. During the field season (June 2014) in partnership with the museum the project ran two workshops (**Fig. 7**). This was to present interim results, to demonstrate the skills gained from the experimental knapping of felsite and to provide information to people who had felsite axes or knives in family collections. This public outreach was a great success and resulted in coverage in *The Shetland Times* newspaper and two interviews on BBC Radio Shetland.

This work has been commented on (Cooney et al. 2013b: NRFP Report 1; Markham 2014) and presented at conferences (e.g. Cooney et al. 2013c; Markham 2013; Gihooly et al. 2014).

Programme of work in 2016

Experimental production of axes and knives, with the aim of understanding the processes of working felsite will continue. This will take place alongside the analysis of debitage from both the targetted excavation to date (Trench 1 and 2 at Grut Wells), areas excavated in 2016 and the surface sample areas at Grut Wells. The impact of the weathering of the felsite will also be examined. This programme of work will be completed in 2016.

Collaboration with Shetland Museum and Archives. Working in partnership with Shetland Museum and Archives the success of the outreach programme begun in 2014 will be developed. A series of workshops will be organised in partnership with the museum. Thes will be advertised widely, providing people with the opportunity to participate in the project, to see demonstrations of the knapping and grinding of felsite and to get detailed information about felsite objects in private collections. They will be provided with an archaeological and PXRF/petrological certificate of data.

Analysis and characterization of museum collections The project is compiling a detailed database with archaeological and geochemical/petrological profiles of all felsite axes and knives in museum collections, complementing the work at the quarry complex. Work will focus on National Museums Scotland, the Hunterian Museum and Kelvingrove Museum.

Mapping and tracking felsite The project GIS will facilitate the integration and mapping of the data strands gathered at different scales. This will enable the generation of detailed distribution maps, for example tracking the pattern of distribution of felsite objects with the same geochemical signature, hence from specific locations within the quarry complex, across the archipelago. A particular focus of work will provided by the hoards of Shetland knives (22).

Geochemical and petrological characterisation of outcrops and museum collections will continue. The fieldwork will be completed. Analysis of the data collected has indicated that the PXRF results are consistent and reliable and that there is variation in the geochemistry of the felsite (**Fig. 8**). A particular target will be Ronas Hill, at the southern end of the quarry complex, the highest point of Shetland where there is a chambered cairn and felsite dykes and the western coastal area. Final work at the quarry complex, particularly at the Beorgs of Uyea, and further analysis of objects

in museum collections will provide the basis for differentiating locations within the quarry complex where specific artifacts were produced.

Archaeological Survey will focus on the Beorgs of Uyea at the north end of the complex. Here there is an palimpsest of felsite debitage and important archaeological features, including a complex of standing stones (to the southeast of the main area of quarrying) discovered in 2014 (**Figs 9-11**). This is the most important area of quarrying activity within the overall complex at North Roe as indicated by dense linear zones of quarrying activity. In addition previously unrecorded dykes in the complex identified by the geochemistry/petrology team, including another area with quarry pits at Midfield at the southern end of the complex will be surveyed in detail.

Targetted excavation Excavation of Trench 2 (Pit 8) at Grut Wells will be completed. Here an *in situ* unweathered, quarried dyke and associated contexts provide at detail of the primary stages in the process of quarrying and dating evidence.

A targetted excavation is also planned at the Beorgs of Uyea, at the western end of the zone of exploitation. The foci here would be:

An excavation trench (10m by 2m) across a quarry pit, ideally with felsite outcrop visible in the centre (**Figs 1, 9, 11, 12**). The aim of the excavation is to understand the primary stages of quarrying, to compare and contrast this with the evidence from Grut Wells and ideally to obtain organic material for dating. This would be located within the area of the Scheduled Monument but outside the northern boundary of the Ronas Hill SSSI (see **Fig. 11**).

Optimally there would also be a small excavation area (2m by 2m) focused on one of the small standing stones (on average 1m high and 20cm in thickness) of granite and felsite discovered and plotted during survey in 2014 (Fig. 10). The relationship of these standing stones with the Neolithic quarry activity is an important issue in terms of understanding the significance of the Beorgs of Uyea landscape. It is recognised that the standing stones are not only located within the Beorgs of Uyea Scheduled Monument but also within the Ronas Hill SSSI.

