

SKAGAFJÖRÐUR CHURCH AND SETTLEMENT SURVEY

Hegranes Settlement Survey: Rein, Keta, Hamar, Utanverðunes, Ásgrímsstaðir. Interim Report 2016



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6/3/2017

Picture on front page – Rein, south end of Hegranes.



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BSK-2017-183 / SCASS-2017-111
2017

Acknowledgements

We are greatly indebted to the farmers in Hegranes who allowed us to core and excavate on their farms, and were incredibly kind and helpful throughout. Specifically, we thank the farmers at Hamar (Sævar Einarsson), at Keta (Ingibjörg Jóhannesdóttir and Símon Traustason), at Egg and Rein (Embla Dóra Björnsdóttir and Davíð Logi Jónsson), at Helluland and Ásgrímsstaðir (Andrés G. Magnússon, Magnus and Yvonne Liljeroos), at Utanverðunes (Heiðbjört Pálsdóttir and Mikael Leo Brennan), and the kind families who own Hróarsdalur who all allowed us to excavate test pits on their land,. We thank all our collaborators and those who supported us in any way.

A team of 24 archaeologists and other specialists worked on the various dimensions of the survey: coring, geophysical survey, and excavation. The principal investigators are John Steinberg, Douglas Bolender, Guðný Zoëga and Brian Damiata, and; the senior specialists include Maarten Blaauw, Kathryn Catlin, Lísabet Guðmundsdóttir, Margrét Hrönn Hallmundsdóttir, Kimmarie Murphy, Stephen Albert Mrozowski, Rita Shepard, John Schoenfelder, Josiah Wagener, Bryndís Zoëga; and, of course, we are very grateful to the team of student archaeologists without which this work could not be achieved: Aileen Balasalle, Grace Cesario, Eric Johnson, Annie Greco, Leigh Koszarsky, Laura Marques-Jackson, Jared Muehlbauer, Lauren Welch O'Connor, Alicia Sawyer, Katherine Wagner, and Nicholas Zeitlin,.

General permits for the survey of Hegranes and associated excavations were granted by The Cultural Heritage Agency of Iceland (MÍ201306-0030, MÍ201306-0040, MÍ201606-0051, & MÍ201606-0065). The National Museum of Iceland granted artifact catalogue number 2016-41. The work was supported by the US National Science Foundation (PLR # 1242829, 1345066, 1417772 & 1523025) in a joint project of the Skagafjörður Heritage Museum (Byggðasafn Skagfirðinga) and UMass Boston. The Icelandic Archaeology Fund (Fornminjasjóður) also supplied significant support for the project. We are grateful to the Skagafjörður Commune for their ongoing and invaluable support. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the individuals and institutions who support this work.

Skagafjörður Heritage Museum

The Skagafjörður Heritage Museum is a center for research on local history and cultural heritage in the Skagafjörður region, North Iceland. It is affiliated with the National Museum of Iceland and its main exhibition at the old turf farm of Glaumbær is one of the most visited national heritage tourist attractions. The Archaeological Department of the museum was established in 2003 and engages in contract and research driven archaeology both within and outside the region. The core long-term research programs center on fundamental issues surrounding the settlement and early medieval church history of Skagafjörður and the North-Atlantic region with a focus on developing methodological and theoretical approaches to the geography of early Christian cemeteries. The department is involved in multifaceted interdisciplinary collaboration with Icelandic and international institutions and specialists. Its research portfolio includes bioarchaeology, early metal production, settlement studies, as well as the methodological aspects of archaeological surveying.

Fiske Center for Archaeological Research

The Andrew Fiske Memorial Center for Archaeological Research at the University of Massachusetts Boston was established in 1999 through the generosity of the late Alice Fiske and her family as a living memorial to her late husband Andrew. As an international leader in interdisciplinary research, the Fiske Center promotes a vision of archaeology as a multi-faceted, theoretically rigorous field that integrates a variety of analytical perspectives into its studies of the cultural and biological dimensions of colonization, urbanization, and industrialization that have occurred over the past one thousand years in the Americas and the Atlantic World. As part of a public university, the Fiske Center maintains a program of local archaeology with a special emphasis on research that meets the needs of cities, towns, and Tribal Nations in New England and the greater Northeast. The Fiske Center also seeks to understand the local as part of a broader Atlantic World.

Skagafjörður Church and Settlement Survey (SCASS)

The Skagafjörður Church and Settlement Survey (SCASS) seeks to determine if the settlement pattern of the 9th-century colonization of Iceland affected the development of the religious and economic institutions that dominated the 14th century. The research builds on the combined methods of two projects, the Skagafjörður Archaeological Settlement Survey and the Skagafjörður Church Project. One has focused on Viking Age settlement patterns. The other has been investigating the changing geography of early Christian cemeteries. Together, the research seeks to understand the connections between the Viking settlement hierarchy and the Christian consolidation.

Fornbýli Landscape and Archaeological Survey on Hegranes (FLASH)

The *Fornbýli* Landscape and Archaeological Survey on Hegranes (FLASH) project investigates ruined structures and sites (*fornbýli*) located on the environmental and social margins of the modern farm properties. This research complements the work of SCASS by seeking to understand the role of smaller, marginal settlements in the political economy of the region, especially the effects of anthropogenic environmental and landscape change on the establishment, abandonment, and reuse of these sites. The project is led by Kathryn Catlin as part of her doctoral dissertation in Anthropology at Northwestern University.

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Summary

On Hegranes, in Skagafjörður, Northwest Iceland, nine farms were investigated in 2016 with a program of cores and test excavations in order to estimate farmstead size and establishment date. This project is part of the larger Skagafjörður Church and Settlement Survey (SCASS) and over 3 years all the farms on Hegranes will be surveyed. The nine farms were Egg, Rein, Keta, Hamar, Ríp, Hegranesþing (Litli-Garður), Utanverðunes, Helluland, and Ásgrímsstaðir. The research results for five of those farms – Rein, Keta, Hamar, Utanverðunes, and Ásgrímsstaðir – are reported here. Using the H1 tephra (AD 1104), as a horizon marker, the largest farmstead was Hamar (7,200 m²), followed by Utanverðunes (4,100 m²), Ásgrímsstaðir (3,600 m²), Keta (2,100 m²), and Rein (400 m²), which is the smallest farmstead associated with a known farm site that we have measured in Hegranes. Ásgrímsstaðir was the oldest farm, likely established in the mid-10th century. A less certain but similar date is likely for Utanverðunes whereas the other farms – Rein, Keta, and Hamar – all appear to have been established close to A.D. 1000.

Útdráttur

Sumarið 2016 fóru fram fornleifarannsóknir á níu jörðum í Hegranesi í Skagafirði. Rannsóknirnar voru í formi ítarlegrar könnunar með töku kjarnabora og könnunarskurða og var ætlunin að kanna aldur jarða og stærð þeirra í upphafi. Rannsóknirnar voru hluti af stærra rannsóknarverkefni, Skagfirsku kirkju- og byggðasögurannsókninni þar sem allar jarðir í Hegranesi verða kannaðar með tilliti til aldurs og byggðapróunar. Jarðirnar níu voru Egg, Rein, Keta, Hamar, Ríp, Hegranesþing (Litli-Garður), Utanverðunes, Helluland, and Ásgrímsstaðir. Í skýrslunni eru kynntar niðurstöður rannsókna á fimm jarðanna: Rein, Ketu, Hamri, Utanverðunesi og Ásgrímsstöðum. Gjóska úr Heklu sem féll 1104 e.Kr. var notað sem leiðarlag varðandi skilgreiningu á elstu byggð. Hamar reyndist stærsta jörðin fyrir gjóskufallið (alls 7,200 m²), næsta var Utanverðunes (4,100 m²), Ásgrímsstaðir (3,600 m²), Keta (2,100 m²). Lang minnsta býlið var Rein (400 m²), og er það minnsta býlið sem rannsakað hefur verið í

Hegranesi. Ásgrímsstaðir reyndist elsta jörðin, komin í byggð um miðja 10. öld. Utanverðunes kann að hafa verið byggt á svipuðum tíma en tímasetningin var óvissari. Jarðirnar Rein, Keta, og Hamar – voru hinsvegar fyrst byggðar um 1000 e. Kr.

Introduction

In 2014 a joint project of the Skagafjörður Heritage Museum and the University of Massachusetts Boston, called the Skagafjörður Church and Settlement Survey (SCASS) received a grant from the Division of Polar Programs (PLR) of the National Science Foundation (NSF). The aim of the project is to systematically survey for the oldest settlement and church history in the area of Hegranes, a rocky promontory in the middle of the Skagafjörður valley in North Iceland. The area is well suited for study as it is geographically distinct and there is evidence for possible cemeteries at nine of the dozen original settlement farms. The primary objectives of the settlement survey are to identify all farmsteads in the Hegranes region, establish their earliest date of occupation, and to measure their extent at different periods in history.

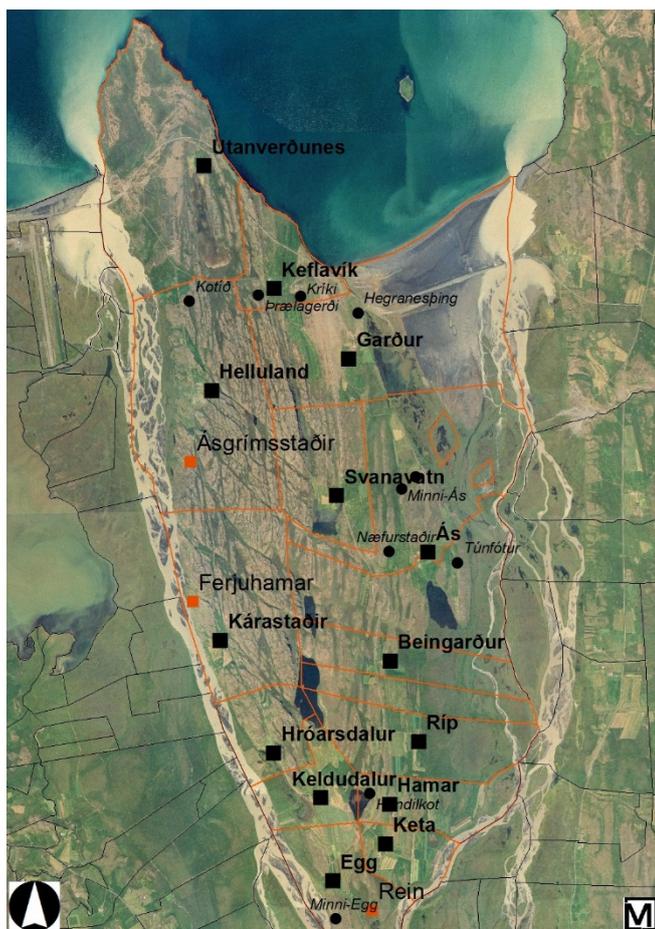


Figure 1. Hegranes overview and location of survey farms with modern property boundaries.

The summer of 2016 was the second of three planned years of intensive survey of farmsteads in the Hegranes region. In 2015, five farms were investigated: Ás, Garður, Hróarsdalur, Keflavík, and Keldudalur. In 2016, nine additional farms were surveyed: Egg, Rein, Keta, Hamar, Ríp, Hegranesþing (Litla-Garður), Utanverðunes, Helluland, and Ásgrímsstaðir (**Figure 1**). The survey field season started on the 6th of July and finished on the 14th of August.

Primary objectives for 2016 field season were:

1. Identify buried or abandoned areas of past domestic occupation and farm activity.
2. Estimate the extent of farmstead deposits at each farm during three periods of occupation: pre-1104 A.D., 1104-1300 A.D., and post-1300 A.D.
3. Identify and date the earliest occupational deposits at each farmstead.
4. Identify early Christian household cemeteries associated with the farms.
5. Investigate the history of changing patterns of farm and cemetery distribution in relationship to the institutionalization of secular power and the Catholic Church in Iceland.

Icelandic farmsteads and settlement survey

Icelandic farms are dispersed throughout the habitable coastal and lowland areas and interior valleys of the island. Historically, farms consisted of a central concentration of turf structures, the immediately surrounding infields, the outfields, pastures, and other resource locations that were owned by a specific farmer (Amorosi, et al. 1998; Urbańczyk 1999). Most farms also relied on extensive grazing lands that were communally owned and managed. During the summer, livestock were moved to the communal pastures while grass was grown in intensified homefields and outfield areas to produce winter fodder (Friðriksson 1972).

There were also productive activities that took place well away from the main farmstead, for example summertime dairy production at shielings, turf cutting, charcoal production, bog iron ore collection, and fishing (Brown, et al. 2012; Lucas 2008; Sveinbjarnardóttir 1991; Vickers and Sveinbjarnardóttir 2013).

Comprised of dispersed infrastructure, lands, and resource rights, the farm is difficult to identify archaeologically and for this reason the survey is primarily focused on the **farmstead** rather than the **farm** as a whole. The farmstead is the central concentration of farm buildings, including the central domestic buildings, barns, and other ancillary structures (Lucas 2009; Milek 2006; Ólafsson and Ágústsson 2004; Vésteinsson 2004). The location of Icelandic farmsteads could be stable and often results in significant concentrations of built up turf and midden material (primarily ash) referred to as farm mounds (Vésteinsson 2010). Many farm mounds have been occupied since the initial settlement of Iceland over a millennium ago. While these are readily identifiable in the landscape (most are still occupied today), the earlier horizons are usually covered by later occupations making them difficult to access. Farmsteads that were occupied for shorter periods, either because the farm was abandoned or because the farmstead was relocated to a new spot on the same farm (Bolender, et al. 2011), are often visible on the surface but in areas with significant soil accumulation can be buried and difficult to identify using traditional surface survey methods.

Hegranes

Hegranes is a low, rocky region situated in the middle of the Skagafjörður valley bottom. It is currently separated from the rest of the valley by the glacial rivers of Héraðsvötn which flow on both its west and east sides. The northern end projects as a low headland in to the fjord. Today, much of the region is exposed rock and heathland. Although it is clear that the environment was impacted by human settlement and subsequent land use the nature and extent of the alternations is currently unclear. There is evidence of localized patterns of soil erosion and deposition as well as wetland formation. According to the Jarðabók Árna Magnússonar (Magnússon and Vídalín 1930), Hegranes had 12 principal farms: Keflavík, Garður, Ás, Ríp, Hamar, Keta, Egg, Keldudalur, Hróarsdalur, Kárastaðir, Helluland, and Utanverðunes, and many smaller subfarms and cottages. It also records two abandoned farms, Ferjuhamar, Ásgrímsstaðir, which are mentioned in other earlier sources. All but two of the large farms

(Ásgrímsstaðir and Ferjuhamar) continue to be occupied today. Hegranes is unusual for its historical and archaeological evidence for a large number of household churches and cemeteries. Nine of the farms have some evidence pointing to the presence of an early church or cemetery including, Ríp, Keldudalur, Ferjuhamar, Ásgrímsstaðir, Helluland, Utanverðunes, Keflavík, Garður (Hegranesþing), and Ás (Sigurðardóttir 2012). The discovery of the previously undocumented early Christian cemeteries at Keldudalur in 2002 (Zoëga 2015) and at Keflavík (Zoëga, et al. 2015) has raised the question of how many of the other farms may have had cemeteries.

