

# Yadlee Stone Circle & Environs: A Student Survey of an Integrated Landscape.



Report – May 2014

Gardner, T.H., Vogelaar, C., Westra, A.J.D & Wood, A.J.



Yadlee Stone Circle & Environs:

A Student Survey of an Integrated Landscape.

*Fieldwork - March-May 2013: Report – May 2014*

OASIS - [connolly1-145684](#)

Gardner, T.H., Vogelaar, C., Westra, A.J.D & Wood, A.J.

**Contact:**

Mr. T. Gardner  
42 Victoria Crescent Road,  
Dowanhill, Glasgow  
G12 9DE, Scotland, UK  
T: 07545617754 E: [yadleeproject@gmail.com](mailto:yadleeproject@gmail.com)

**Contents:**

**List of Figures:..... 2**

**1.0 Summary ..... 3**

**2.0 Introduction ..... 5**

**3.0. Objectives ..... 8**

**4.0 Methodology ..... 8**

**5.0. Results ..... 11**

**6.0. Conclusions and Recommendations ..... 15**

**Appendixes..... 17**

    Appendix 1: Photo Record ..... 17

    Appendix 2: Student Archaeology as a Resource ..... 18

    Appendix 3: GIS Data Used ..... 19

**References..... 19**

**Acknowledgements..... 20**

**List of Figures:**

Figure 1: Site Location Map . ..... **Error! Bookmark not defined.**

Figure 2: Historic Mapping ..... **Error! Bookmark not defined.**

Figure 3: Yadlee Stone Circle Composite Image ..... **Error! Bookmark not defined.**

Figure 4: Detail of Viewshed software over OS topography data ..... 11

Figure 5: Google Earth © Image of Equinox Sun rising above Witches Cairn due East of  
Yadlee Stone Circle. .... 13

## 1.0 Summary

- 1.1 The Yadlee Stone Circle Project is an archaeological survey carried out for project management and survey training, in order to increase the detail and amount of data previously gathered at Yadlee Stone Circle in the Scottish Lammermuirs.
- 1.2 The work consists of field surveying, planning and photography to investigate the stone circle and possible related sites in the surrounding landscape.
- 1.3 This project is undertaken independently by a group of undergraduate archaeology students from the University of Edinburgh under the guidance of professional archaeologists from the British Archaeology Jobs Resource (BAJR) and Connolly Heritage Consultancy (CHC). The field work was undertaken in March-May 2013, and the report was culminated in May 2014. The Final document was uploaded to OASIS - [connolly1-145684](#)
- 1.4 The research is restricted to survey as a precautionary measure due to the uncertainty of the site's significance as a Scheduled Monument (HS Index No: 4443).
- 1.5 Potential for further examination is suggested, which could enable precise dating of the site and a greater understanding of its purpose, as the preliminary non-invasive survey led only to a hypothesis being formed on the site's function.