The rationale for the targetted excavation within the area of the Scheduled Monument at the Beorgs of Uyea and how it articulates with national historic environment research frameworks and policies are addressed in the following sections.

Rationale for targetted Excavation at the Beorgs of Uyea

The Beorgs of Uyea Scheduled Monument (Canmore Index No. 890) is the best known and most important element of the North Roe felsite quarry complex (see **Figs 2 and 3**). It extends over an area of 850m by 600 m and contains very well preserved and complex evidence for the exploitation in the Neolithic of a series of felsite dykes for the production of rough outs or preforms for stone axeheads and Shetland knives. The evidence for extraction from the outcrops and the associated debitage from this activity and the production of roughouts is the main archaeological evidence on the ground. In addition there is a roofed gallery which appears to incorporate a worked felsite quarry face (Scott and Calder 1954) and a monument that has been classified as a chambered cairn (see **Fig. 11**).

Although the site has been recognised since the 1940s much of the detail of what we know about the Scheduled Monument is the result of the reconnaissance survey of Ballin and the work of the North Roe Felsite Project since 2012 (see Canmore entry http://canmore.org.uk/site/890).

The survey work of the project has provided a baseline assessment of the evidence for quarrying across the whole of the complex. This has demonstrated that while there is evidence for quarrying elsewhere, as at Midfield and Grut Wells, the Beorgs of Uyea was the major focus of activity and is critical to our understanding of the extraction and working of felsite as a key component of the material culture of the Neolithic in Shetland. Realising the complexity of the archaeological deposits at the Beorgs of Uyea in 2013 and 2014 the fieldwork of the North Roe Felsite Project specifically focused on Grut Wells in the southern part of the quarry complex (see **Figs 5-6**). Here discrete episodes of activity could be analysed, the debitage on the surface of the surveyed area was recorded in detail and the associated programme of experimental work provided the team with the experience to distinguish weathered felsite from debitage. The excavation trenches at Grut Wells provided an understanding of the quarrying process and critically in Trench 2 (**Fig. 6**) the identification of the actual quarried outcrop, of which there was no trace on the surface.

It has been a central aim of the research plan of the project to use the knowledge accumulated through survey and excavation at Grut Wells to understand the more complex archaeology at the Beorgs. In 2014 we began detailed survey at the Beorgs and the preliminary results are the basis of

Figs 9-12. It should be emphasised that this represents the first detailed survey of the exploited felsite dykes and associated debitage and this in itself has provided significant new information about the Scheduled Monument and demonstrated that it is the key location for understanding the overall complex and its role, and the role of felsite objects, in Neolithic Shetland.

Survey has shown that in the western third of the Scheduled Monument (see **Fig. 9**) there are at least eight felsite dykes that were heavily worked. As some of these are located close together and may coalesce, it is also valid to talk about five major working zones extending north-south on the north-facing slope of the Beorgs (see detail in **Fig. 12**). One critical result from survey was the identification of quarry pits for the extraction of felsite from outcrop, as seen clearly at southern end of two heavily exploited dykes at the western end of the zone of felsite exploitation (shown in red). More broadly it appears that there are surviving worked blocks of felsite in these exploited dykes. These are located at the centre of quarry pits which extend to the east and west of them. This is the only location across the whole quarry complex at North Roe where this scale and complexity of extraction is seen, and where there is the opportunity to follow the entire sequence of production, given the wealth of debitage on the surface.

Excavation of one of these quarry pits would provide important new information about the primary stages of quarrying, and the only possiblity of obtaining direct dating evidence for the quarrying activity in the form of organic material. The earlier stages of quarrying are difficult to understand from the complementary surface evidence alone because of the superimposition of different episodes and stages in the production process on the surface. Geochemical analysis of outcrop and artifacts indicate that axes and knives in museum collections come from the two dykes shown in detail in **Fig. 12**. Hence it is only possible to obtain this key information at the Beorgs of Uyea felsite dykes.