Survey Methodology

The survey utilizes cores to identify buried farmsteads and to map the extent of known and newly discovered farmsteads over time. Small test excavations, usually 1x1 meter or 1x2 meters, are carefully placed in the oldest, well-preserved sections of middens to collect soil samples for flotation and tephra identification. Tephrochronology and radiocarbon dates from preserved organics (preferably barley seeds) in the stratigraphically oldest layers in the midden are used to refine the farmstead establishment date. These survey methods are augmented with geophysical survey where appropriate to gain a better understanding of the farmstead layout and structure.

Two core types were used in the survey: a JMC Backsaver soil sampler push probe with an 18-inch long 1.25-inch wide sampling tube which fully extended can reach a depth of 120 centimeters, and an Eijkelpamp meter-long single-gouge auger with a 6 cm diameter, which with multiple extensions can reach a depth of up to 5 meters. Wherever possible, cores probed to the prehistoric tephra layers (e.g., H3 or H4) ensuring that the entire potential period of occupation was sampled. All tephra layers, soil horizons, and inclusions (cultural and otherwise) were recorded. When cultural material was identified (e.g., charcoal, ash, midden, floor, or turf not belonging to natural in situ bog deposits) additional cores were taken, filling in the intermediate areas in the survey grid to more precisely determine the nature, extent, and dates of the deposit. In the combined

survey programs of SCASS and FLASH over 2600 cores were taken in 2016; 910 of these were at the five farms reported here: Rein, Keta, Hamar, Utanverðunes, and Ásgrímsstaðir.

Excavation utilized a single context methodology following protocols modified from the Museum of London Archaeology Service (Westman (ed.) 1994). Excavation data, including context descriptions as well as sample, find, and photographic registries, were entered into a FileMaker relational database. In the combined survey programs of SCASS and FLASH over 21 small test pits were excavated in 2016; 7 of these were at the five farms reported here: Rein, Keta, Hamar, Utanverðunes, and Ásgrímsstaðir

Reconnaissance for buried farmsteads and other farm activity areas

In areas with sufficient soil accumulation to completely bury abandoned farmsteads, coring densities varied from 10 to 100 meter intervals depending on the geological conditions. Cores were generally taken every 40 m.

Farmstead coring and site size estimation

Known farmstead sites, including buried activity areas identified in the reconnaissance coring, were systematically cored to estimate the extent of the farmstead at various periods in history and to target the oldest preserved layers of midden for small text excavations. Coring generally concentrated at the edge of farmstead areas to better define their changing boundaries.

'Farmstead' deposits

Small and infrequent anthropogenic inclusions in soils – such as ash, charcoal, and bone – are common near farmsteads and other activity areas. These are good indicators that an activity area or domestic site may be near but we do not count infrequent inclusions as contributing to the areal extent of the farmstead. Higher concentrations of anthropogenic inclusions, midden deposits, turf, dense cultural layers, and activity surfaces are included. For the purposes of the survey, farmstead deposits include:

Low density cultural layers – defined by anthropogenic inclusions amounting to 2-50% of the soil matrix (*Figure 2*). These are assumed to result from indistinct and extensive deposition events that suggest regular activity typical of farmsteads or other farm production areas.



Figure 2. Core 151006 from Ás showing low density cultural deposit (LDC).

Middens – defined by anthropogenic inclusions amounting to more than 50% of the soil matrix that suggest the regular deposition of household or production area waste (*Figure 3*). Middens are the result of distinct and intensive deposition events associated with purposeful disposal.

Turf deposits – any evidence for a turf structure, including collapsed or levelled turf, are considered evidence of farm buildings (*Figure 4*). The organic content and percentage of soil in turf deposits is variable.



Figure 3. Core 150604 from Keflavík showing a midden deposit.



Figure 4. Core 150033 from Keflavík showing a turf deposit.

Dense cultural layers and floors – characterized by dense, compacted, and/or greasy cultural layers indicative of floors, extramural activity areas, or areas of intense deposition of organic materials. These deposits are often thin but are very distinct.

Geology and tephra

The geology of the region is characterized by Upper Tertiary basic and intermediate extrusive basalts (Feuillet, et al. 2012) overlain by morainic glacial till. The area was deglaciated by 6100 yr cal.BP and then subject to uplift (Cossart, et al. 2014). The natural stratigraphy of the surface of the region consists of a rapidly formed sediment and soil with intermixed tephra layers, along with gravel layers and lenses of glacial origin. The soil is a brown andosol that derives from aeolian sediments of volcanic origin, but is not the direct product of eruptions (Arnalds 2004; Arnalds, et al. 1995). The andosol is non-cohesive but has an extremely high water-retention capacity (Arnalds 2008).

Survey chronology and the Skagafjörður tephra sequence

The survey relies heavily on datable tephra layers preserved in the soil stratigraphy. Skagafjörður has an early tephra sequence that allows for a fine-grained chronology of the changes in early settlement patterns (Larsen, et al. 2002). While tephra deposition can vary over small distances (Davies, et al. 2010) the basic tephra sequence is found throughout Skagafjörður and allows for a common dating system among farms and farmsteads, including sheet middens and relict field systems (Þórarinnsson 1977). The dates of the historic eruptions roughly coincide with several major historical events including the original settlement of the island about A.D. 870, the end of mass migration to the island in 930, the conversion to Christianity in 1000, the establishment of the tithe law in 1097, the incorporation of Iceland into the Norwegian state in 1262, and the beginnings of the Little Ice Age in 1300. Specific tephras are described below.

Historic tephras:

- Hekla A.D. 1766. A black tephra usually found in turf or in the upper 10 cm of the soil sequence.
- Hekla A.D. 1300. A gray-blue to dark black tephra (Larsen 1984; Larsen, et al. 1999; Larsen, et al. 2002; Larsen, et al. 2001; Sveinbjarnardóttir 1992).

- Hekla A.D. 1104 (H1). This white or yellowish-white tephra is the most consistent in Skagafjörður (Eiriksson, et al. 2000; Thórarinnsson 1967) and is readily identifiable in both natural and cultural stratigraphic sequences.

Landnám sequence tephras:

- Vj~1000 tephra. A blue to bluish-black layer whose source has not been determined but is likely to be either from Grímsvötn or Veiðivötn eruption dated to approximately A.D. 1000 (Boygle 1999; Ólafsson 1985; Sigurgeirsson 1998; Wastegard, et al. 2003).
- The mid-10th century layer (~950). This blue-green layer is currently an un-sourced and undated layer that is found between the LNL and Vj~1000. There are several potential candidates for this layer, including the large A.D. 934 ±2 eruption of Eldgjá. (Fei and Zhou 2006; Hammer, et al. 1980; Thordarson, et al. 2001) or an A.D. 933 ±6 green tephra layer identified in the Lake Mývatn area from Veiðivötn, termed V-Sv~950 (Sigurgeirsson, et al. 2013). Because this layer has not yet been dated it is referred to as the ~950 layer throughout the text.
- “Landnám” or “settlement” layer (LNL). The layer is so-named for its association with the earliest settlements in Iceland (Andrew J Dugmore and Newton 2012) and is dated to A.D. 871 ±2, (Grönvold, et al. 1995; Zielinski, et al. 1997 [A.D. 877 ±4]). The tephra originates from the Vatnaöldur fissure swarm associated with the Torfajökull and Bárðarbunga volcanos (Andrew J Dugmore and Newton 2012; Larsen 1984). In general, this layer consists of two distinct tephras—an olive-green tephra overlying a white tephra. However, in Skagafjörður, only the green portion is present (cf. Hallsdóttir 1987).
- Black tephra before the LNL (K800). The earliest tephra in this sequence is a dark black layer probably from the Katla volcano, but is not well

dated (Wastegard, et al. 2003). It is usually labeled K800 in profiles.

Prehistoric tephras:

- Hekla 3 (H3). A thick (generally 2-3 cm) white or whitish-yellow tephra dating to about 950 B.C. (Andrew J. Dugmore, et al. 1995).
- Hekla 4 (H4). A thick (generally 1-3 cm) white or yellowish-white tephra dating to about 2300 B.C. (Eiriksson, et al. 2000).

Farmstead stratigraphy and estimates of farmstead size at different periods

Chronological phasing of farmstead sizes primarily relies on two tephra layers: the white Hekla A.D. 1104 and the dark Hekla A.D. 1300. These layers are the most common in coring stratigraphy and often the easiest of the historical tephras to identify. Using these tephra layers to date cultural deposits allows for the chronological phasing of farmstead sizes and for farmstead sizes to be compared across contemporary temporal horizons. It also allows for the identification of changes in the size of individual farmsteads. Other tephra are used to help identify the overall stratigraphic sequence in the soil cores and to associate specific layers with historical periods. The resulting chronology allows for the estimation of farmstead size for three primary periods:

- *Pre-A.D. 1104,*
- *A.D. 1104-1300, and*
- *Post-A.D. 1300*

Deposits were also identified as belong to two, more inclusive, categories:

- *Post-A.D. 1104, this is especially useful where the Hekla A.D. 1300 tephra is not present or difficult to identify, and*
- *‘All time’, which simply denotes the presence of a farmstead deposit from any time period.*

Deposits were categorized by these temporal phases based on whether or not they contained “farmstead” material.

Estimates of Farmstead extent

Cores that contained a 'farmstead' deposits are coded in three simple categories for each chronological period: "yes," "no," and "maybe" based on the presence of any of the above discussed cultural deposits identified in any of the temporal phases. Deposits classified as "yes" for each temporal period were stratigraphically bound by the appropriate tephra layer(s). "Maybe" was used to classify farmstead deposits that could not be restricted to a particular temporal period but for which a particular chronological could not be ruled out. For example, a core with layers of midden and turf layers but without any tephra would be classified as "yes" for 'all time' but "maybe" for all other periods as the cultural deposits could date from anytime. Similarly, a core with midden below and turf above the H1 tephra but with no other tephra would be categorized as "yes" for pre-1104 and "yes" for post-1104 but "maybe" for both the 1104-1300 and post-1300 periods as it is unclear when, post-1104, the turf was deposited. "No" classifications indicate the absence of any farmstead deposits for the designated time period or for the core as a whole.

The distribution of "yes", "maybe", and "no" deposits for each time period are plotted in GIS and an outline representing the furthest extent of contiguous farmstead deposits is drawn resulting in an estimation of the areal extent of each farmstead for each period. "Yes" deposits are used to define the basic shape of the farmstead outline. Then "maybe" deposits for each period are used to refine the basic outline based on the distribution of "yeses". In general, "no" deposits were ignored if they were contained within an area surrounded by "yes" and "maybe" deposits. Boundaries to the areal extent were placed approximately halfway between the last "yes" deposit and the first "no" deposit at the edge of the contiguous farmstead deposits. Where a "maybe" deposit was between the last "yes" and the first "no" deposit, the boundary was drawn passing through the "maybe" location. The process of modeling farmstead boundaries in GIS produces an estimated farmstead footprint and area calculation for each time period based on the material recovered in cores and test excavations. To not imply an

inappropriate level of accuracy to these estimates, all farmstead sizes are reported rounded to the nearest 100 m².

Isolated areas of farmstead deposits that are non-contiguous with the main farmstead extent but with 100 meters are given separate boundaries and added to the areal calculation of the main farmstead. Isolated farmstead deposits beyond 100 meters from the main farmstead are counted as separate activity areas (or as additional farmstead sites on the farm if they are extensive and include substantial midden deposits).

The estimations of farmstead extent presented in this survey report should be considered preliminary. Final estimations of farmstead extent will involve the careful review of all coring data and stratigraphic sequences to further refine the estimated farmstead extent.

Farmstead establishment date

The establishment date of a farmstead is the final critical metric for the settlement pattern study. The establishment dates were determined from tephra dates, sometimes in combination with AMS radiocarbon dates, obtained from carefully targeted excavations in the oldest part of a farmstead's midden.

Household middens are ideal targets for obtaining the establishment date of a farmstead. Substantial concentrations of ash and bone are indicative of domestic occupation and their presence can distinguish farmsteads from isolated outbuildings and other non-domestic site types. Ash and other household garbage was not universally spread on fields, but often built up into a mound (e.g., Davidson, et al. 1986) and a small portion of the ash spread over living floors (Milek 2006). Middens were often concentrated adjacent to a side entrance or kitchen door (Buckland, et al. 1994; Snæsdóttir 1991; Vésteinsson 2010). In other regions, Viking Age middens frequently were dispersed like a sheet around the farmstead. In all of these midden formations, the ash tends to build up rapidly due to the tremendous volume of waste from the burning of peat, dung, and wood (Simpson, et al. 2003; Vésteinsson and Simpson 2004). Midden deposition seems to be relatively continuous and thus provides an excellent



Figure 5. Rein, view of the homefield looking to the south. Figures are standing on the north side of the main medieval farm mound near the location of test pit 2.

environment for the rapid burial and preservation of tephra layers. Middens can be sampled without unduly damaging the complex stratigraphic relationships in structures.

The estimations of farmstead establishment date presented in this survey report should be considered preliminary and are likely to be refined by more extensive radiocarbon samples in combination with tephra layers. In some cases, chemical analysis may redefine tephra layers entirely changing a farmstead's date range.

Survey results

The survey produces three main datasets related to the farmsteads in Hegrane: the identification of occupational areas on the farm, an estimation of changing farmstead size based on coring data, and an estimate of the earliest occupation at the farm based on test trenches strategically placed in the farmstead midden deposits to expose the oldest cultural deposits identified in the coring. Results from each farm are presented below.

Rein

Rein is currently an abandoned farm on the property of Egg. It is located at the southern end of Hegrane on the western side of a sloped piece of land that projects into an area of wetlands at the valley bottom (*Figure 5*). The eastern side of the farmstead is delineated by a low but precipitous escarpment. The area to the west of the farmstead has recently been drained. The drainage

ditch profiles show that the area has been boggy for the past several thousand years. The land to the northeast of the farmstead, in the direction of Keta, is dry but heavily eroded.