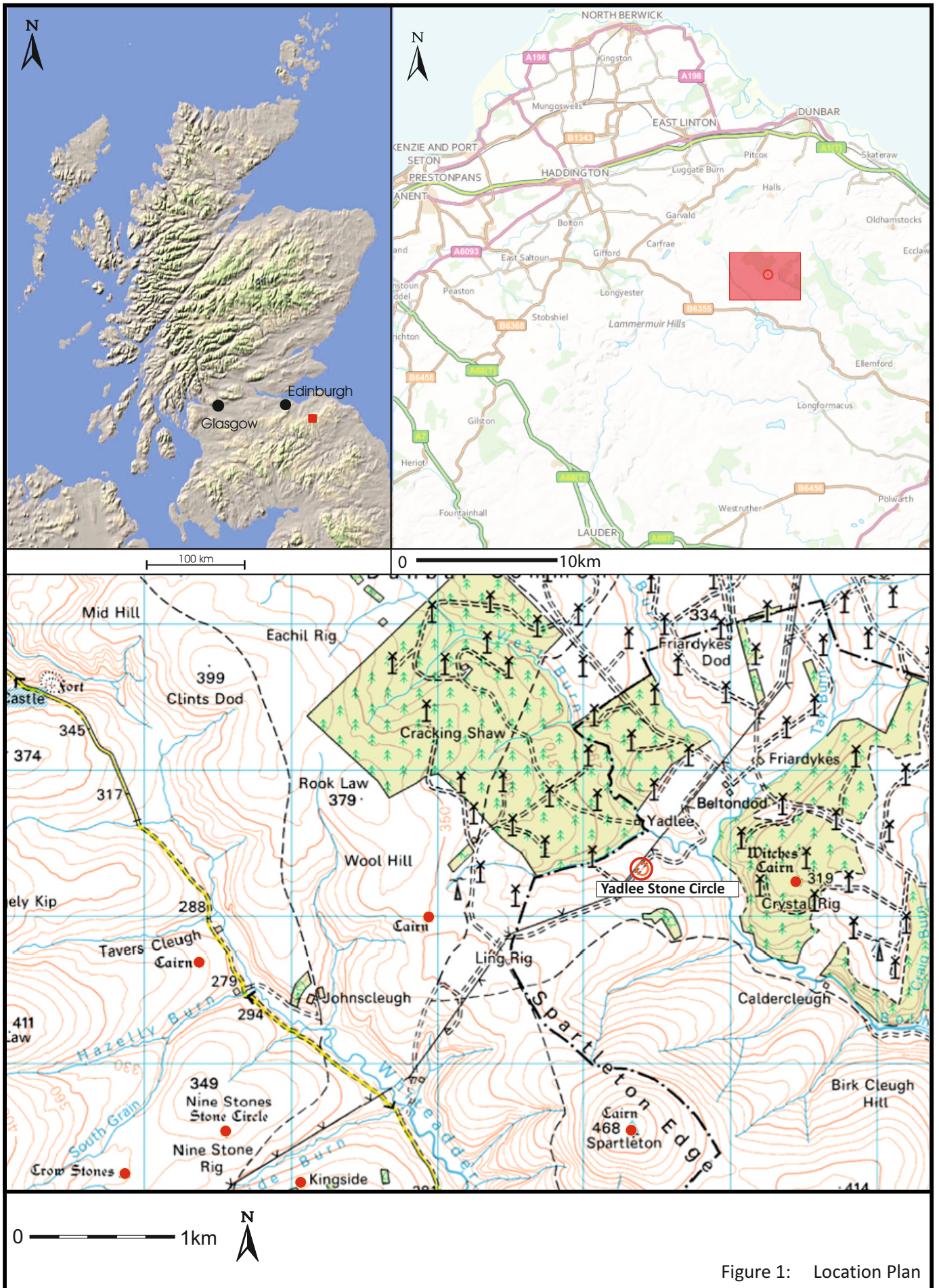


Figure 1: Location Plan

## 2.0 Introduction

### 2.1 Site Location:

The site is located in the Lammermuir hills of East Lothian and the Scottish Borders, an upland pastoral area to the south-west of Crystal Rig Wind-farm. The site is situated at NT 65403 67319 in a natural basin; Spott Parish Scottish Borders, TD11 3SW (*Figure 1*). Canmore ID 57472, (HS Index No: 4443).

### 2.2 Site History:

#### a) Recent surveys

The initial results were obtained by a desk based assessment by the authors using the Canmore and RCAHMS database, NLS maps database, Ordnance Survey data, County Archaeologists office (East Lothian), & CFA Report No. 1579.2 (Moore, 2009).

The site was first surveyed and planned by the Royal Commission for Ancient and Historic Monuments Scotland in 1913 by an unknown individual (*Figure 2*). It was subsequently surveyed in 1924 (RCAHMS), 1963 (R W Feachem), 1966 (OS – WDJ), 1979 (OS – JRL), 2008 (CFA Ltd.), and 2013 (Yadlee Stone Circle Project). Various members of the public have sporadically photographed the site throughout this period (*Figure 3*).

#### b) History of the Area

The area surrounding Yadlee stone circle could have a long cultural history dating back to the prehistoric period; however, the lack of research in the area makes precise dating of any prehistoric activity difficult. There are an array of sites that could date from any prehistoric period. The surface remains at Yadlee Stone Circle and the surrounding area could be prehistoric because of their similarities to other small stone circles like that at Aldclune (Hingley *et al*, 1997: 451). The adjacent sites, for the most part cairns, could be contemporary with Yadlee stone circle. Equally, the wider Lammermuirs area contains a selection of substantial stone circles, such as Nine Stones (NT66NW 14), Kingside Burn (NT66NW 2), and Crow Stones (NT66NW 20). These sites may be the earliest visible activity in the region. Cairns upon the horizon of the landscape bowl in which Yadlee Stone Circle sits include; 'Witches Cairn' ([NT66NE 1](#)), 'Spartleton Cairn' ([NT66NE 4](#)) and 'Rook Law' ([NT66NW 15](#)). (*Figure 1*).