An unexpected result of the preliminary survey of the Beorgs of Uyea in 2014 was the identification of about 40 small standing stones uphill and to the southeast of the main area of felsite exploitation (**Fig. 10**). These are mostly of granite, but several of the standing stones consist of upright blocks of felsite. The standing stones average 1m in height and about 20-25cm in thickness. They are inserted into crevices in granite outcrops

(around which they seem to be clustered) or are propped up. Considering these in the context of the roofed gallery and the chambered cairn it could be suggested that they may indicate that the Beorgs of Uyea was not just seen as a quarry during the Neolithic but a landscape that carried a wider symbolic importance and meaning. To understand this aspect of the Scheduled Monument area within the wider quarry landscape it would be extremely useful to undertake a limited excavation around one of these standing stones.

Alignment of the targetted excavation at the Beorgs of Uyea with national historic environment policies and research framework

Contribution to the conservation and management of the Scheduled Monument

The survey work carried out to date by the North Roe Felsite Project within the Beorgs of Uyea Scheduled Monument has added to our knowledge and the intrinsic value of the Beorgs of Uyea, hence assisting in underpinning its national importance (see Scottish Historic Environment Policy (SHEP) 2011, 2.4-16).

The very limited proposed excavation (significantly less than 0.1% of the area of the Scheduled Monument) is in line with the concept of a minimum level of intervention 'that is consistent with conserving what is culturally significant' in the monument (SHEP 3.16).

The proposed excavation would assist with the management and conservation of the Scheduled Monument by providing an assessment of the condition of the archaeology below the surface, its depth and character and the presence of possible impact(s) in the past.

Given the national and international importance of the site and its potential fragility the survey and proposed very limited but targetted excavation could provide the baseline for a future management plan for the site to be drawn up in association with the landowner, Shetland Islands Council (Shetland Amenity Trust) and Historic Environment Scotland, should this be desired by all parties. Specific issues that could be addressed include the problem of conserving surface working areas which in many cases are as they were left when abandoned in the Neolithic, but where there is the continuing low level

impact of walkers and visitors and collection of felsite material. The area has in the past been used on occasion for military exercises and this appears to have an impact in the area to west of and downslope from the worked felsite dykes. The complex of standing stones has only been recognised as a result of the survey work of the North Roe Felsite Project and by their scale and nature these are vulnerable to impacts.

A report on the surface condition of the Scheduled Monument will be submitted to Historic Environment Scotland along with the results of the detailed survey and results of the proposed excavation. This will be submitted by 30 September 2016.

Scottish Historic Environment Policy

As well as being the policy document that sets out Scottish Minsters' policy on Scheduled Monument Consent, SHEP also articulates the key strategic policy framework for the historic environment.

It is the view of the applicant that the North Roe Felsite Project, and specifically the proposed targetted excavation at the Beorgs of Uyea Scheduled Monument, meets two of the three key outcomes identified in SHEP.

- Through deepening our understanding of the Scheduled Monument it seeks to provide a better basis for its care, protection and enhancement.
- The project aims to promote understanding and knowledge of the Beorgs of Uyea, and more broadly the North Roe felsite quarry complex so that its value can be understood and enjoyed, reinforcing local identity and sense of place and visitors' experience.

Our Place in Time: The Historic Environment Strategy for Scotland

The vision set out by the Scottish Government in *Our Place in Time*: the Historic Environment Strategy for Scotland (2014) is that the historic environment will be at the heart of a flourishing and sustainable Scotland. It

notes that this vision will be reached through the aims of understanding, protecting and valuing Scotland's historic environment.

The North Roe Felsite Project and its work at the Beorgs of Uyea can be seen as contributing to both the Cross-Cutting Strategic Priorities of *Our Place in Time* and to specific Strategic Priorities.

In terms of the Cross-Cutting Strategic Priorities the project is providing a sound evidence base to assess the importance of the North Roe felsite quarry and specifically the national importance of the Scheduled Monument at the Beorgs of Uyea and its management and conservation in that context. The project works through a partnership model (actively involving University College Dublin, Shetland Museum and Archives, National Museums of Scotland, Queen's University Belfast and the Implement Petrology Group) to further our understanding of the Neolithic period in Shetland.

In terms of the Strategic Priorities the aim of the project is to *Understand* the North Roe Felsite quarry complex through investigation and recording. This will provide the basis for the *Protection* of the complex, specifically the Scheduled Monument at the Beorgs of Uyea, and a greater professional and public appreciation of its *Value* and significance.