Rein had two major periods of occupation. The first beginning with the Viking Age settlement of Hegrane lasting into the late Middle Ages and a later reoccupation sometime around 1800 and lasting into the first half of the 20th century (Pálsson 2010). The end of the first occupation is unrecorded but probably occurred sometime in the 15th century. The tephra sequence in the midden clearly shows continued accumulation after A.D. 1300. The farm is listed in the A.D. 1388 inventory of properties belonging to the Bishopric at Hólar (*Diplomatarium Islandicum*, 3:408, 413). The specification of rent payments suggests the farm was occupied at the time but was likely abandoned sometime before A.D. 1449 as it was not then listed in the Hólar inventory.

In 1713, the *Jarðabók Árnarnágnussonar* lists Rein as an abandoned farm on the property of Egg, which was owned by the Hólar bishopric (Magnússon and Vídalín 1930). At that time the homefield fence and turfhouse ruins were visible but there was no knowledge of when it had last been occupied. In 1802 Hólar sold Egg, including Rein. It is unclear if Rein was occupied at the time. The first recorded reoccupation is in 1831. The farm continued to be occupied until 1931 with short period of abandonment from 1887-1889 and 1921-1923 (Pálsson 2010).

Site overview:

The early 20th homefield map (*túnakort*) closely corresponds to an area of well-preserved soils and differing surface vegetation. The grass within the homefield was very tall when Rein was surveyed making it difficult to identify surface features. Nonetheless, a number of features were visible.

The old homefield wall is most clear on the south side of the farmstead (*Figure 7*). Coring (#160872) in the wall showed multiple bands of white Hekla 1104 tephra demonstrating that this section of the wall was constructed after A.D. 1104. The high degree of preservation suggests a relatively recent date. In all likelihood the entire homefield wall would have had to be rebuilt with the reoccupation of the farm so it is surprising that only this section is well-preserved. The homefield map does not indicate walls around the field so it is possible that the entire wall was not rebuilt. The escarpment to the east, with minor alterations, would have acted as a natural barrier to movement. Evidence of alteration along the ridgeline and a few faint linear features indicate some additional effort to restrict the movement of animals on the east side of the homefield, although it is unclear if there was continuous wall. A modern barbed wire fence runs along the north side of the homefield. This fence does not match the field boundary on the homefield map, which places it to the south. Coring (#161419) revealed buried turf correlating to a faint linear surface feature roughly corresponding to the north edge of the homefield on the map. The turf in the core contained an unidentified dark tephra and it is unclear if these two preserved sections of wall date from the same period or belong to the same homefield boundary. No homefield wall was identified on the west side of the homefield but the area was covered with tall grass and any surface evidence of a wall could have easily disappeared in the boggy landscape.

There are two collapsed structures immediately south of the homefield wall. Toward the middle of the wall is a small *stekkur*. Coring (#160895) shows a post Hekla-1766 date for the structure. To the southeast is a rectangular enclosure. The enclosure is on south-facing



Figure 7. Rein, homefield wall on south side of farmstead. View is to the southwest. The small ruin outside the homefield wall is visible to the left of the wall just before the landscape dips away to the wetlands below.

slope. The structure was not cored but likely is the remains of an old kitchen garden dating to the later early modern reoccupation of the farm.

The homefield map also shows a distinct jutting out in the northeast corner of the field. The remains of two collapsed structures are visible in the area. Both appear to be two-aisled sheep sheds (*beitarhús*) with attached hay lofts. Coring showed that both structures were built after the fall of the Hekla 1766 tephra and are likely associated with the early modern reoccupation of the farm. (#161430, north structure; #161417, south structure).

Another small collapsed structure was found 230 meters north of the homefield at the base of a steep rocky outcropping (*Figure 8*). The structure and immediate surroundings were cored. No domestic deposits were recovered.



Figure 8. Rein, small ruin north of homefield. View is to the south. The Rein homefield is the light green patch in the upper right of the image.

Farmstead coring:

A total of 148 cores were taken at Rein, including the cores taken to define the farmstead extent and place test pits. Of the 148 cores, 69 had farmstead deposits. Most of these were concentrated around the obvious farm mound and areas with visible collapsed structures.

The medieval domestic deposits at Rein are associated with two surface features located in the southern half of the homefield area. These features are quite close to one another but appear distinct on the surface (and subsequent coring confirmed this). To the northwest is an obvious rounded farm mound for which no clear surface features could be discerned in the tall grass. To the southeast is a low rise with a rectangular feature in its center. There is a built up section of stones and turf to the east and a wall on the southern edge but no overall structural form could be identified. The two areas were both associated with early domestic deposits.

Rein has the smallest farmstead extent of any of the farms investigated so far in Hegranes. The pre-1104 was notably small at only 400 m² including both areas of domestic deposition. The farmstead tripled in size after 1104 to 1200 m² but remained a very small farmstead compared to other farms in the region. It remained roughly the same size in the post-1300 period dropping 100 m² to 1100 m² (*Figure 9*). The area of the early modern reoccupied farmstead was not calculated but is unlikely to be much larger.

The small size of Rein is consistent with the smallest farms measured in the neighboring region of Langholt, which range from around 500-1000 m² (Steinberg, et al. 2016). All of these small farms in Langholt were established during the last phase of land division, sometime in the 11th century (or as later historically known subfarms). In many ways, Rein resembles these farms in terms of establishment date and location relative to its neighboring farms and it is easy to image

that it was carved out of the earlier and larger landholding of Egg. Two of the farms with areas measuring in the mid-hundreds in the pre-1104 period in Langholt, Grófargil and Ytra-Skörðugil, appear to have been established at the very end of this period and, like

Rein, increase in size in the period after 1104. This has led to the idea that the small measured size of these farmsteads in the pre-1104 period may be related to their short period of occupation. This cannot, however, be the case for Rein as the midden deposit begins just

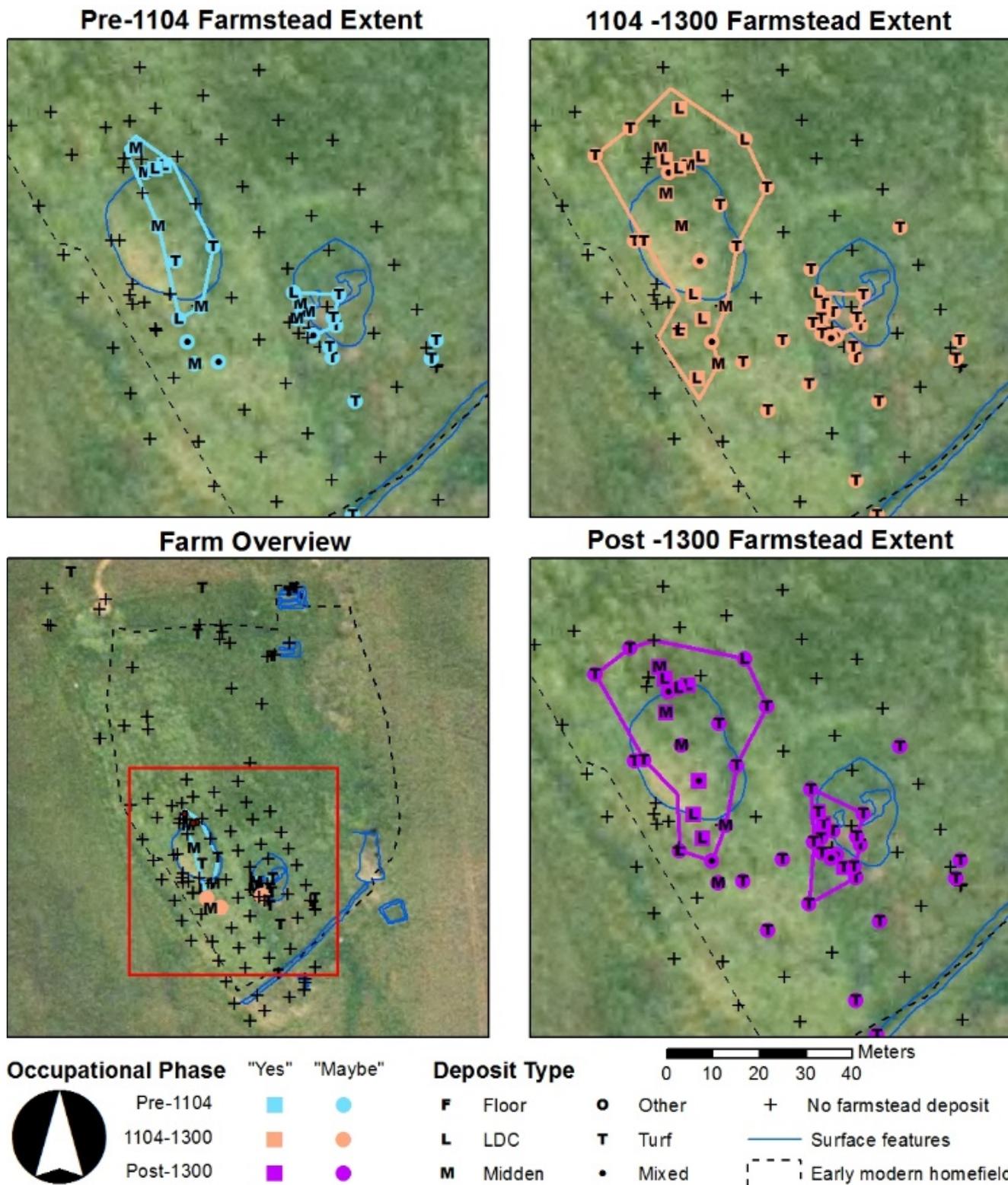


Figure 9. Rein farmstead coring and estimated farmstead extents.

Rein - 452, TP 1

SW corner: E 478875, N 572157

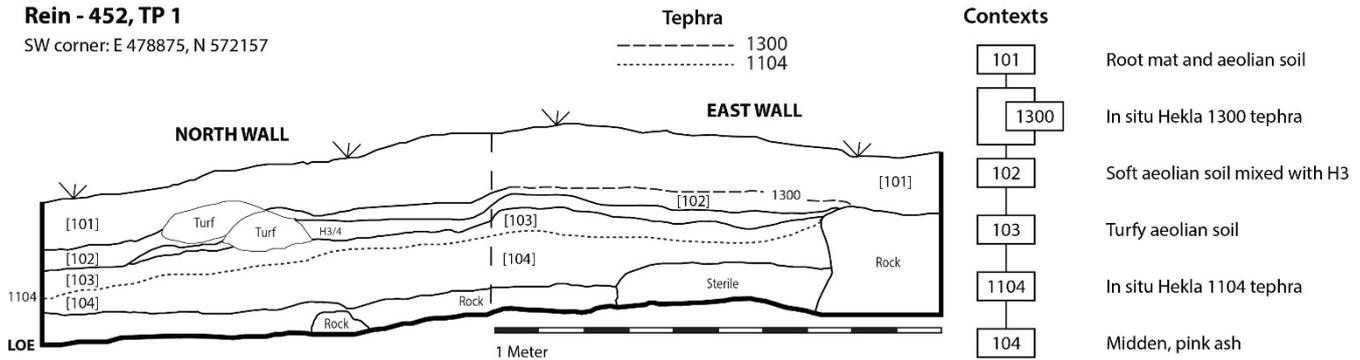


Figure 10. Rein, test pit 1, north and east profiles.

under the Vj~1000 tephra and continues to accumulate through 1104 (see discussion of test pit 2 below). Therefore, Rein must have maintained this small size throughout a century of occupation. In this sense, it is unlike any other farm investigated by the survey so far in either Langholt or Hegranes.

Test excavations:

Two 1 x 1 meter test pits were excavated at Rein corresponding to the two areas with pre-1104 deposits identified in the coring. These two areas of cultural deposition are discrete, although quite close to one another. Test pit 1 (TP1) was located just to the west of the small rectangular ruin where a small, linear area of midden was identified running north-south. Coring (#161203) showed that some of the turf in the area was either post-1300 or 1766. The early 20th century homefield map places an animal barn at the location and the visible surface features are probably that structure. The midden deposits were under the Hekla 1104 tephra and appear to be unrelated to the later structure. Test pit 2 (TP2) was placed on the north side of a visibly mounded area to the northwest of TP1. Reconnaissance coring identified pre-1104 deposits on both the north and southwest sides of the mound. Follow up coring suggested that the earliest deposits were on the north side of the mound. The deposits in the center of the mound were deeper than 1.2 meters (the full length of the core) and therefore the earliest layers were not accessed in the coring in the center of the mound.



Figure 11. Rein, test pit 1, east profile. Context 102 with the yellow mixed H3 tephra is clearly visible above the in situ white Hekla 1104 tephra. The midden with reddish ash [104] begins immediately below the Hekla 1104 tephra. The rocks in the profile and base of the unit are embedded in the natural prehistorical sediment.

Test pit 1 revealed a relatively shallow deposit of aeolian soil overlaying a thin pre-1104 midden (Figure 10). The uppermost layer consisted of aeolian soil and possibly some degraded turf [101]. The turfy sections visible in the profile as differential drying are likely remains from the later early modern structure apparent on the surface to the west of the test pit (Figure 11). The Hekla 1300 tephra was inconsistently preserved across the unit. Where it was visible, and at the same approximate depth throughout the rest of the unit, a new aeolian layer was designated. This layer [102] was mixed with yellow tephra (possibly Hekla 3). The thick layer of tephra and mixed aeolian deposition indicates the deposition of material from some significant erosive

Rein - 452, TP 2

SW corner: E 478841, N 572187

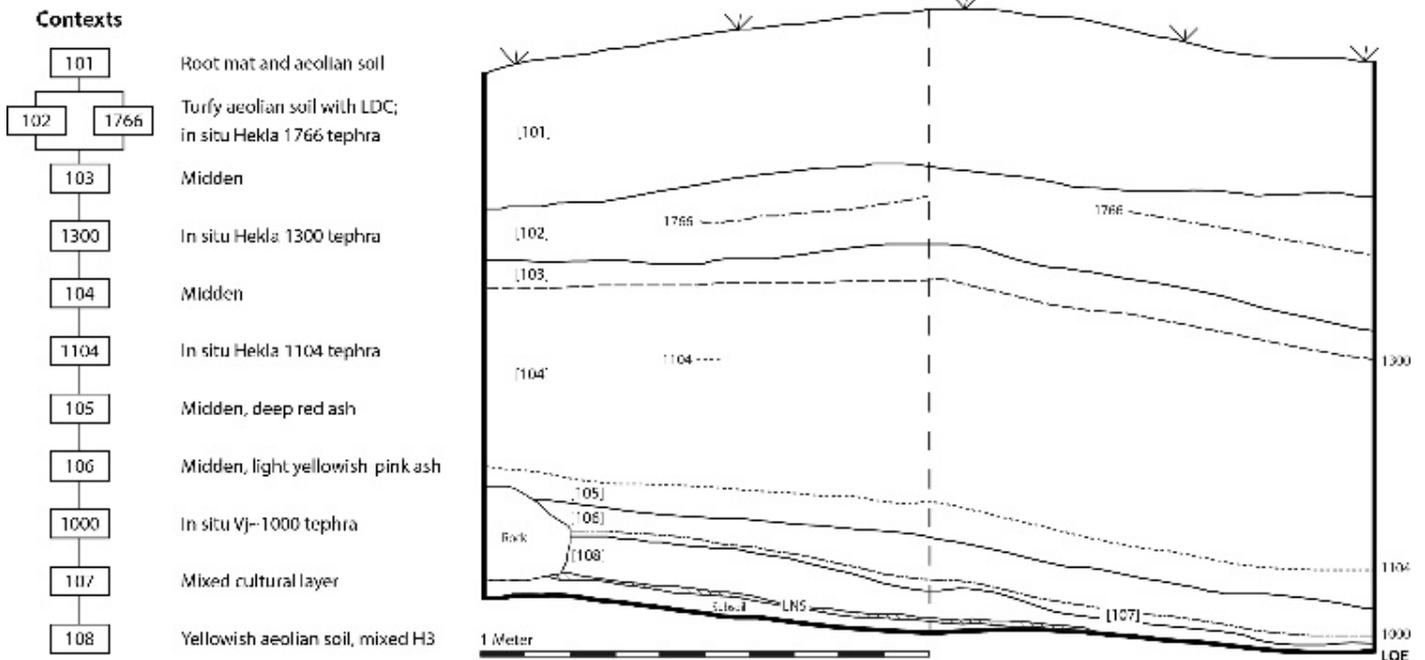


Figure 12. Rein, test pit 2, east and south profiles.