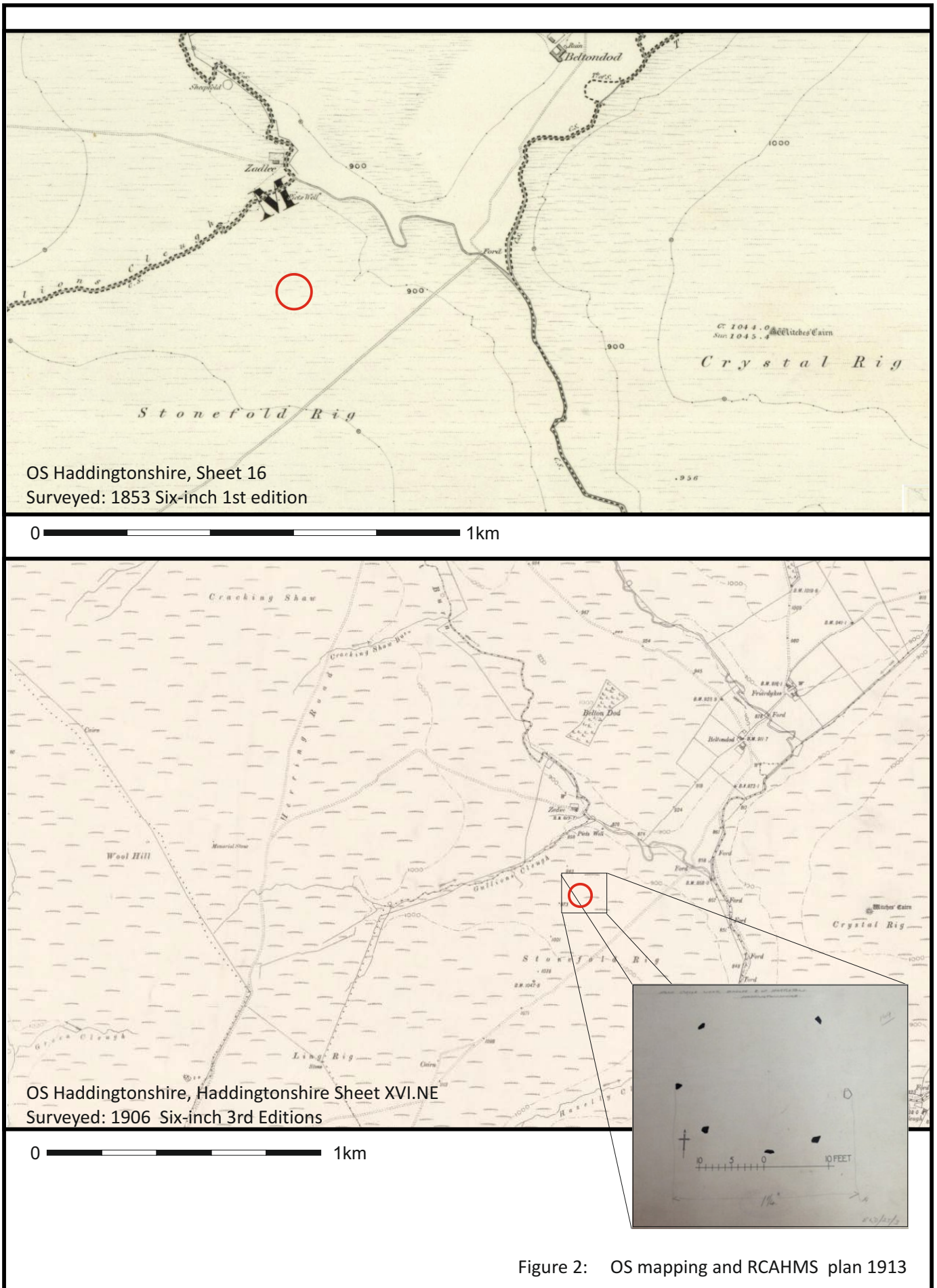


Figure 2: OS mapping and RCAHMS plan 1913



Plate 1: Modern Amateur Photograph – Lisa Jarvis©.

The stone circle is named ‘*Yadlee*’ in relation to the nearby farmstead of the same name or ‘*Zadlee*’. The name figures in certain early modern maps of the area. However, the cartographic evidence is scarce, with the site included in only large scale OS maps. The historic evidence for the pastoral land use surrounds Yadlee Stone Circle in the form of farmsteads like Caldercleugh ([NT66NE 26](#)) and Beltonodod ([NT66NE 29](#)), and enclosures such as Hazelly Burn ([NT66NE 9](#)), Stonefold Rig ([NT66NE 25](#)), and Wool Hill ([NT66NW 23](#)). This pastoral landscape has undoubtedly helped preserve Yadlee Stone Circle, as ploughing of any consistency would have completely eradicated the small structural elements of the monument.

The 1913 (*Figure 2*) plan is the only survey concerning the site prior to this investigation, and shows seven stones of the central circle. This number varies in each visit to the site throughout the 20<sup>th</sup> century, between nine (1979) and twenty-five (2013) potentially related stones (*Figure 4*). There has been no invasive archaeological investigation at the site. The site is a scheduled monument (HS Index No: 4443), which is why this investigation remained non-invasive. Repeated surveys of the area show varying amounts of success, as illustrated above. The authors believe this study to be the most detailed to date, potentially the site had been ignored due to the small scale of the site, and its inaccessible situation.