Scotland's Archaeology Strategy

Scotland's Archaeology Strategy (2015) has five Strategic Aims. It is the view of the applicant that the North Roe Felsite Project relates to the following aims in particular.

Aim Two – Enhancing Understanding: To increase knowledge, understanding and interpretation of the past.

The aims and objectives of the North Roe Felsite Project are strongly aligned with the Scottish Archaeological Research Framework (ScARF, see below) and is targetting key knowledge gaps of our understanding of the Neolithic period in Shetland. The project is underpinned by international partnership and collaboration and is emphasising and promoting the international quality of the Neolithic archaeology of Shetland, specifically the international importance of the felsite quarry complex at North Roe.

Aim Three: - Caring and Protecting: To ensure that the material evidence of the human past is valued and cared for by society and managed sustainably for present and future generations.

The North Roe Felsite Project is promoting through its research the importance of the quarry complex at North Roe as a place and component of local identity. The aim of the research at the Beorgs of Uyea is to better understand the processes of production of Neolithic artifacts from the felsite source and in doing this to contribute to a better understanding of the character and management of the archaeology of the Scheduled Monument there. In addition it is adding to our understanding and knowledge of museum collections of felsite artifacts.

Scottish Archaeological Research Framework

The North Roe Felsite Project and specifically its work at the Beorgs of Uyea Scheduled Monument is directly aligned with and responds to the key research issues and knowledge gaps identified in the Neolithic Panel Report of ScARF (Brophy and Sheridan 2012; see also Sheridan 2012).

ScARF indicates that in terms of the issue of *The Detailed Picture: issues of regional and chronological resolution,* a critical issue is our lack of any detailed knowledge of the Neolithic in Shetland. Among the outstanding research questions that are identified (Brophy and Sheridan 2012, 3.3.7, 79) is the question of the overall currency of the use of felsite and how its exploitation was organised.

In the discussion in ScARF of *Material Culture and the use of resources* the potential of the felsite axeheads and knives of Shetland to inform us more broadly about the production and role of axe-heads during the Neolithic in Scotland is highlighted. Specific mention is made of the potential contribution of the work of the North Roe Felsite Project (Brophy and Sheridan 2012, 5.2.2, 74, 76).

While the focus in the ScARF discussion on *Neolithic Society and Belief systems* is on monuments (Brophy and Sheridan 2012, 6.2, 103-4), clearly the production and use of objects, and the associated transformation of the landscape at places like the Beorgs of Uyea, also took place in the context of the belief systems and world view of Neolithic people. The complexity and

variety of the evidence at the Beorgs of Uyea suggests that we need to see this place not just as a production area, but as somewhere that was central to the construction of identity in Neolithic Shetland.

Engagement with stakeholders

To date and as part of the process of discussion prior to application for Scheduled Monument Consent the applicant has spoken to a range of stakeholders about the project. This includes consultation with the landowner of the Beorgs of Uyea (Mr John Alec Cromarty) who is supportive of the project and has given permission for the fieldwork to take place. Discussion has also taken place with Historic Environment Scotland (Simon Stronach, Senior Heritage Management Officer, Heritage Management Directorate) and Scottish Natural Heritage (Jonathan Swale, Operations Manager, SNH, Shetland). National Museums of Scotland (Dr Alison Sheridan, Principal Curator, Early Prehistory), the Shetland Amenity Trust (Dr Val Turner, Shetland Archaeologist) and Shetland Museum and Archives (Jenny Murray, Curator of Collections) are supportive and the project has wide support from local communities in Northmavine, Mainland Shetland.

Section 2: Suggested programme of work

Survey

The detailed location of the proposed targetted excavation areas within the Beorgs of Uyea Scheduled Monument will form part of the overall programme of survey of the North Roe Felsite Project (Drs Will Megarry and Dr Rob Sands).

Site survey is controlled by a Trimble 5800 GNSS Rover/Base combination. This gives a maximum potential accuracy based on machine precision of 1cm horizontally (X,Y) and 2cm in elevation (Z) internal to the survey framework when using the Rover. The base station is located on fixed stations established in 2013. Because of poor mobile signal there is currently no access to real time correction in these locations so the base points were initially established from a fix provided by single uncorrected base position in each location. These initial fixes have been used for subsequent seasons and as the basis for extending the framework in each area. Without real time correction or post-processed solutions the initial fix can be up to c.2 metres from the true position. Post processing the base position has not yet been an option as a result of changes in, and availability of, Trimble software. An alternative approach has currently been adopted by using data from a Trimble Geo7x, which can provide potential post-processed precision down to 10cm. The originally physical base positions remain on each of the survey locations.