event sometime between A.D. 1104 and 1300 when the farm was occupied. The source of the erosion is not clear but the lands north and east of the farmstead are heavily eroded. Below the mixed tephra and aeolian layer is another layer of turf and aeolian accumulation [103]. There does not appear to have been domestic activity or deposition in the immediate vicinity at this time but the turf mixed into the soil is suggestive of building collapse or perhaps simply the general accumulation of trampled turf debris one might expect close to the farm mound, which is just to the northwest. Under these mixed aeolian layers, and an in situ white Hekla 1104 tephra layer, is a midden layer with red ash, charcoal, and fire-cracked rocks [104]. The bottom of the midden lay on a truncated sterile aeolian deposit of reddish-brown soil and mixed yellowish tephra (H3) and rocks. None of the early settlement (LNL, ~950, Vj~1000) or prehistoric tephtras were present in the soil sequence suggesting a significant truncation sometime after approximately A.D. 1000. This is close the establishment date for the farm based on the stratigraphic sequence in TP2 and probably is related to turf stripping or other landscape disruption associated with the creation of the farm.

Based on the short depositional sequence and apparent post-1000 date for the midden in TP1 a second test pit was placed on the north side of the visible farm mound (Figure 12). Test pit 2 began with a thick aeolian layer [101] followed by another layer of mixed aeolian, turf, and scattered ash, charcoal, bone, and an in situ Hekla 1766 tephra layer [102]. This deposit can be attributed to the early modern reoccupation of the farmstead and the continued collapse of the old farmhouse buildings that the Jarðabók Árna Magnússonar described as still visible on the surface. Below [102] was a midden deposit with ash, charcoal, and bone [103]. There is a continuous midden deposit from [103] through the remainder of the occupational contexts in the unit. These were broken in to separate contexts based on in situ tephra and significant changes in the character of the midden. The midden was largely homogenous with some banding and variation in color and the concentration of organic inclusions but overall it was very similar throughout. A few centimeters below [103] was a bluish in situ Hekla 1300 tephra layer, which marks the only difference between [103] and the underlying [104]. The limited deposition above the 1300 tephra layer fits the overall occupational history of

the farm based on the historical records, which indicate that the farm was abandoned sometime between the late 14th and mid-15th century. An in situ white Hekla 1104 tephra broke the midden deposit between [104] and [105]. Midden layers [106] and [107] were separated by an in situ bluish tephra layer, likely the Vj~1000. The midden is very thin under the Vj~1000 layer, < 1 cm thick. This midden lay directly on a layer of yellowish aeolian soil [108] also likely mixed with disturbed H3 tephra (*Figure 13*). The preserved sections included what appeared to be an in situ bluish-green tephra layer, possibly part of the landnám sequence or the ~950 layer. The preservation of these layers under the truncated surface fit with the general sequence identified in coring around the homefield of widespread surface disruption sometime after the ~1000 and before the 1104 tephra. The overall evidence from the site indicates an establishment date sometime between the ~950 and Vj~1000 layers. Based on the very thin layer of midden under the Vj~1000 tephra, the date is likely to be closer to A.D. 1000.



Figure 13. Rein, test pit 2, bottom of east profile with midden and in situ white Hekla 1104 tephra. The Vj~1000 layer is visible as the faint inscribed line in the reddish midden below the Hekla 1104.

Keta

Keta is first mentioned in the historical record in A.D. 1446 where it appears as one of the properties owned by the cloister at Reynistaður (*Diplomatarium Islandicum*, vol. 4:701). A number of farms on Hegranes

were owned by the cloister. Ferjuhamar, Karastaðir, Hróarsdalur, and Keldudalur are all listed in the original endowment of the cloister by the Hólar bishop in A.D. 1295 (*Diplomatarium Islandicum*, vol. 2:301-302). The absence of Keta, and its immediate neighbor to the north Hamar, from the earlier inventory suggests that this represents a transition in the status of the properties sometime in the 14th or early 15th century. It is unclear if the properties were previously independent or how they became properties of the cloister. The geographical pairing of the two farms might indicate that they were transferred at the same time and that their ownership may have been related before coming under the control of the cloister. Keta remained a property of the cloister, and the state following the reformation, until A.D. 1915 (Pálsson 2010). The *Jarðabók Árni Magnússonar* suggests that the farm only produced enough fodder to support 2 cows and nothing more (Magnússon and Vídalín 1930, vol. 9:67). This limited capacity does not fit well with the estimated post-1300 farmstead size and may indicate a late shift in either the status or environment of the farm closer to the 18th century.

Site overview

The farmstead at Keta is situated on a dry low north-south running ridge about 150 meters wide between two bogs. The ridge extends about 500 meters to the south and widens into a broad rise to the north. The soil sequence is deep and tephra are well-preserved in the boggy areas but much of the dry ridge has shallow soils and is missing many prehistoric and historic tephras suggesting that it has been subject to erosion (*Figure 14*). Tephra were best preserved in the deeper soils around the farm mound.

The historical farm mound is located at the end of the contemporary farm road where the older modern house and barn are situated. The old farmstead has been partially truncated by the construction of the modern farm: the barn foundation appears to have been dug down to bedrock and the parking area and extension of the farm road appear to have been bulldozed to at least 60 centimeters before the gravel bed was laid (possibly deeper, two small probing

excavations were discontinued at this depth). It is likely that this construction completely truncated the remains of the old farmstead in this area. Nonetheless, a significant portion of the farmstead remains just to

the west of the parking area and part of the post-1104 farm mound extends beyond the gravel to the north and southeast allowing for a reasonable estimation of the full farmstead size.

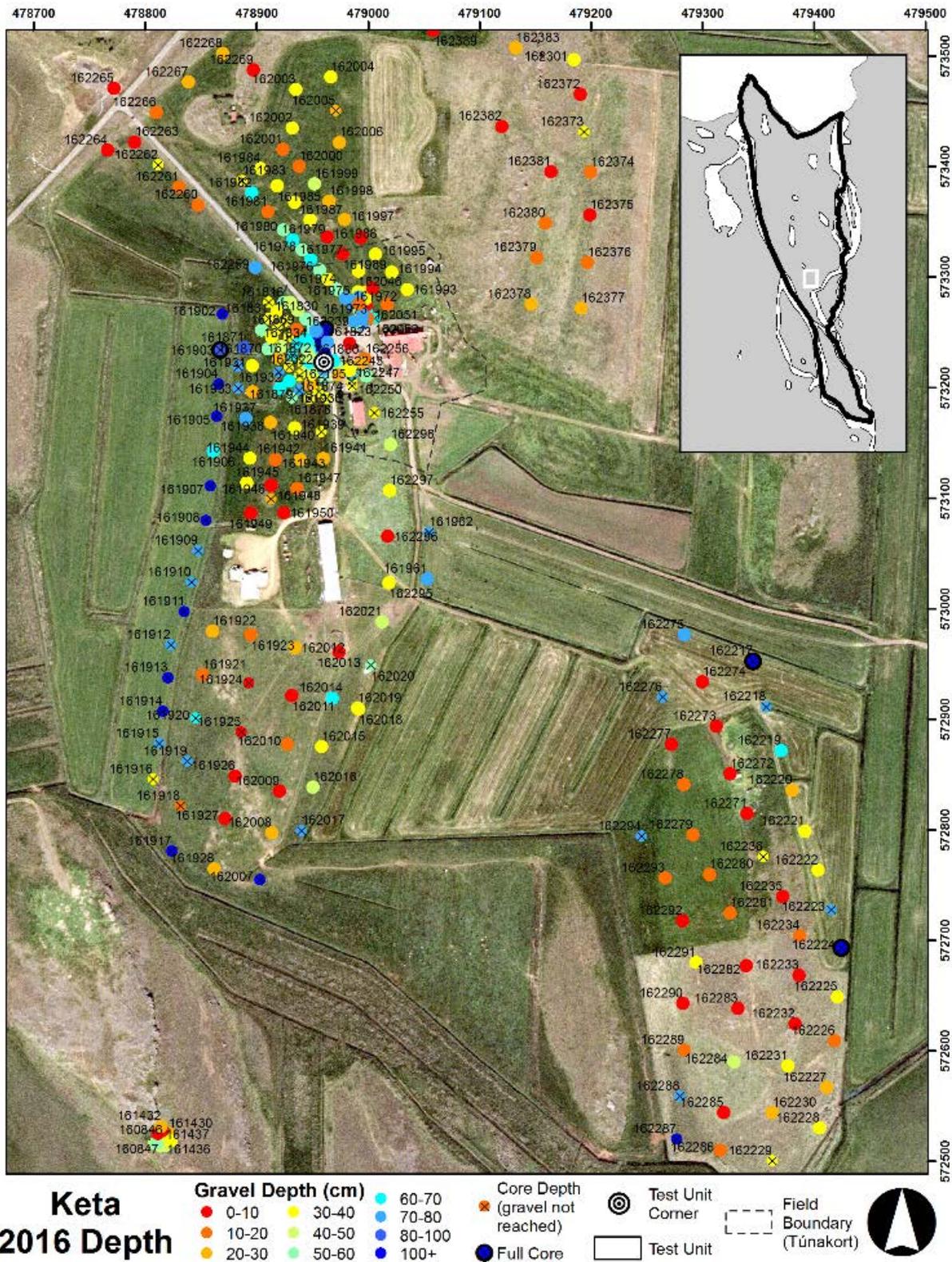


Figure 14. Keta soil depth.

Farmstead coring

The Keta farmstead is on the small side of the overall distribution of farmstead sizes measured in Hegranes so far. The exact pre-1104 farmstead size is a little uncertain as the eastern extent is under the modern farm drive. The estimate of 2100 m² is based on the

exposed portion of the mound to the west and an eastern boundary approximately halfway between last preserved deposits by the edge of the road and the preserved soil stratigraphy to the northeast and southeast that show that the pre-1104 farmstead did not extend that far. While imprecise, the area that could

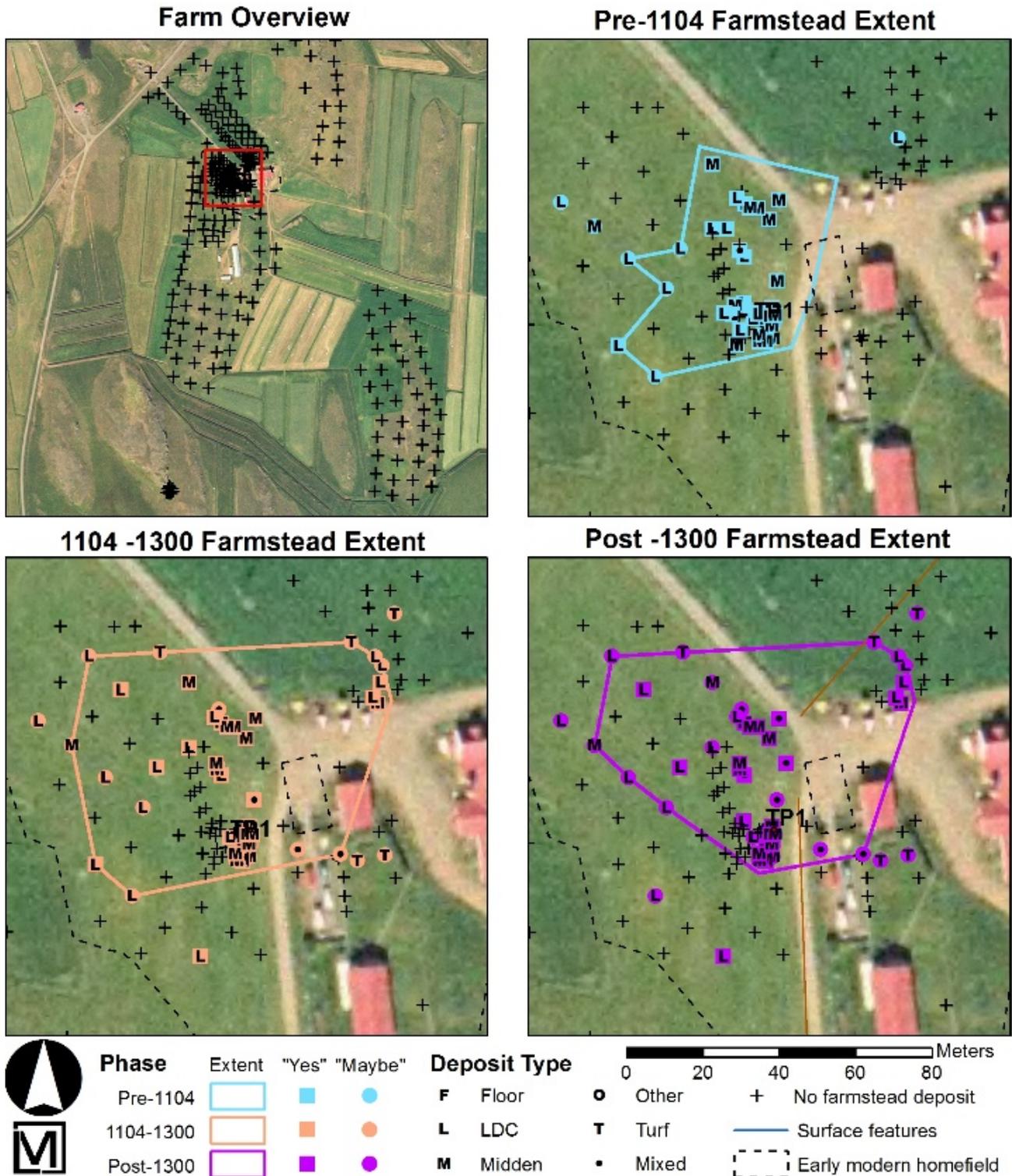


Figure 15. Keta farmstead coring and estimated farmstead extents.

not be accessed in the coring is relatively small and this estimate is unlikely to be off by more than a couple of hundred square meters. The post-1104 farmstead size estimates are a little more solid as preserved deposits were recovered to the north and southeast of the truncated area. The farmstead doubled in size in the A.D. 1104-1300 period growing to 4500 m² and then retreated modestly in the post-1300 period to 3800 m² (Figure 15). In terms of the overall site distribution so far, Keta is one of the smallest farms in the pre-1104 period but is in the middle of the distribution for both post-1104 periods.