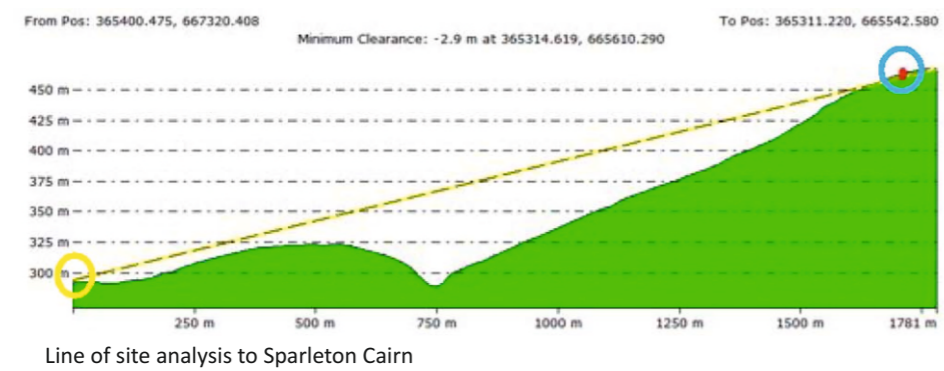
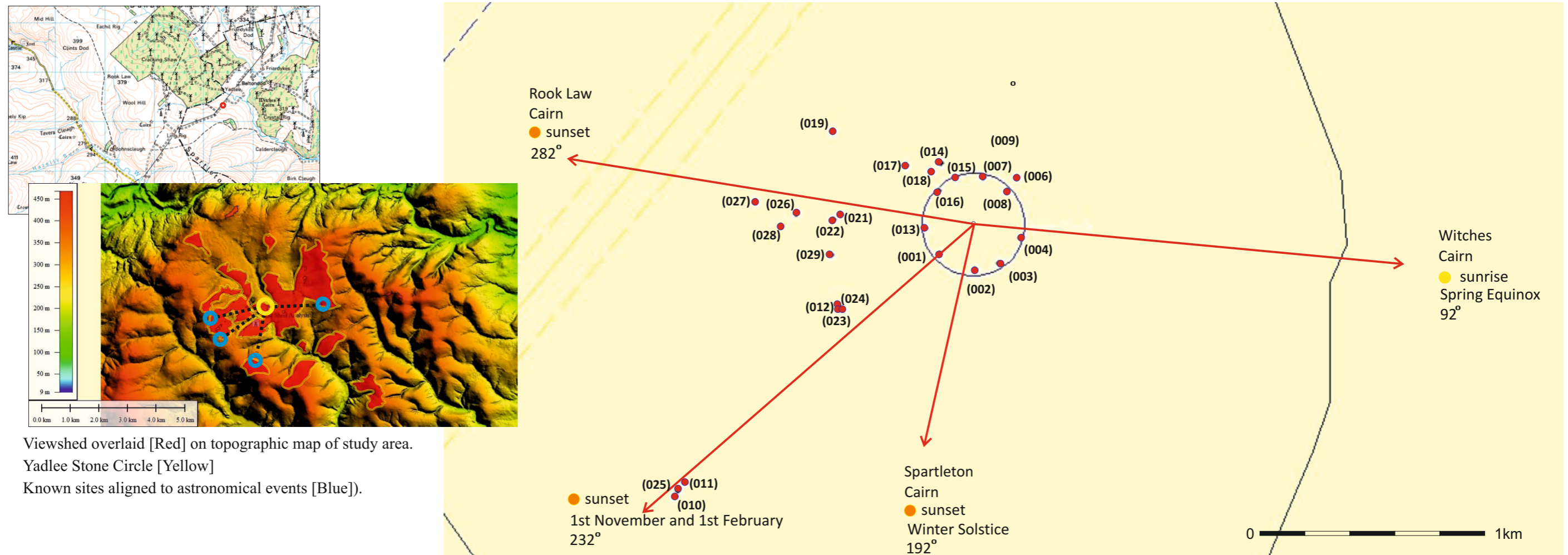
### **3.0. Objectives**

- 3.1 To gather secondary data in the form of a desk based assessment of the site and surrounding landscape and sites within it.
- 3.2 To collect primary survey data including panoramic photographs, survey by total station, field-walking, and low-level aerial photography from the site and surrounding landscape to rectify the deficit of investigation undergone in the area.
- 3.3 To use both primary and secondary data to determine a provisional date and purpose of the site, and to investigate its potential correlation to astronomical events.
- 3.4 To use the development of the project to train undergraduate archaeology students (UoE) in project management, planning, survey, and execution.
- 3.5 To disseminate information through social media, conference presentations, and a final report and publication.

### **4.0 Methodology**

- 4.1 A desk based assessment was implemented using Canmore, RCAHMS, NLS maps, OS data and various online sources to plan further investigation of the site in addition to a visit to the East Lothian Council Archaeology Service HER. This led to the adoption of a targeted landscape survey plan of the surrounding horizon using viewshed analysis (Figure 4).
- 4.2 Fieldwork consisted of three days of field survey of the monument and surrounding area on March 18th, April 22nd & May 20th 2013.
- 4.3 Desk based assessment utilized Ordnance Survey Data outlined below:
  - 1:10000 Raster TIFF Geospatial Data
  - 1:25000 Raster TIFF Geospatial Data
  - 1:10000 Profile Contours NTF Geospatial Data
  - 1:10000 Profile DTM NTF Geospatial Data
  - The complete details about the data used can be found in Appendix 3.