Field recording

The fieldwork, and all associated work, will conform to current best archaeological practice and national standards and guidelines including:

Chartered Institute for Archaeologists (CIfA) – Standards and Guidance for Archaeological Field Evaluations (CIfA 2009)

Museum of London Archaeological Service (MoLAS) Archaeological Field Manual. (Third edition) (MoLAS 1994)

Council for British Archaeology (CBA) First Aid for Finds (Second edition) (CBA 1987).

All excavation will be by hand. Excavation records will be produced using both pro-forma and trench/area record sheets using the single context approach. Finds, sample and drawing registers will be maintained for each of the two targetted excavation areas. Two separate trench/area notebooks will be maintained. There will be separate sample forms for all environmental records (including radiocarbon dates).

A record of all archaeological deposits will be made. Plans of features will be drawn at the scale of 1:20, with all sections at 1:10. All drawings will be allocated a unique number and recorded in a register, all will be located on the site grid (tied to the National Grid). All levels on plans and sections and all drawings will be related to Ordnance Datum.

Prior to the excavation the areas will be photographed for record purposes. Photographs will be taken throughout the excavation and will include record shots of all features, structures and working shots. At the completion of excavation the areas will be photographed. Photographs will be taken and stored as .jpeg files.

All three dimensional data (including significant find locations) and site plans will be entered in to the project GIS system to allow spatial interrogation of all datasets and their integration with survey data.

It is anticipated that the sampling strategy will be dominated by the retention of stone samples from debitage layers. Where and if appropriate bulk samples (10L for wet and 40-60L for dry) will be taken for the recovery of envirionmental data and dating (to be overseen by Joanne Gaffrey).

All identified artefacts will be treated as small finds, located in three dimensions and retained. All finds and samples will be treated in a proper manner and to agreed standards (Institute for Conservation, Conservation Guidelines 2 (UKIC 1983); First Aid for Finds (CBA 1987).

Site records and artefacts will be removed from site at the end of each day.

The excavation areas

As detailed above one key result of the extensive survey at the Beorgs of Uyea is the identification of quarry pits for the extraction of felsite from outcrop, as seen clearly at southern end of two heavily exploited dykes at

the western end of the zone of felsite exploitation (shown in red, **Fig. 12**). More broadly it appears that the surviving worked blocks of felsite in these exploited dykes sit at the centre of quarry pits which extend to the east and west of them. Excavation of one of these quarry pits would provide important new information about the primary stages of quarrying, and the only possiblity of obtaining direct dating evidence for the quarrying activity in the form of organic material. The early stages of quarrying are difficult to understand from the surface evidence alone because of the superimpostion of different episodes and stages in the production process on the surface. Geochemical analysis of outcrop and artifacts indicate that axes and knives in museum collections come from the two dykes shown in detail in **Fig. 12.**

1.The intention is to place an excavation trench that at maxmimum will be 10m by 2m as a E-W transect across one of these quarry pits. Initial archaeological work on the gound will identify the most feasible location for the trench, this will include probing to establish the depth of deposits. The trench will be positioned to ensure that both the eastern and western edge of the quarry pit will be captured within the excavation. The excavation will be conducted in the context of the recognition of the need for minimal intervention in the Scheduled Monument, the available time and resources and the need to re-instate the area of excavation as it was prior to excavation. In this context there will be ongoing evaluation and if necessary a restriction in the area to be excavated (specifically the width of the trench; 2m is being chosen as the initial width as experience at Grut Wells has demonstrated the practical difficulties of beginning with a trench that is only 1m wide), consistent with the research design and the objective of understanding the primary stages of felsite extraction. The trench wil not exceed 1.2m in depth. If deeper excavation is required the trench will be stepped. [NOTE: Other potential dating techniques will be explored prior to fieldwork and appropriate samples collected as needed].