Test excavation

Test pit 1 (TP1) was placed just west of the gravel road and parking area near the old farmhouse at Keta where the coring indicated relatively deep and stratified midden accumulation under the Hekla 1104 tephra layer (Figure 16). The uppermost layer of the 1 x 1 meter test unit [101] consisted of loose mid-reddish brown soil a number of mid-sized rocks (greater than 10 cm in width). The deposit was clearly disturbed and in all likelihood is a product of bulldozing the 20th century turf farmhouse and upper layers of the farm mound.

Below the bulldozed upper layer was a highly striated midden with a peaty, organic matrix [102]. The deposit was very dry, probably a result of its turfy nature. The thin, peaty lenses included ash, charcoal, bone, turf and

a few cobbles (> 6 cm). The compressed turf included specks of white tephra that suggest the accumulation of heavily fragmented turf bits rather than primary collapse. The dry, organic lensing is similar to the downslope deposit at the farm of Stóra-Seyla in Langholt where subsequent micromorphological analysis established that the thin layers had developed as organic material accumulated on a vegetated surface and not through primary dumping (Sawyer 2016). If this is the case, then this area may have been at the edge of the farm mound and not an area of primary deposition in the period after 1300.

Under an in situ Hekla 1300 tephra layer was a mid-reddish brown lensed midden accumulation [103] including ash, charcoal, bone, and more turf with small pockets of a grayish-green tephra, possibly either the Vj~1000 or ~950 tephtras. The deposit did not have the dry, striated quality of the post-1300 deposit [102] and appears to represent in situ dumping. Below an in situ white Hekla 1104 tephra layer was a lensed sequence of midden layers that included ash, charcoal, bone, and more turf fragments [104], [105], and [106]. These deposits were all similar and were broken into separate contexts at roughly 10 cm intervals to separate the sequence stratigraphically. The deposition was fairly flat across the unit and the lensing allowed the arbitrary divisions of follow natural layers of accumulation in the

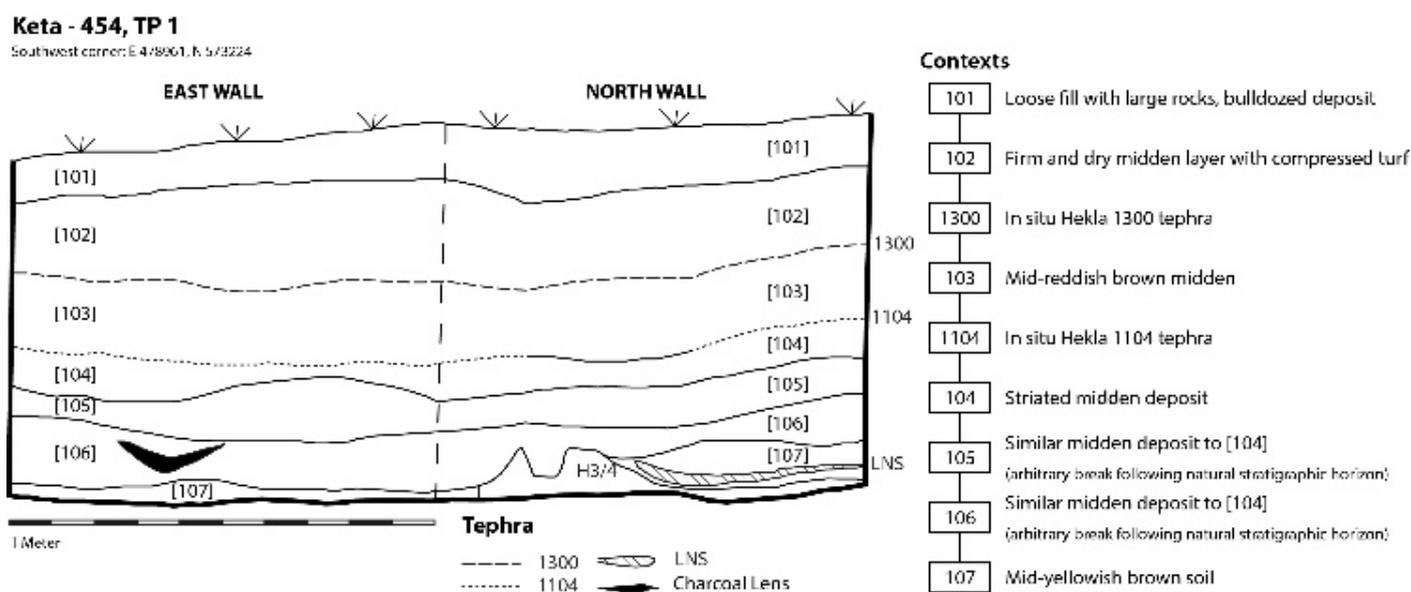


Figure 16. Keta, test pit 1, east and north profiles.

midden so they should represent progressively earlier deposition under the Hekla 1104 layer.

The midden accumulation began on a clearly truncated layer of mid-yellowish brown sandy silt [107]. No tephra layers between the Hekla 1104 and Hekla 3 tephra layers were identified in the midden deposit or in the underlying sterile soil. In all likelihood, they were removed when the surface was truncated probably sometime after approximately A.D. 1000.

Test pit 1 clearly shows substantial midden accumulation prior to A.D. 1104. The absence of either the Vj~1000 or ~950 tephra layers in the early midden accumulation suggest that they may have been removed when the soil sequence under the midden in test pit 1 was truncated. This would indicate that the midden began formation after approximately A.D. 1000. However, there was a cluster of cores a short distance to the west and south of the final test pit location that showed farmstead deposits under what

appeared to be the Vj~1000 tephra layer (#161864, #162026, #162059, #162060, #162061, #162062, #162063) (Figure 17). Most of these cores showed relatively shallow farmstead sequences (30-60 cm in depth) and were frequently disturbed at the top, probably from the bulldozing of the late farmstead as was shown in the test pit and it was not clear if the pre-1104 tephra were in situ. It was decided that the area with possible pre-1000 midden was too restricted, disturbed and shallow to prioritize for a test pit. The possible Vj~1000 tephra identified just west of the test pit (core #162062) contained no other tephra. In the end, the test pit was placed where there was the best preserved and deepest sequence of pre-1104 midden accumulation. If the cores to the south of the test pit represent pre-1000 activity, it appears to have been very restricted and possibly unrelated to the establishment of the farmstead.

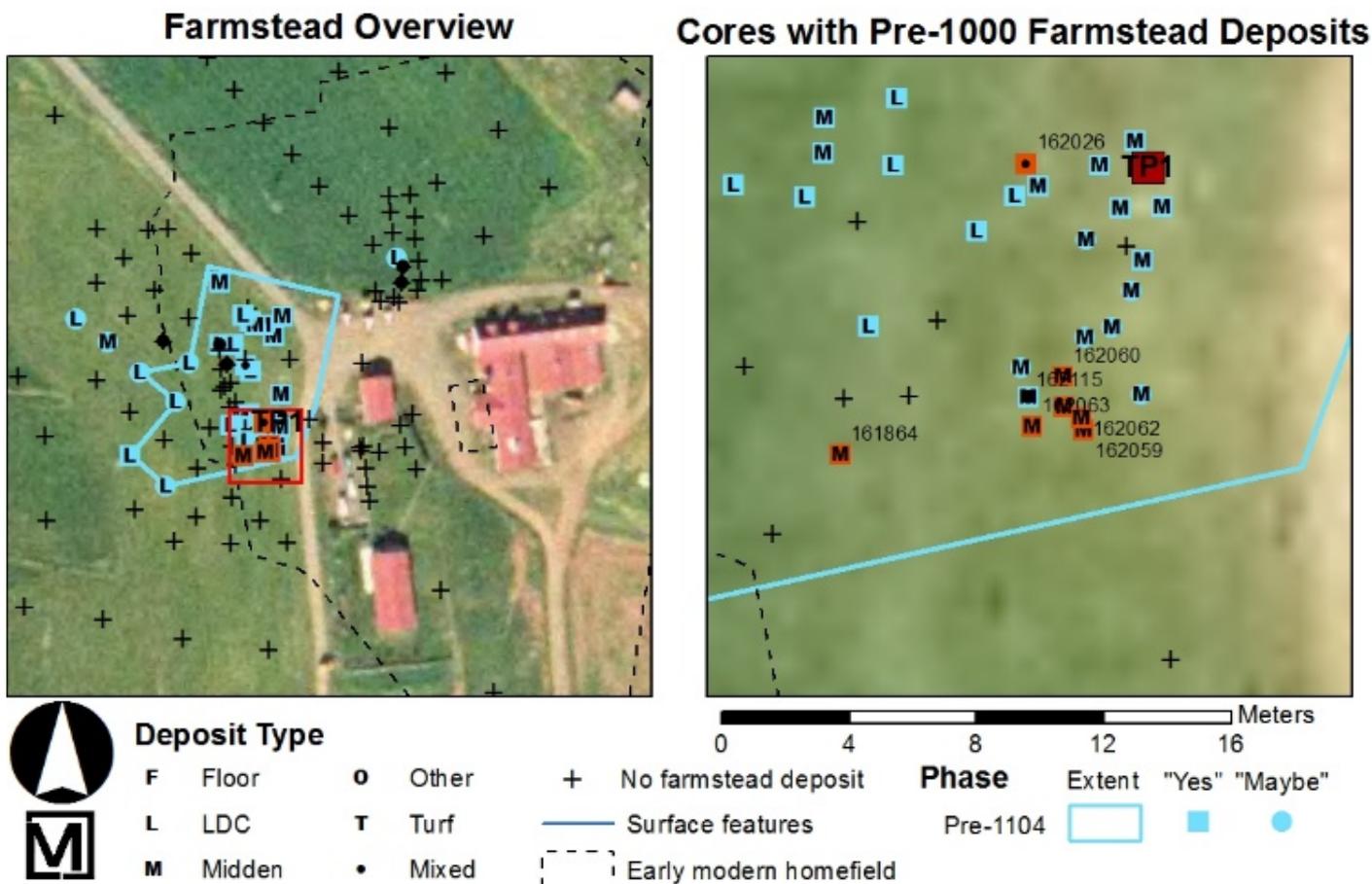


Figure 17. Keta, distribution of cores with pre-1000 farmstead deposits.

Hamar

Hamar is located immediately north of Keta. The two farmsteads are quite close; the contemporary farm buildings are separated by less than 400 meters and a low barren ridge. Like its southern neighbor, Hamar is first mentioned in the historical record in A.D. 1446 where it appears as one of the properties owned by the cloister at Reynistaður (Diplomatarium Islandicum, vol. 4:701). A number of farms on Hegranes were owned by the cloister. Ferjuhamar, Karastaðir, Hróarsdalur, and Keldudalur are all listed in the original endowment of the cloister by the Hólar bishop in A.D. 1295 (Diplomatarium Islandicum, vol. 2:301-302). The absence of Hamar, and its immediate neighbor to the south Keta, from the earlier inventory suggests that this represents a transition in the status of the properties sometime in the 14th or early 15th century. It is unclear if the properties were previously independent or how they became properties of the cloister. The geographical pairing of the two farms might indicate that they were transferred at the same time and that their ownership may have been related before coming under the control of the cloister. Hamar remained a property of the cloister, and the state following the reformation, until A.D. 1908 (Pálsson 2010). The Jarðabók Árni Magnússonar lists its value at 20 hundreds and includes a past subfarm, now barn area, at Hendilkot (Magnússon and Vídalín 1930, vol. 9:66). Coring and test excavations at Hendilkot confirm that it was probably a functioning hjáleiga in the past and was established sometime before A.D. 1104 (Catlin 2016).

Site overview

The farmstead at Hamar is situated on eastward sloping swath of land. The farmstead has probably always been located in approximately this location as excavations in 2014 revealed a sequence of domestic structures dating back to the 11th century just north of the current farmhouse (Sigurðsson 2014). About 80 meters east of the current farmhouse the land flattens into a now drained bog. Coring in the boggy area revealed deep layers of damp peaty soils dating back thousands of years. Further to the east a few north-south running rocky ridges punctuate the boggy land. The primary

early modern homefield covers the area between the house and the bog.

The historical farm mound is located on the site of the contemporary farmhouse. Coring and previous excavation show a long occupation in this area dating back to the 11th century (Sigurðsson 2014). The farmstead midden extends to the east of the farmhouse and covers much of the eastward facing slope between the contemporary house and drained marshlands. There is little evidence of farmstead deposits in the field to the west of the house beyond a small cluster of cores that are likely from a small outbuilding.