- 4.4 Viewshed Global Mapper 13<sup>®</sup> GIS software was used to create a viewshed analysis of the area around the study area. Centred on the study area, the viewshed covered a radius of 25km, with a transmitter and receiver height of 2m above the ground. These settings were used to cover a slightly larger viewshed area so as to not exclude potential sites close to the horizon. Settings to take into account the curvature of the earth and atmospheric refraction were not used for simplicity. This data was overlaid onto the above OS Data to construct a visible area from Yadlee Stone Circle. The results of the viewshed analysis allowed us to limit our targeted landscape survey to areas on the horizon, visible from Yadlee Stone Circle. Using viewshed and site information from RCAHMS Canmore database, the team compiled a list of potential archaeological sites to investigate in our on-site survey (Figure 5).
- 4.5 Field walking of 100m<sup>2</sup> around the stone circle to help verify the archaeological nature of the stones and discern that they were not naturally deposited. This was necessary due to the small size of the structural elements within Yadlee Stone Circle, which could have easily been erratic. However, as the twenty-five stones of the site existed within 20m<sup>2</sup>, and were then the only surface stones in the immediate 100m<sup>2</sup>, indicates their isolation as a monument rather than a glacial dump.
- 4.6 Using a total station courtesy of CFA Ltd., we produced a topographic and site plan twenty-five stones and the immediate area to aid in the interpretation of potential alignments (Figure 4).
- 4.7 Implementing photographic survey including panoramas from the stone circle and the cairn on Spartleton Hill, as well as individual photos of the stones.
- 4.8 Using a handtape and notebook, the team surveyed the three cairns selected in the targeted landscape approach; 'Witches Cairn' ([NT66NE 1](#)), 'Spartleton Cairn' ([NT66NE 4](#)) and 'Rook Law' ([NT66NW 15](#)).
- 4.9 Analysis of the primary data collected was undertaken in Global Mapper 13, Google Earth, and AutoCAD 2014 Student Edition. These programs were used to investigate angles of the stones, distances, astronomical associations, and the connection of the study area to the rest of the visible landscape.



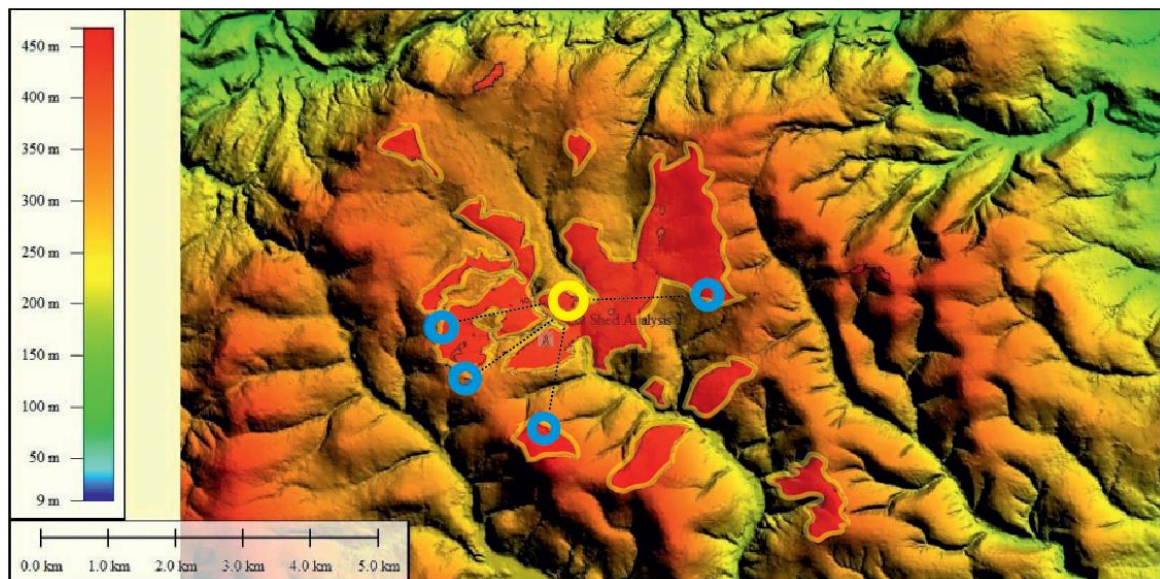
Pinflags highlight the stones showing the circle.

Figure 3: Composite image of site with orientations and views

## 5.0. Results

5.1 Using viewshed analysis the survey established the modern visual range from Yadlee Stone Circle and deemed it roughly comparable with that in the prehistoric period. This does not take into account any tree cover, which unfortunately the research question of this study could not account for. This is an issue being tackled at present by the authors, in preparation for an upcoming report.

5.2 A second viewshed survey was completed with the same data, but with different viewshed parameters. Centred on the study area, the second viewshed had a radius of 25km, a transmitter height of 1.5m and a receiver height of 0m. These parameters would perhaps resemble an average human standing in the study area and cover all of the visible ground. However, a slight parameter tweak at this scale may not lead to any better conclusions, as local geomorphological processes, factors such as tree cover, and the error bars of the digital elevation data make this scale of change negligible.