An unexpected result of the preliminary survey of the Beorgs of Uyea in 2014 was the identification of about 40 small standing stones uphill and to the southeast of the main area of felsite exploitation (**Fig. 10**). These are mostly of granite, but several of the standing stones consist of upright blocks of felsite. The standing stones average 1m in height and about 20-25cm in thickness. They are inserted into crevices in granite outcrops (around which they seem to be clustered) or are propped up. Considering these in the context of the roofed gallery and the chambered cairn it could

be suggested that they indicate that the Beorgs of Uyea was not just seen as a quarry during the Neolithic but a landscape that carried a wider symbolic importance and meaning.

2.To understand this aspect of the Scheduled Monument it would be extremely useful to undertake a limited excavation around one of these standing stones. It is proposed that an area 2m by 2m will be excavated around the base of one of these standing stones. To avoid destabilisation of the stone two opposing 1mx1m quadrants of the square extending 2mx2m and centred on the stone base will be excavated, leaving 50% of the basal deposits intact. The stability of the stone will be protected and the effect of the excavation evaluated as it is proceeding.

Post-excavation analysis and reporting

A report will be produced in the form of a Data Structure Report, prepared in accordance with current standard Historic Environment Scotland requirements and CifA. The project entry on the 2016 field season for *Discovery and Excavation in Scotland* (DES) will include details of the results of the excavation at the Beorgs of Uyea Scheduled Monument. The Data Structure Report will be submitted by 30 September 2016.

A Post-Excavation Design will be prepared immediately after the excavation and in consultation with Historic Environment Scotland. It is anticipated that the analysis will primarily involve lithic analysis which will be carried out by the project team. If necessary (hopefully!) a sampling and dating strategy of relevant contexts will be designed. Provision has been made in the project budget for a restricted programme of sampling and dating, consistent with the nature of the archaeological deposits and the limited scale of the excavation. This will be submitted by 31 July 2016.

Application will be made to the Queen's and Lord Treasurer's Remembrancer for permission to borrow material from the excavation for analysis in the post-excavation facilities at the School of Archaeology, University College Dublin, Ireland.

Final Reporting: The results of the targetted excavation at the Beorgs of Uyea will be incorporated into the publication of the results of the three seasons of fieldwork and associated research of the North Roe Felsite Project. It is anticipated that this will take the form of a monograph.

Section 3: The team and work environment

The team

The overall director of the project is Professor **Gabriel Cooney**, UCD School of Archaeology, University College Dublin. Gabriel is the director of the long-running Irish Stone Axe Project (Cooney and Mandal 1998), directed the excavation of the quarry site at the Eagle's Nest, Lambay (Cooney 2005; 2009) and is recognised internationally as researcher on stone axe quarries (Cooney 2011; 2015). The project GIS is under the direction of Dr **Will Megarry**, lecturer in GIS, School of Archaeology, Geography and Paleoecology, Queen's University Belfast (Megarry et al. forthcoming). Dr **Rob Sands**, lecturer in the application of ICT to archaeological research, UCD School of Archaeology, University College Dublin directs the field survey. **Brendan O Neill and Bernard Gilhooly**, doctoral students in the UCD School of Archaeology direct the programme of experimental knapping in felsite and have a detailed understanding of the character of felsite debitage across the North Roe felsite quarry complex . **Joanne Gaffrey** has extensive field experience and as the post-excavation manager with CRDS, an Irish archaeological consultancy. She will act as site supervisor, and will co-ordinate the sampling strategy, site archives and post-excavation work.

In addition the excavation team will draw on the advice and support of other project members; Dr **Torben Ballin** (lithic specialist, Lithic Research/Research Fellow, University of Bradford), Dr **Mik Markham** (geochemist, Implement Petrology Group), and **Dr Alison Sheridan** (Principal Curator, Early Prehistory, National Museums Scotland.

Dr **Astrid Nyland**, Department of Archaeology, Conservation and History, Faculty of Humanities, University of Oslo whose doctoral research was on stone quarries and procurement in the Stone, Bronze and Early Iron Age in southern Norway (Nyland 2015) will provide a valuable comparative perspective.

Working environment

The project maintains high standards of health and safety, both in the field and in the project base in the UCD School of Archaeology. University College Dublin provides the institutional guidance.