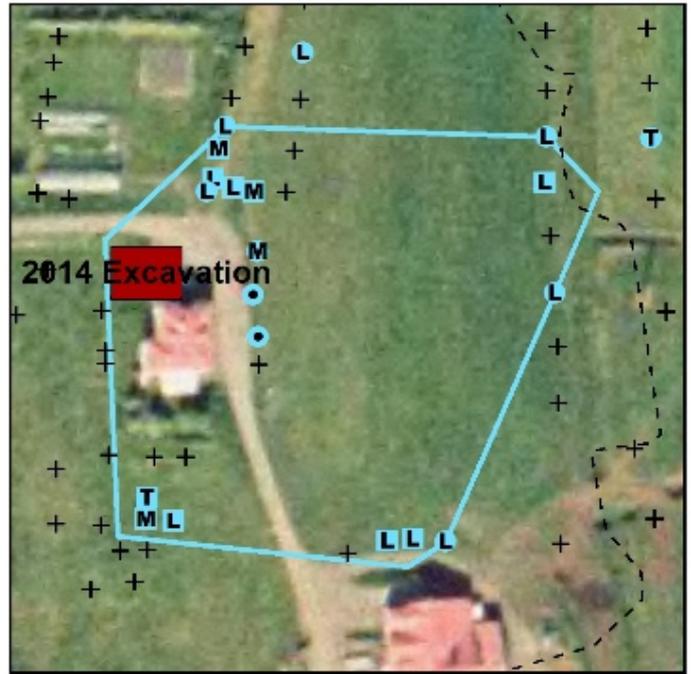
Farmstead coring

The field just to the east of the contemporary farmhouse was covered with mature barley when Hamar was surveyed and it was decided not to disturb the crop. This left areas immediately to the north, west, and south of the farmhouse open for coring and a thin strip along the edge of the barley field that could be accessed without disturbing the crop. Coring at the edge of the barley field closest to the farmhouse revealed a deep stratified midden which likely extended some distance into the field. Cores with farmstead deposits to the east and south of the barley field were also securely dated to the pre-1104 and 1104-1300 phases allowing for a reasonable estimation of the total farmstead size for these period (*Figure 18*). Hamar was moderately sized in the pre-1104 phase at 7200 m². It appears to have retracted slightly in the 1104-1300 period to 6100 m². Additional coring in the field would help to confirm these findings and refine the estimate of farmstead size. The post-1300 period was not securely identified to the south or east of the farmhouse, although there are a number of “maybe” cores. These were tentatively included in the estimate of post-1300 farmstead size of 4800 m² as removing them would have left no information to bound the farm on those sides. Thus, the 4800 m² estimate for the post-1300 period is very uncertain. It probably represents a maximum possible extent for the farmstead in this period and it appears that the farmstead at Hamar retracted sometime after 1104.

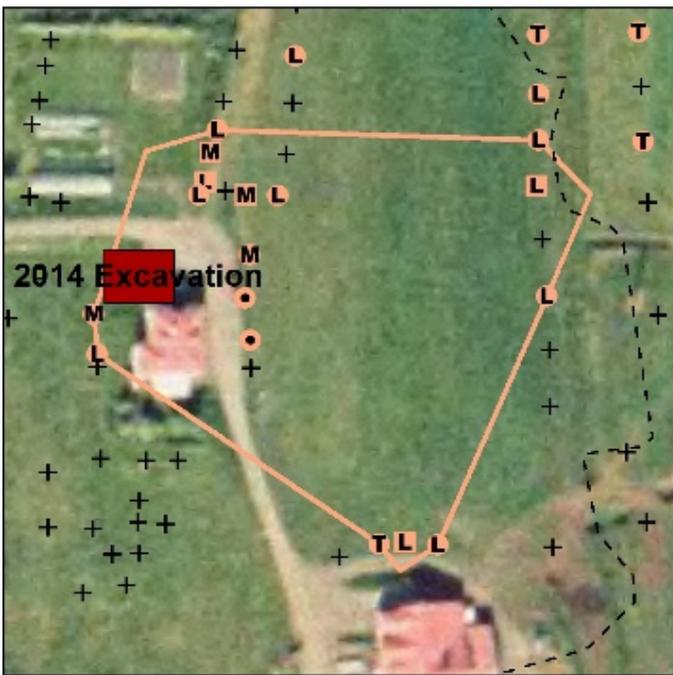
Farm Overview



Pre-1104 Farmstead Extent



1104 -1300 Farmstead Extent



Post -1300 Farmstead Extent

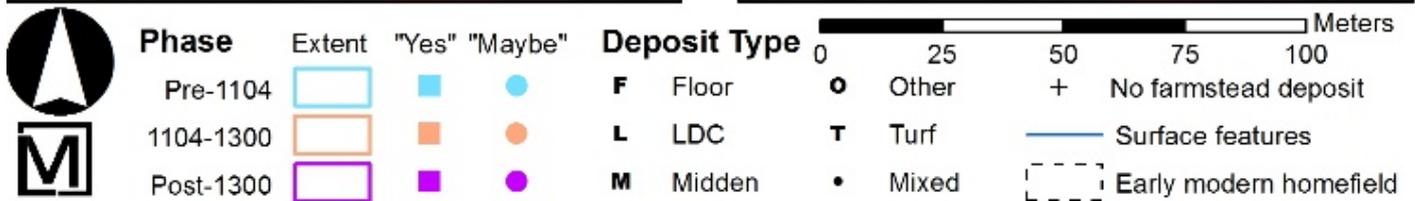
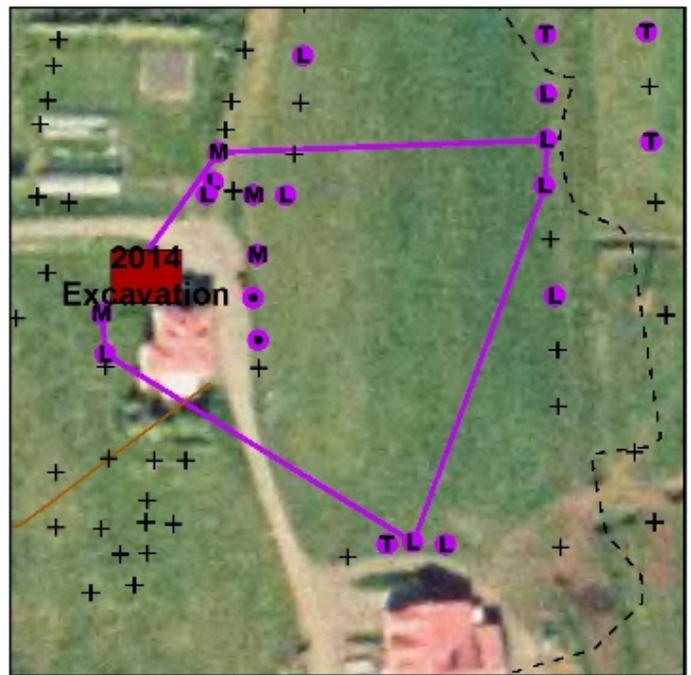


Figure 18. Hamar farmstead coring and estimated farmstead extents.

Test excavation

No test excavations were made at Hamar. The primary midden is located under the barley field and excavation would have disrupted the crop. However, in preparation for an expansion of the farmhouse the archaeology department of the Skagafjörður Heritage Museum conducted an excavation the site in 2014 (Sigurðsson 2014). The 122 m² excavation was located on the north side of the contemporary farmhouse where the drive from the main road turns south. The earliest deposits revealed in the excavation were before the Hekla 1104 layer and appeared to be mixed with the Vj~1000 layer and were interpreted to represent occupation between A.D. 1000 and 1104. Such a date would be consistent with the coring which identified a number of farmstead deposits under the Hekla 1104 tephra but none under the Vj~1000.

The farmers plan to rotate the field next year and follow up coring and excavation are planned for the coming field season.

Utanverðunes

Utanverðunes is first historically mentioned in A.D. 1374 as a property belonging to the bishop's estate at Hólar along with its two neighbors to the east, Keflavík and Garður (Diplomatarium Islandicum, vol. 3:278-279). In A.D. 1449 Hólar recorded a rent of 10 cows (Diplomatarium Islandicum, vol. 5:36). higher than its neighbors with Keflavík 5 rent cows and Garður having 6. In A.D. 1713 when the inventory for the Jarðabók Árna Magnússonar was recorded the farm had been abandoned for the past 6 years Hendilkot (Magnússon and Vídalín 1930, vol. 9:61). The property was sold by Hólar in 1802 (Pálsson 2010:173).

Site overview

The property of Utanverðunes extends all of the way to the north tip of Hegranes. While there is a historically identified settlement on the coastal edge of the headland, Nautavík, much of the area north of the contemporary main road is not suitable for a farmstead and there is no evidence that it was ever the site of habitation. The known farmstead location is situated south of the main road in a flat expanse between two

low rocky ridges to the east and west and Nesvatn. The lake's northern shore is a short distance southwest of the contemporary farmhouse. The farmstead is placed at the south end of a dry grassy field. The areas to the east and south of the house quickly become wet and boggy.

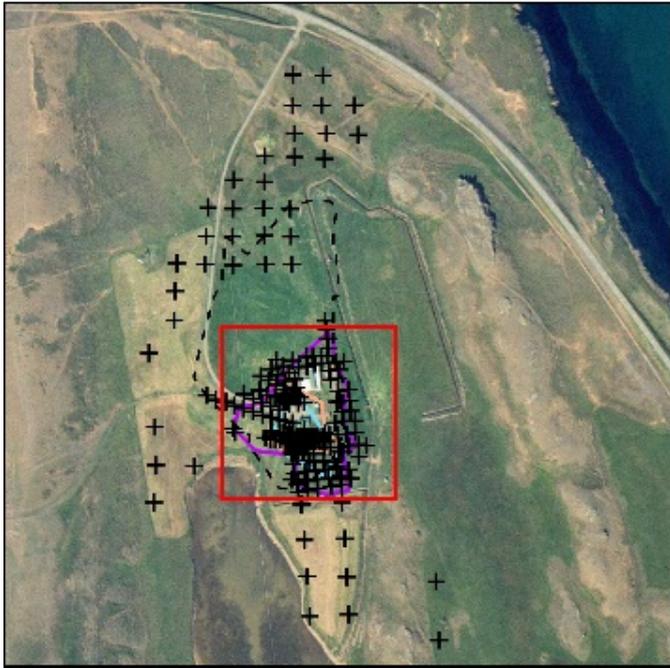
Farmstead coring

Coring was concentrated around the existing farmstead structures and the fields to the north, west, and south. The area beyond the large drainage ditch to the east of the farmstead was wet and boggy. The past farmstead area appears to have closely conformed to contemporary distribution of buildings with the deepest and oldest deposits found around the contemporary dwelling house.

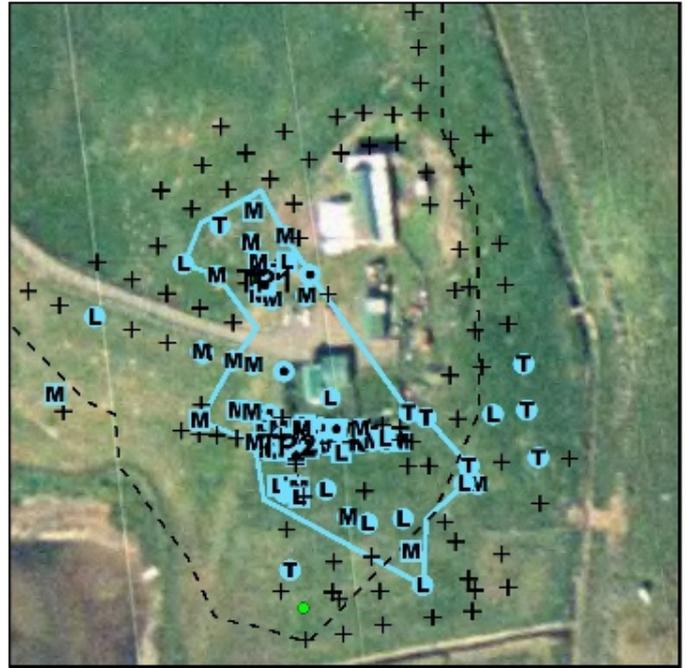
To the northwest of the farmhouse, it was possible to clear some of the gravel just below the surface and access the underlying layers with the core. This was not possible in the area between the contemporary farmhouse and barn or, obviously, under the contemporary structures. The post-1300 farmstead extends beyond these contemporary features but the pre-1104 and 1104-1300 farmstead deposits appear to terminate somewhere under them and as a result the farmstead extents for these early periods are a bit uncertain. The boundaries were drawn somewhat conservatively based on the solid evidence on the west and south sides so these boundaries may slightly underestimate the actual farmstead size. A more liberal method of defining the boundary closer to the negative data north and east of the buildings or including a number of "maybe" cores on the eastside of the mound would increase the estimates by about 1000-2000 m².

Regardless of any possible underestimation of the early phase farmstead extents, Utanverðunes increased in size a great deal sometime after A.D. 1300 (Figure 19). The pre-1104 farmstead size of 4100 m² and the modest increase to 4300 m² in the 1104-1300 period are in the middle range of farmsteads surveyed so far on Hegranes. After 1300 there was a massive increase as the farmstead tripled in size to 13,100 m². This is the most dramatic increase in farmstead size of any farm surveyed to date.

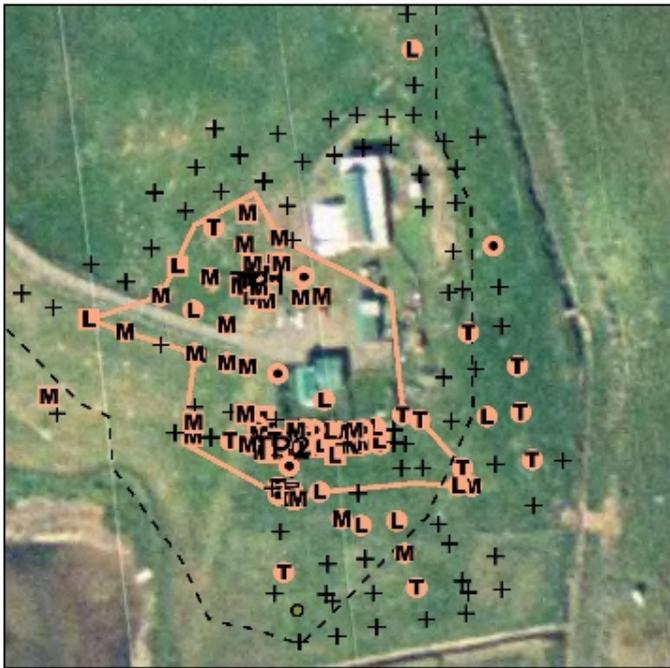
Farm Overview



Pre-1104 Farmstead Extent



1104 -1300 Farmstead Extent



Post -1300 Farmstead Extent

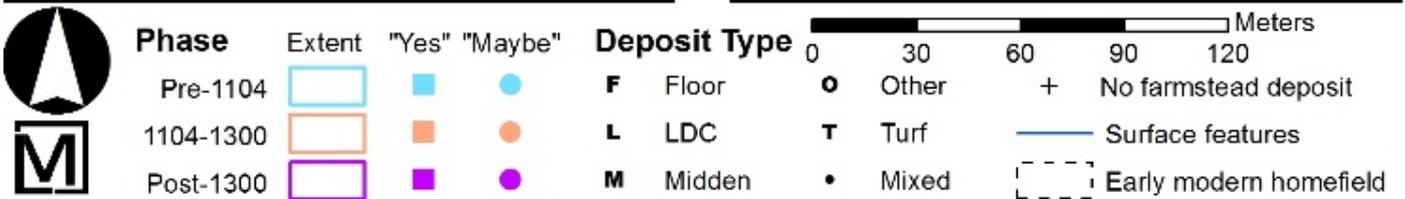
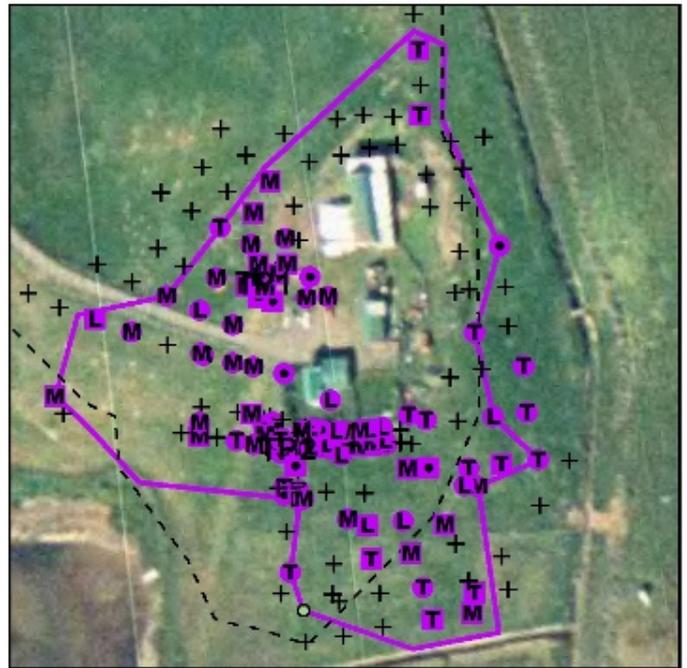


Figure 19. Utanverðunes farmstead coring and estimated farmstead extents.