**Figure 4: Viewshed software over OS topography data: Yadlee Stone Circle (Yellow), and associated cairns (Blue).**

5.3 Panoramic photographs taken using Canon EOS1100D to prove visual association of sites from Yadlee Stone Circle in the 21<sup>st</sup> century. Because of the ephemeral nature of the site, and adverse weather conditions the panoramic photography however was of limited value.



Plate 2: Panoramic view to north from Sparleton Edge

5.4 Including the application of the targeted landscape survey. This survey found three possible associated landscape features (at roughly due West, North and East of Yadlee Stone Circle) which have alignments within the stone circle indicating their importance (*Figure 3*).

- Determined the location of Yadlee Stone Circle and underwent preliminary survey using handtape and notebook, identifying eighteen potentially associated stones, field walking of the immediate area, and the photographing of the panorama from the site.
- Extreme weather conditions limited the data collected. Panoramic shot and field walking attempted in the area of Witches Cairn (NT66NE 1), visibility seriously limited by weather. During survey of both sites, we were able to observe the application of the viewshed analysis.
- Sparleton Cairn surveyed (NT66NE 4): Panoramic photograph, preliminary survey with handtape & notebook. Undertaken again in adverse weather conditions (fog) which limited visibility.
- Yadlee Stone Circle: Reconfirm preliminary survey with handtape & notebook, stone count increased to twenty-five. Stone's surveyed using total station. Photographed stone circle with polecam, and later used images in Autodesk 123D application. Identified potential rock art, later disproved (Barnett Pers. Comm.). Assessed potential of archaeo-astronomical correlations. Individual stones photographed for alignments.

5.5 A tumblr Blog was created, ([yadleestonecircleproject.tumblr.com](http://yadleestonecircleproject.tumblr.com)) to aid the dissemination of results to a larger demographic. This included a link on the Edinburgh University Archaeology Society webpage.

5.6 Aerial (pole camera) images were used in Autodesk 123D Catch and Agisoft Photoscan applications to create a 3D reconstruction of the site. This enabled us to check alignments within the stone circle while not on site. (*Plate 3*)

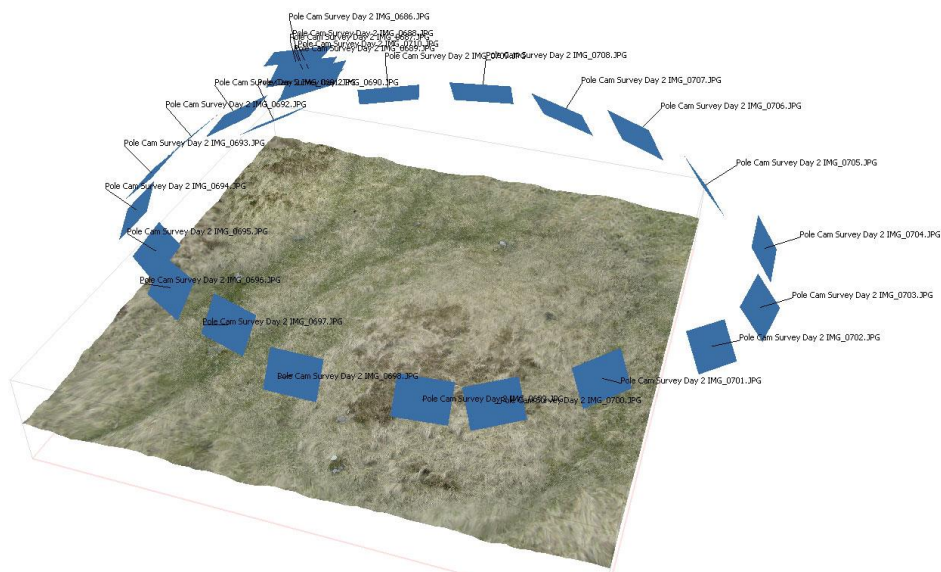


Plate 3: Capture of 3D model using Agisoft Photoscan.

5.7 Used **Google Earth** software to correlate significant movements within the solar cycle with the alignments within the stone circle and the landscape (*Figure 5*). This utilised the angles of alignments within the stone circle, their associated cairns and landscape features, and then investigating whether these lines matched with the setting or rising of the sun at significant points. The following alignments were associated with sunsets or sunrises:

- 92°: Witches Cairn, Sunrise Spring Equinox.
- 192°: Spartleton Cairn, Sunset Winter Solstice.
- 232°: Landscape Trough, Sunset 1<sup>st</sup> November & 1<sup>st</sup> February.
- 282°: Rook Law Cairn, Sunset Spring Equinox.



Figure 5: Google Earth © Image of Equinox Sun rising above Witches Cairn due East of Yadlee Stone Circle.

- 5.6. The investigations found proof of the possibility of association between alignments within the circle itself, visible points on the viewshed landscape analysis such as peaks and troughs, and then related archaeological remains in the form of cairns on these landscape features. These in turn could thus be associated with significant solar movements.
- 5.7. By utilising the Canmore database, it was brought to our attention that Yadlee Stone Circle may be linked, through shared use of Spartleton Cairn, with other stone circles in the immediate area. These are preliminary investigations, but a meshwork of related sites may include Nine Stones Stone Circle (NT66NW 14), and others across the Whiteadder Water.