The **UCD Fieldwork Safety Guidelines_Rev.1 2015** is the official University document overarching all fieldwork. It is used to to inform specific projects and is cited to participants and funding/licensing agencies.

The **Health & Safety Pre-Fieldwork Cover Sheet v 12_04_16** is a document prepared by the UCD School of Archaeology to prepare fieldwork participants and give them links to further information. This is a value-added document and not a statutory requirement, but is well regarded by the UCD Safety Office. Participants can also be asked to sign it to show they have been informed.

The **UCD Fieldwork Risk Assessment Template Rev 2-3** is the official Risk Assessment to be complete for each fieldwork project and including specifics of participants and dates.

Based on this template a specific **NRFP Risk Assessment 2016** will be prepared prior to the commencement of the project and for each element of it. All personnel will attend an induction meeting where risks and procedures will be explained and will be required to notify the director/site supervisor of any health issues relevant to their participation on sites. Emergency procedures, including provision for severe weather conditions, will be made clear to all at the induction meeting.

By way of precaution the **Lyme Leaflet Apr 1-1** will be brought to the attention of all participants. Lyme disease is not unknown in Shetland.

Joanne Gaffrey, will manage all Health and Safety during the project and on site, she is a qualified First Aider. Staff on the project will be provided with copies of all health and safety documentation. Regular audits of health and safety practices will be carried out during the course of the project.

References

BALLIN, TORBEN

2011a The felsite quarries of North Roe, Shetland – An overview. *Stone Axe Studies III.* Davis, V. and Edmonds, M. eds Oxbow. Oxford, pp. 121-30.

2011b The Felsite Quarry Complex of Northmaven. Observations from a fact-finding mission to Shetland. *Flint and Stone in the Neolithic Period.* Saville, A. ed. Oxbow. Oxford, pp. 62-81.

2012 The distribution of worked felsites – within and outwith Neolithic Shetland . *The Border of Farming and the Cultural Markers.* Mahler, D. and Andersen, C. eds National Museum of Denmark. Copenhagen, pp. 62-78.

2013 Felsite Axehead Reduction – The Flow from quarry pit to discard/deposition. In *Papers from the 2012 Network Meeting (Farming on the Edge: Cultural Landscapes of the North),* Mahler, D. ed. National Museum of Denmark. Copenhagen.

2015 Making an island World: Neolithic Shetland. Felsite polished axeheads/adzes and Shetland knives in Shetland Museum. North Roe Felsite Project Report 2. University College Dublin. Dublin.

In press North Roe felsite and Shetland's felsite material culture- assemblages from quarry workshops and domestic settlements.

BROPHY, KENNY AND ALISON SHERIDAN,.

2012 *Neolithic Scotland: Scottish Archaeological Research Framework Panel Report*. ScARF. Edinburgh.

COONEY, GABRIEL

2005 Stereo porphyry: quarrying and deposition on Lambay Island, Ireland. In *The Cultural Landscape of Prehistoric Mines,* Topping, P. and Lynott, M eds. Oxbow. Oxford, pp. 14-29.

2009 The prehistory of Lambay, a long view. In *Axes, Warriors and Windmills: Recent archaeological discoveries in North Fingal,* Baker, C. ed. Fingal County Council. Swords, pp. 8-22.

2011 New Approaches to Stone Mines and Quarries: Materials and Materiality, Cooney, G. ed. *World Archaeology* 43:2, pp 145-341.

2015 Stone and Flint Axes in Neolithic Europe. *The Oxford Handbook of Neolithic Europe.* Fowler, C., Harding, J. and Hofmann, D eds. Oxford University Press. Oxford, pp.515-34.

COONEY, GABRIEL AND STEPHEN MANDAL

1998 *Irish Stone Axe Project Monograph 1.* Worldwell. Dublin.

COONEY, GABRIEL, STEPHEN MANDAL, EMMET O'KEEFFE AND GRAEME WARREN

2012a Rathlin in Early Prehistory. In *Rathlin Island: An Archaeological Survey of a Maritime Landscape*, Forysthe, W. and McConkey, M. eds. The Stationery Office/NIEA. Belfast, pp. 46-55, 62-74.