Utanverðunes - 446, TP 1

Southwest corner: E 4761 57, N 583782

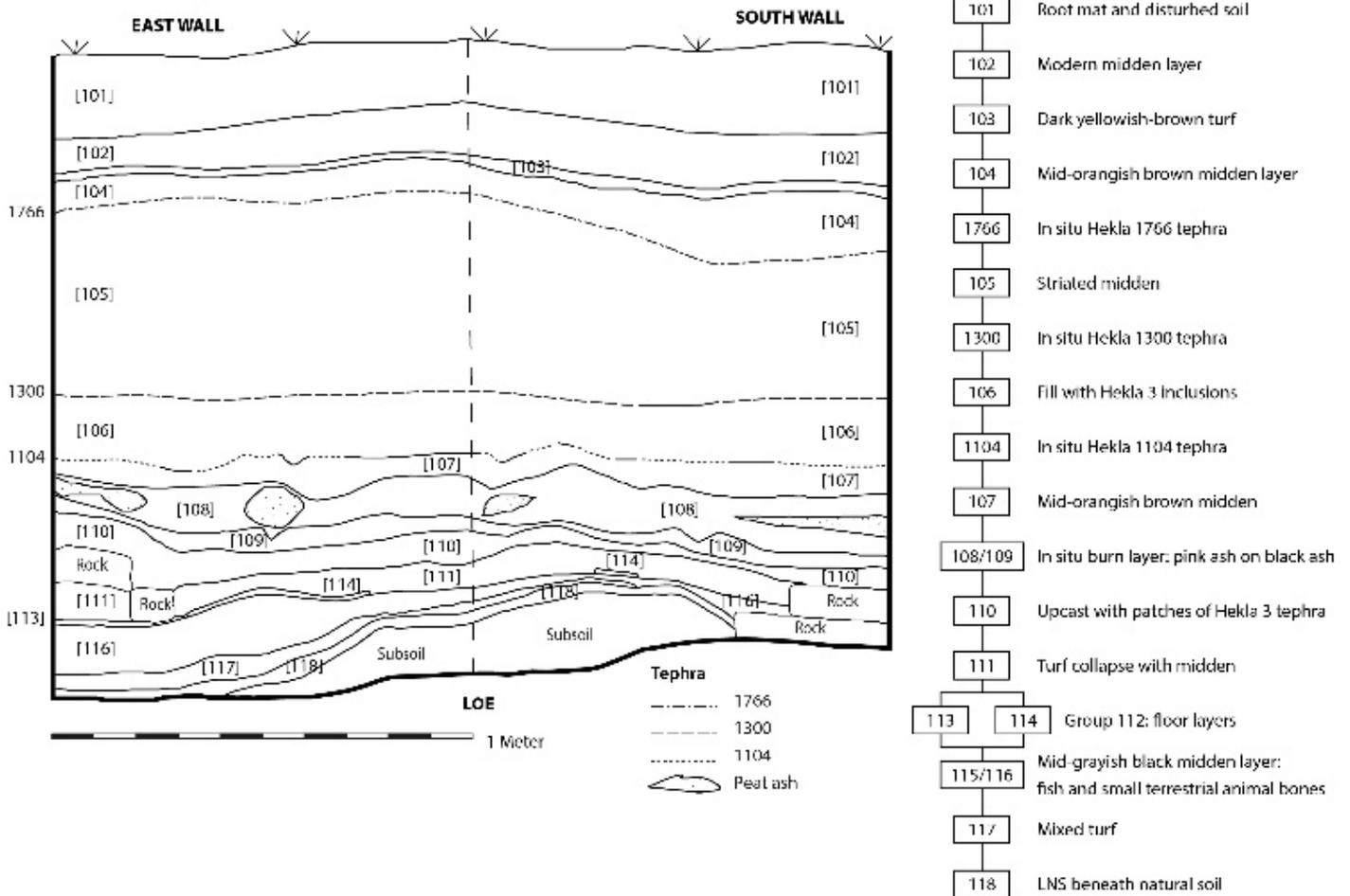


Figure 20. Utanverðunes, test pit 1, south and east profiles.

Test excavation

Two 1 x 1 meter test excavations were dug at Utanverðunes, one in the northwest of the farmstead and the other in the southwest. Both were placed to follow up on coring that suggested the presence of midden under either the ~950 or Vj~1000 tephra layers.

Test pit 1 (TP1) was placed on the northwest side of the farm mound just to the north of the drive and parking area. The Vj~1000 or ~950 tephra originally identified in the cores (#163047 and #163045.2) ended up being in turf and therefore did not establish an early date for the test pit or farm. However, the lowest cultural deposits may still yield useful radiocarbon dates for the site.

The upper layers of TP1 were made up of modern fill and deposition (Figure 20). The upper 20 cm [101] largely consisted of gravel from the nearby drive and parking area surfacing. Below this was another layer of

modern turf which appears to have been flattened or bulldozed [102], probably as part of the 20th century leveling of the old turf buildings and construction of the modern houses on the farm. The layer was very organic and dried rapidly in the profile. Below this was another layer of turf [103] which lay on a mid-orangish brown midden layer [104]. The midden layer [104] was separated from the underlying striated midden [105] by the black Hekla 1766 tephra. Both midden layers included charcoal, ash, and bone. The midden continued [106] under the Hekla 1300 tephra and was largely similar to [105]. There was a section of speckled fill with H3 inclusions in the northwest corner of the unit. The Hekla 1300 tephra goes to but ends at this section of fill. No cut was clear in the profile but it seems likely that this distinct area of fill was in some cut or erosion of H1300 and underlying midden deposit [107] suggesting that at least part of the deposit, and



Figure 21. Utanverðunes, test pit 1, burnt wood ember in [109].

pink. Below the ash was a layer of dark black ash [109] with an average thickness of about 3 cm and up to 5 cm. The deposit consisted mostly of fine-grained black ash but included some hard granular inclusions and a few larger burnt pieces of wood. At the bottom of the layer, presumably in situ, was one very large piece of burnt wood (ca. 30 cm long), which had very hard embers like a piece of mostly burnt wood in a fireplace (Figure 21). The presence of two early dark tephra layers in the burnt ash suggests a date for the burning of sometime before A.D. 1104 and either 950 or 1000, depending on which tephra are actually present.

specifically the part with the H3 fill post-dates A.D. 1300. This cut was not picked up during excavation and the field notes contradict the profile, which places [106] securely under H1300 and [106] should really be considered as two distinct stratigraphic units with different materials: (1) a post-1300 cut and fill event in the NW corner of the unit, and (2) a regular incremental midden accumulation between 1104 and 1300. The upcast material in (1) is unusual as it is clean of anthropogenic inclusions and included H3 tephra, which would have been buried deeply in most parts of the farm mound by A.D. 1300. This suggests that the fill material originates from somewhere else on the farm, likely in an area that had seen little accumulation of cultural or geological deposition. The midden [107] continued beneath the white Hekla 1104 layer.

There was a distinct break between the striated midden and a thick layer of bright pink and red [108] and black [109] ash. The two layers appear to represent a single in situ burning event with blocks of peat on top of wood. The upper layer [108] is a kaleidoscope of burnt ash in very bright colors ranging from light pink to red. Blocks and tephra patches aligned in all orientations suggest the in situ burning of peat blocks with at least 2 different early dark tephra: Vj~1000, ~950 or LNL. The color of the tephra were hard to distinguish in the burnt context and unusual background color of bright

Under the in situ burning layers was layer of mixed fill [110], which included patches of yellow tephra, probably the Hekla 3 layer. The material is probably upcast material from some digging, possibly nearby. While a single 1 x 1 m test pit reveals only a limited view into the local region, the fact that the burn layers appear to lay directly on the upcast material is suggestive of a sequence of pits and possibly in situ burning episodes in the area. The second test pit on the south side of the farm mound showed a similar layer of digging and in situ burning also dating to the early deposition at the site. Obviously activity in these two test pits separated by nearly 50 meters is not necessarily linked in anyway but they do indicate that digging and in situ burning took place at multiple locations around the farmstead and these layers may represent a widespread phase of activity at the farm. If this is the case, then the upcast material under [108/109] may be from a sequence of nearby digging and burning events.

Beneath [110] was a layer of mixed turf collapse with charcoal inclusions [111]. The turf did not form coherent blocks so it may have be from some other location or have been seriously disturbed. There were, however, compacted floor layers in patches under the turf, which suggests that the mixed turf may be linked as part of single building regardless of the lack of any

structure to the turf. The floor layers (group 112) were made up of two discrete patches of hard, compact black floor [113] and [114]. The main distinction between the two is that [113] included some unburnt bone and that it may be on top of [114] but the two deposits probably represent slightly different laminations of the same disrupted floor deposit.

Under the floor layers [112] was a thin layer of mashed turf with inclusions of wood and ash [115] that did not cover the entire unit. It does represent a stratigraphic break between the floor layers and a blackish deposit filled with small bones [116] infilling what appears to be natural undulations in the underlying layer of mixed turf [117]. The upper interface of [116] was compact but the midden layer had less lensing than previous layers and likely represents a single depositional event. The black sooty matrix was filled with the bones of small marine and terrestrial animals. Some of the bones were pushed into the soft subsoil below. Fire-cracked rock was most common on top of context, less common on bottom. This is a very dense deposit of bones and ash. It fills in an underlying undulating surface with deep dips (*Figure 22*). The preservation of delicate small bones suggests that it was not subject to trampling until it was fully capped. This, again, reinforced the idea that the context represents a single depositional event or, at least, a short sequence of dumping. Under [116] was a thin layer of mixed turf [117] that only covered patches of the unit and a thin layer of natural aeolian deposition [118] over what appeared to be an in situ LNS layer although no distinct tephra were identified. The bottom of the unit has yellowish pod soil with areas of reddish iron precipitation that are commonly seen in much older pre-settlement contexts so it is possible that the thin dark layer tentatively identified as part of the landnám sequence is actually part of a prehistorical sequence in what was probably a semi-wet environment.

Test pit 1 had a number of cultural layers under the Hekla 1104 tephra but no clear in situ tephra to aid in

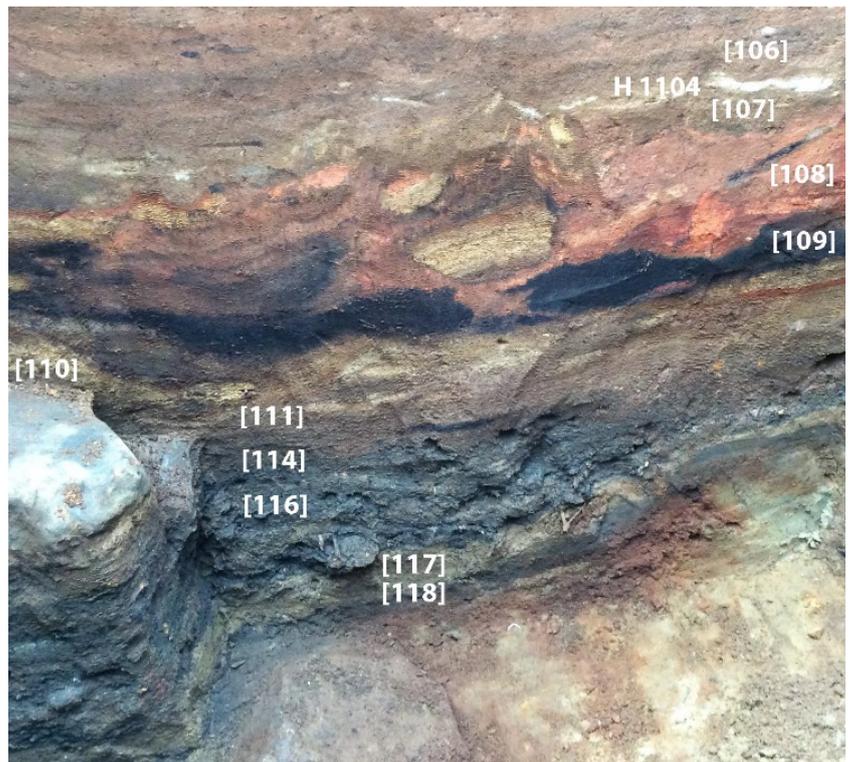


Figure 22. Utanverðunes, test pit 1, lower layers with in situ burning [108/109] and dark midden with small bones [116] in filling natural undulation in underlying turf layer [117].

determining the establishment date for the farmstead. A second test pit (TP2) was placed south of the contemporary farmhouse in the southwest corner of the fenced garden based on a core (#163114) that indicated midden under either the Vj~1000 or ~950 tephra. The upper layers of the deposit ([101] and [102]) were heavily bioturbated, as would be expected in an enclosed garden and hedge of trees. The lower layers of the deposit, however, were preserved intact.