Plate 4: Fieldwork was often hampered by difficult recording conditions.

## 6.0. Conclusions and Recommendations

### **Conclusions:**

6.1 This project has found persuasive evidence for the association between Yadlee Stone Circle and its surrounding landscape, due to connections of significant alignments within the circle and significant areas upon the horizon (Figure 4). It is again persuasive that these alignments across the landscape are subsequently associated with solar movements of the Equinox and Solstice. These alignments across the landscape and sky can be argued as being indicative of reliance upon the site for reinforcing agricultural timings, or holding a specific agricultural and ritual value. While it would be tempting to argue a ritual reliance upon the stone circle and its environs, this is not currently supported by any evidence.

6.2 Essentially, the interpretation of the relation of Yadlee Stone Circle to solar movements requires a series of criteria to be filled for each potential alignment:

- There needs to exist an alignment of three or more stones within the stone circle and its outliers.
- There needs to exist a subsequent alignment from the stone circle to a significant landscape feature (peak or trough) on the horizon.
- There needs to exist a subsequent cairn or possible prehistoric structure on the horizon at the significant landscape feature.
- There needs to exist a sunrise or sunset at this point, sometimes of a significant date (solstice or equinox).

6.3 This experiment in student-led research proved to be successful, gaining an in-depth understanding of structuring and designing archaeological survey projects and increased our knowledge regarding Yadlee Stone Circle. It exemplifies the possibilities available to students to engage with local archaeology using freely available resources (national/regional institutions, equipment, and software) and to create archaeological reports of professional standards, at little financial cost.

6.4 The dissemination of the progress and results of this project was successful. The creation of a blog was useful as a site record and as a reference for individuals who are interested in tracking our progress. However, the extent of the value of the use of blogs remains to be determined. Publication in student journals such as *The PostHole* and *InSitu Online Archaeology Journal*, as well as presentations at various conferences, such as the 1<sup>st</sup> Annual Students Archaeology Conference and TAG2013, helped to disseminate the value of a project such as the Yadlee Stone Circle project, seem to have more tangible impact upon academic audiences.



6.5 It was concluded that the extent of work that can be achieved through the medium of free resources and software is impressive. It is useful to experiment with these in order to obtain a better understanding of their potential and shortcomings. The photography and 3D software were invaluable; however there was a tangible difference between free software and those which one has to purchase.

6.6 The interpretations formed of the site are supportable by the data collected, but the author's acknowledge that they approached the site from a very specific research hypothesis; that of archaeo-astronomy. This may have marred or biased the conclusions, and thus several other site conclusions are suggested here:

- The site of Yadlee Stone Circle may be a natural formation.
- The site of Yadlee Stone Circle may be a prehistoric roundhouse, and the stones present could be packing stones for post-holes where the floor surface has eroded away.
- The site of Yadlee Stone Circle may be a mound with kerbstones around it, which has eroded downslope.
- The site of Yadlee Stone Circle may be an enclosure with packing stones for fence-posts or supports.

***Recommendations:***

6.7 Further work, deemed necessary to clarify the function of the site, should take the form of further non-invasive survey as the site is a scheduled monument.

6.8 Further region-wide survey could clarify the relation of the site to the surrounding landscape, which may be of importance if the interpretation of the site justifies such an approach. This could include both topographic survey (especially of the surrounding horizon) and archaeological survey to identify any possibly contemporaneous features.

6.9 Geophysical survey (Magnetometry/Ground-penetrating-radar) could clarify the purpose of the site on a local level, potentially revealing any sub-soil features which may indicate construction or taphonomic processes that could otherwise be misinterpreted based upon the surface evidence.

6.10 Trial excavation (test pit/small area excavation) could further clarify the purpose of the site on a local level, and could potentially provide a secure date (relative/absolute) in the form of an artefactual record or scientific dating.

## Appendixes

### Appendix 1: Photo Record

Photo ID	Site Code	Description	Direction From	Date
001	YSC13	DSC_003 - Stone 001	South	20/05/2013
002	YSC13	DSC_005 - Stone 002	South	20/05/2013
003	YSC13	DSC_007 - Stone 003	South	20/05/2013
004	YSC13	DSC_009 - Stone 004	South	20/05/2013
005	YSC13	DSC_0012 - Stone 005	South	20/05/2013
006	YSC13	DSC_0016 - Stone 006	South	20/05/2013
007	YSC13	DSC_0018 - Stone 007	South	20/05/2013
008	YSC13	DSC_0021 - Stone 008	South	20/05/2013
009	YSC13	DSC_0023 - Stone 009	South	20/05/2013
010	YSC13	DSC_0027 - Stone 010	South	20/05/2013
011	YSC13	DSC_0030 - Stone 011	South	20/05/2013
012	YSC13	DSC_0032 - Stone 012	South	20/05/2013
013	YSC13	DSC_0035 - Stone 013	South	20/05/2013
014	YSC13	DSC_0039 - Stone 014	South	20/05/2013
015	YSC13	DSC_0041 - Stone 015	South	20/05/2013
016	YSC13	DSC_0045 - Stone 016	South	20/05/2013
017	YSC13	DSC_0047 - Stone 017	South	20/05/2013
018	YSC13	DSC_0052 - Stone 018	North	20/05/2013
019	YSC13	DSC_0053 - Stone 019	South	20/05/2013
020	YSC13	DSC_0056 - Stone 020	South	20/05/2013
021	YSC13	DSC_0060 - Stone 021	South	20/05/2013
022	YSC13	SD2_018 - Stone 011	N/A	22/04/2013
023	YSC13	SD2_025 - Stone 011	N/A	22/04/2013
024	YSC13	SD2_050 - Stone 009	N/A	22/04/2013
025	YSC13	SD2_053 - Stone 009	N/A	22/04/2013
026	YSC13	Yadlee Stone Circle Panorama	N/A	18/03/2013
027	YSC13	Spartleton Panorama	N/A	22/04/2013