COONEY, GABRIEL, STEPHEN MANDAL, EMMETT O'KEEFFE, GRAEME WARREN, GRAEME, TORBEN BALLIN AND WILL MEGARRY

2012b Axes from islands: the role of stone axeheads from insular sources in the Neolithic of Britain and Ireland. *The Border of Farming and the Cultural Markers*. Mahler, D. and Andersen, C. eds National Museum of Denmark. Copenhagen, pp. 78-99.

COONEY, GABRIEL, TORBEN BALLIN AND GRAEME WARREN

2013a Island quarries, Island axeheads and the Neolithic of Ireland and Britain. *North American Archaeologist* 34, 409-31.

COONEY, GABRIEL, TORBEN BALLIN, VIN DAVIS, ALISON SHERIDAN AND WILL MEGARRY

2013b *Making an island world: Neolithic Shetland. 2013 Field Season Report*. North Roe Felsite Project Report 1. University College Dublin. Dublin.

COONEY, GABRIEL, TORBEN BALLIN, VIN DAVIS, MIK MARKHAM AND ALISON SHERIDAN

2013c Making an island world: The provenancing of felsite axes and knives in Neolithic Shetland

Presentation at European Association of Archaeologists conference, Pilsen, September 2013

DAVIS, R. VINCENT

2012 A preliminary report on the petrographic survey of the Neolithic stone quarries and stone tool manufacturing sites at North Roe, Shetland: May 2012 (unpublished).

GILHOOLY, BERNARD, BRENDAN O'NEILL AND GABRIEL COONEY

2014 Working with felsite: An experimental approach to identify stone tool working on the Shetland Islands
EXARC Conference, Oxford, January 2014

MAHLER, DITLEV

2011 Shetland – the Border of Farming 4000-3000 BC. Some Features of the Neolithic of Shetland. *Farming on the edge: Cultural landscapes of the North.* Mahler, D. and Andersen, C. eds National Museum of Denmark. Copenhagen, pp. 6.18..

MARKHAM, MIK

2013 The geochemistry of Shetland axes compared to Goups I and VI.
Cornwall and Devon Archaeological Societies symposium, Tavistock, Devon, November 2013

2014 Stone axes in Neolithic Shetland. Focus: *Informing the conservation of the built environment*, 21. Historic Scotland.

NYLAND, ASTRID J.

2015 *Humans in Motions and Places of Essence: Variations in rock procurement practices in the Stone, Bronze and Early Iron Ages, in southern Norway.* University of Oslo. Norway.

OUR PLACE IN TIME

2014 *Our Place in Time: The Historic Environment Strategy for Scotland*. The

Scottish Government. Edinburgh.

PHEMISTER, J. C.O. HARVEY and P.A. SABINE

1952 The riebeckite-bearing dikes of Shetland, *Mineralogical Magazine* 29, pp. 359-373.

RITCHIE, P.ROY

1968 The stone implement trade in third-millennium Scotland. In Coles, J.M. and D.D.A. Simpson (eds) *Studies in Ancient Scotland,* pp. 119-136. Leicester University Press, Leicester.

1992 Stone axeheads and cushion maceheads from Orkney and Shetland: some similarities and contrasts, In Sharples, N. and Sheridan, A. (eds), *Vessels for the Ancestors,* pp. 213-220. Edinburgh University Press, Edinburgh.

RITCHIE, ROY AND JOHN SCOTT

1988 The petrological identification of stone axes from Scotland.In Clough, T.H. McK and Cummins, W.A. (eds) *Stone Axe Studies 2*, 85-91. Council for British Archaeology (Research Report 67); London.

SCOTLAND'S ARCHAEOLOGY STRATEGY

2015 *Scotland's Archaeology Strategy*. Scottish Strategic Archaeology Committee. Edinburgh.

SHEP

2014 *Scottish Historic Environment Policy.* The Scottish Government. Edinburgh.

SHERIDAN, ALISON

2012 Neolithic Shetland: a view from the "mainland".

In Mahler, D. ed. *The Border of Farming and the Cultural Markers*. National Museum of Denmark. Copenhagen, pp. 6-36..

WHITTLE, ALASDAIR, FRANCES HEALY AND ALEX BAYLISS (EDS)

2011 Gathering time: Dating the early Neolithic enclosures of Southern Britain and Ireland. Oxbow: Oxford.