## **Appendix 2: Student Archaeology as a Resource**

As stated in the conclusions, one aim of this project was to test the ability of student archaeologists, and to train them in some aspects of project management they would not receive in the course of their undergraduate career. This appendix is dedicated to briefly exploring this concept of the 'Undergraduate Resource' in advance of a further paper.

If we consider the above report of satisfactory detail, and then consider that the project was completed by four undergraduate students in around two weeks, the scale of the possible benefit of this resource becomes apparent. If the hundreds of undergraduate archaeology students across the UK each undertook a small-scale piece of investigation like this once a year during their studies, yet not for academic gain, and then published it in the same format as above there would be hundreds of projects. Each of these projects, as again above, would have a narrow and humble research question, yet that which still makes a viable difference to the archaeological record of a local area. This would relate itself in the medium of hundreds of reports such as that above, forming a web of archaeological material accessible by all interested in a specific area.

The logistics of implementing an enabling initiative such as this are of course complex, and shall as such be addressed in another piece of work by the authors. Yet it is clear that a move to unlock this 'Undergraduate Resource' would be beneficial to the entire archaeological community.

### Appendix 3: Secondary Data Used

Ordnance Survey Data was downloaded through the University of Edinburgh and the EDINA Digimap Ordnance Survey Service.

1:10 000 Raster [TIFF geospatial data], Scale 1:10000, Tiles: nt66sw, nt66nw, nt66ne, nt66se, nt67sw, nt67se, nt76sw, nt76nw, nt77sw, Updated: June 2012, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <<http://edina.ac.uk/digimap>>, Downloaded: Wed Feb 27 17:25:12 GMT 2013

1:25 000 Raster [TIFF geospatial data], Scale 1:25000, Tiles: nt66, nt67, nt76, nt77, Updated: May 2012, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <<http://edina.ac.uk/digimap>>, Downloaded: Sun Feb 24 14:21:38 GMT 2013

PROFILE Contours [NTF geospatial data], Scale 1:10000, Tiles: nt66sw, nt66nw, nt66ne, nt66se, nt67sw, nt67se, nt76sw, nt76nw, nt77sw, Updated: November 2009, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <<http://edina.ac.uk/digimap>>, Downloaded: Thu Feb 14 22:18:41 GMT 2013

PROFILE DTM [NTF geospatial data], Scale 1:10000, Tiles: nt66sw, nt66nw, nt66ne, nt66se, nt67sw, nt67se, nt76sw, nt76nw, nt77sw, Updated: November 2009, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <<http://edina.ac.uk/digimap>>, Downloaded: Thu Feb 14 22:13:38 GMT 2013

### References

Hingley, R., Moore, H.L., Triscott, J.E. & Wilson, G. 1997, 'The Excavation of two Later Iron Age Fortified Homesteads at Aldclune, Blair Atholl, Perth and Kinross, *Proceedings of the Society of Antiquaries of Scotland*, Vol. 127, pp. 406-466.

Moore, P., 2009, 'Crystal Rig II Wind Farm, Lammermuir Hills, East Lothian and Scottish Borders: Report No. 1579.2', *OASIS Reference No: cfaarcha1-52014*.

Scheduled Monument Record, 1988: (Assessed 8/10/2013)

[http://data.historic-scotland.gov.uk/pls/htmldb/ESCHEDULE.P\\_ESCHEDULE\\_DOWNLOADFILE?p\\_file=4443](http://data.historic-scotland.gov.uk/pls/htmldb/ESCHEDULE.P_ESCHEDULE_DOWNLOADFILE?p_file=4443)

## **Acknowledgements**

The Yadlee Stone Circle Project would like to thank, in no specific order, the following:

Dr T. Barnett, Mr C. Bowles, Dr I. Ralston, Mrs M. Struckmeier, Ms S. Williamson, East Lothian County Archaeology Service, Edinburgh University Archaeology Society and Scottish Borders County Archaeology Service.

Special thanks should be extended to Mr D. Connolly of Connolly Heritage Consultancy, and Mr D. Scott, without whom this project would never have proceeded.