The root mat sat on a soft layer of topsoil with patches of white Hekla 1104 tephra that were obviously disturbed [101]. Under these was a disturbed and bioturbated midden with patches of ash, turf, and tephra [102]. Like [101] above, the layer contained patches of disturbed white and dark tephra but two bands of dark Hekla 1300 tephra appeared to be preserved in situ in the eastern side of the unit and are visible in the profile (*Figure 23*). An in situ layer of white Hekla 1104 tephra was preserved only in the northern portion of the unit. The layer roughly corresponded to the transition between disturbed and intact midden deposits. Under the white tephra was a layer of mid-

Utanverðunes - 446, TP 2

Southwest corner: E 476164.8, N 583735.3

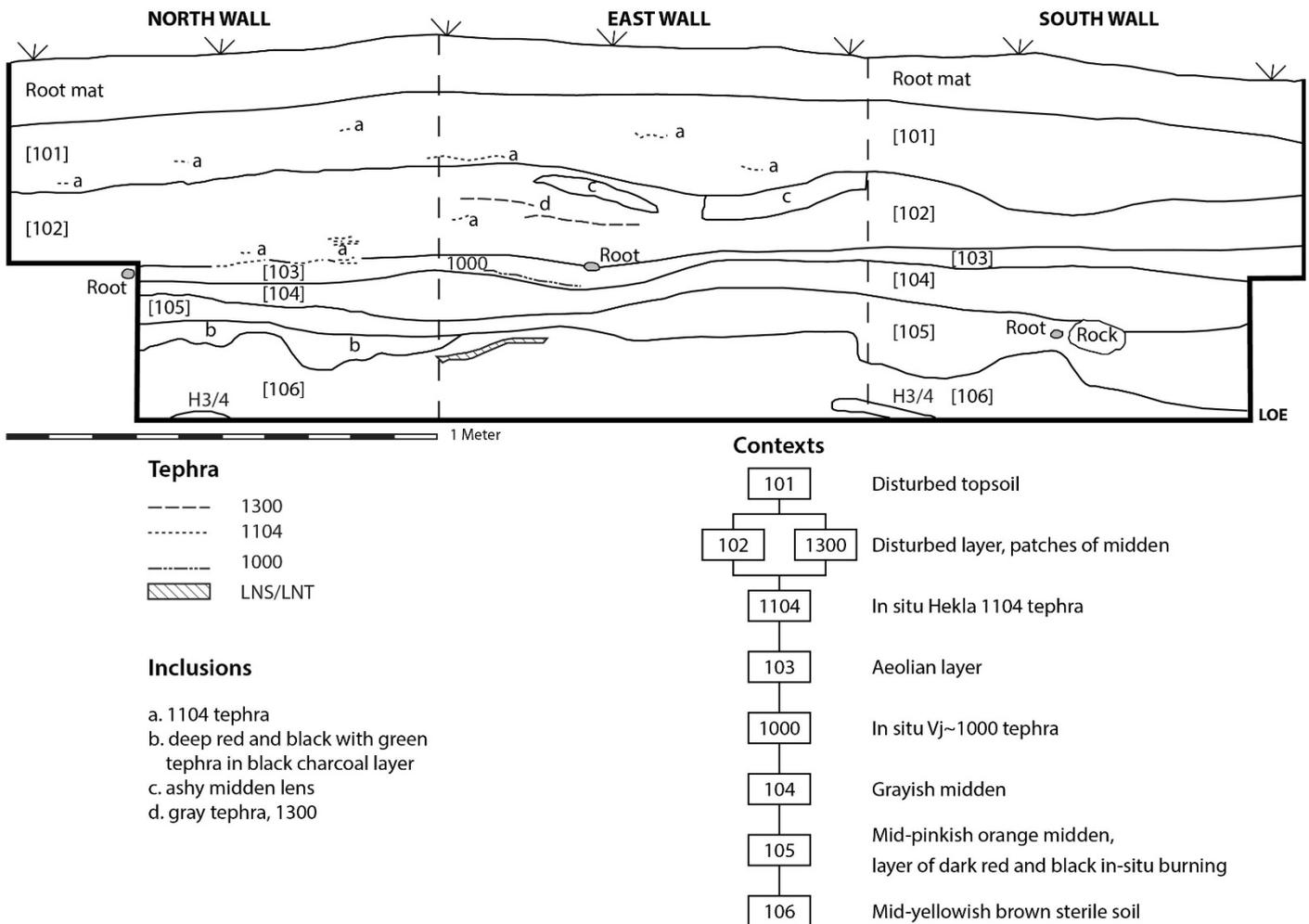


Figure 23. Utanverðunes, test pit 2, north, east and south profiles.

brown aeolian soil, which had no visible cultural inclusions [103]. The thin aeolian accumulation [103] layer was on a thin and patch greenish-gray tephra layer, which could be either the Vj~1000 or ~950 tephra. Under the greenish-gray tephra was another midden layer [104]. The layer was relatively compact and gritty with a mid-grayish brown color primarily composed of ash, charcoal and some fire-cracked rock. At the bottom of the midden was a layer of stratified red ash and black ash representing in situ burning [105]. The ash included visible pieces of charcoal, bone, fire-cracked rock, and gravel (Figure 24). Both stratigraphically and in terms of basic composition, [105] is similar to the in situ burn layers in TP1 [108/109] and may represent a similar type and phase of early activity at the farm, or even possibly representing some activity in the area that predates the establishment of

the farmstead itself. The in situ burning extended across the 1 x 1 meter unit but it was thickest in a shallow north-south running trench that appears to have been cut down into the underlying soil (Figure 25).

Beneath the in situ burning layer was a mid-yellowish brown layer of silty soil [106]. The sediment may have been cryoturbated as there is some evidence of mixing and swirling but it is difficult to distinguish this from possible disturbance associated with the digging and burning of [105]. Included in [106] was an organic band about 2 cm thick. This band was most visible in the profile and formed a continuous layer in the north profile but was partially truncated by the digging associated with [105] in other areas. The organic lens had no distinct tephra layers but is likely to be the



Figure 25. Utanverðunes, test pit 2, north profile showing bioturbated layers [101] and [102] and in situ burning in [105].

organic lens often associated with the landnám sequence.

Tephra preservation in TP1 and TP2 were different. In TP2 the later historical tephras were poorly preserved whereas they were well preserved in TP1. The opposite was true for the early 10th century tephras. In TP1 no in situ tephra were identified beneath the white Hekla 1104 tephra. In TP2 one greenish-gray tephra was identified below the 1104, probably either the Vj~1000 or ~950 tephra. Based on TP2, activity began at Utanverðunes sometime before approximately A.D. 1000 or 950. If the in situ burning events in TP1 [108/109] and TP2 [105] are actually contemporary then both test pits have 10th century deposits and the dark, bone-filled midden [116] below the burning in TP1 may well be the earliest deposition identified at the site so far.



Figure 24. Utanverðunes, test pit 2, cut at bottom of [105].

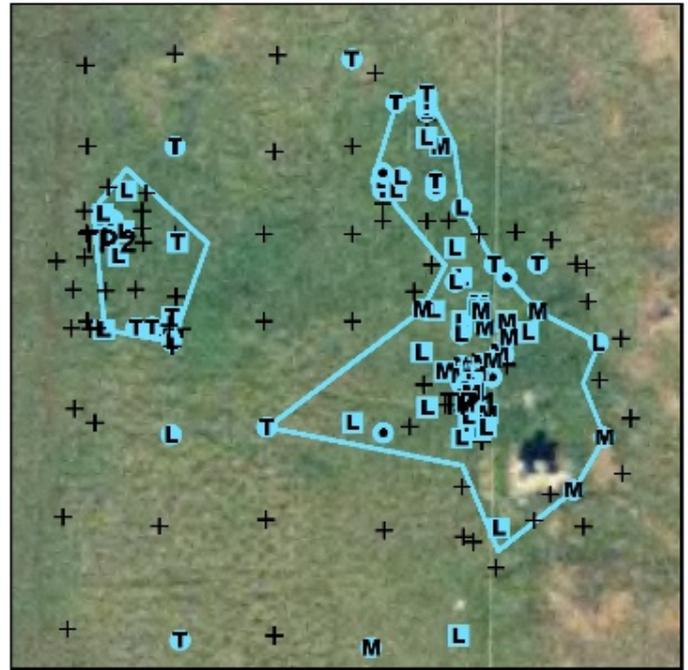
Ásgrímsstaðir

The Jarðabók Árna Magnússonar mentions Ásgrímsstaðir as a long abandoned farm with some visible surface remains on the property of Helluland. It had briefly been reoccupied about 40 years prior but there was no information about the farmers (Magnússon and Vídalín 1930, vol. 9:61). The farm is first mentioned in Sturlunga Saga associated with events in A.D. 1238 (Pálsson 2010:157). In A.D. 1388 the properties of Helluland and Ásgrímsstaðir were sold together by Björn Brynjólfsson to Gissur Þorbjarnarson in exchange for Skiðastaðir in Laxárdal (Diplomatarium Islandicum, vol. 3:425). The properties of Helluland and Ásgrímsstaðir appear to be closely linked in the historical record at this time on. In A.D. 1421, their ownership was transferred together, along with a number of other farms (Diplomatarium Islandicum, vol. 4:290-292) but later, Ásgrímsstaðir is sold separately from Helluland in A.D. 1439 (Diplomatarium Islandicum, vol. 4:600-601) and again in 1477 (Diplomatarium Islandicum, vol. 6:95-96). The property passed in to the control of the church in the 16th century, first to the cloister at Reynistaður and later to the direct control of the bishopric at Hólar. It appears to have been abandoned by A.D. 1579 (Pálsson 2010:158).

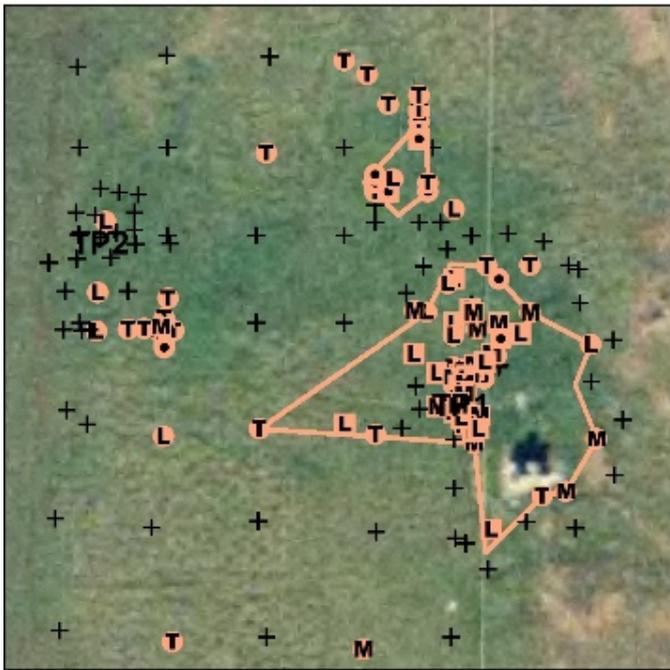
Farm Overview



Pre-1104 Farmstead Extent



1104 -1300 Farmstead Extent



Post -1300 Farmstead Extent

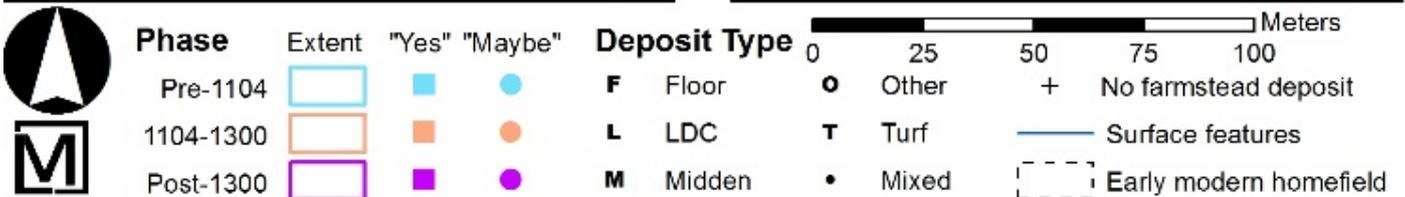
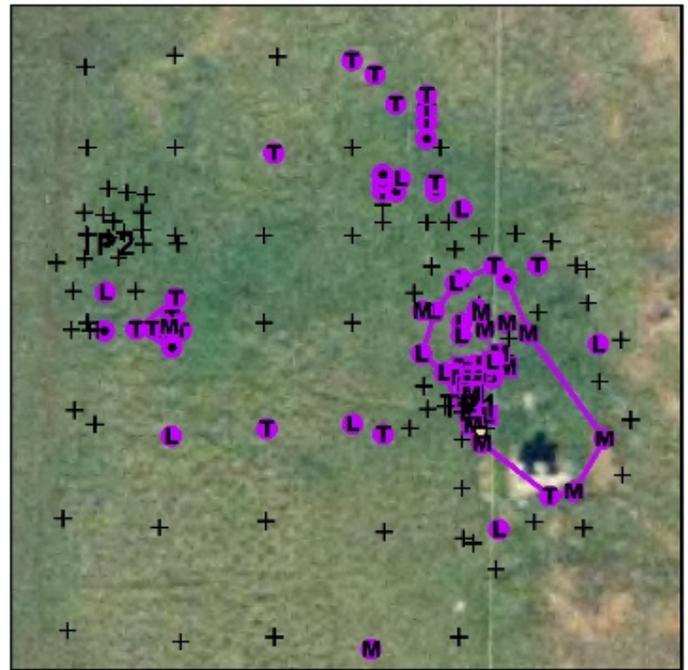


Figure 26. Ásgrímsstaðir farmstead coring and estimated farmstead extents.

Site overview

The farmstead at Ásgrímsstaðir is dominated by the remains of an unfinished 20th century house just below the rocky ridge bounding the eastside of the site. This house sits on the most obvious collapsed buildings on the site and the location of the most recent occupation of the farm. Based on early coring and surface survey, it was suspected that Ásgrímsstaðir was a likely candidate for an early farmstead relocation (see Bolender, et al. 2011). One the west side of the site, just above the wetland buffer between dry land and Vestari-Héraðsvötn, an oblong surface feature was identified that resembled a longhouse. Subsequent coring revealed pre-1104 ash layers but no distinct floor layers were identified. Coring in the 2016 field season failed to identify any extensive farmstead deposits associated with the possible longhouse and a while a follow up test excavation showed a thin layer of pre-1104 ash in the building no clear domestic floor was identified (TP2, see below). Excavation at the visible farm mound to the east (TP1, see below) showed that the main farmstead occupation dated to before the ~950 tephra layer and

that main occupational site was probably always in that location. Rather than being an early dwelling, the oblong building at the western edge of the site was probably an outbuilding of some sort.

Farmstead coring

A small number of cores were taken at Ásgrímsstaðir in 2013 during a preliminary reconnaissance of the site. In 2016, the old coring grid was expanded and the areas by the wetlands and visible farm mound were more thoroughly investigated. The farmstead was modestly sized in the pre-1104 period at 3600 m² (Figure 26). This is in the lower third of farmsteads surveyed so far and the site declined in size in subsequent periods. Two distinct areas of pre-1104 farmstead activity were apparent in the coring: the main occupation up the hill where the contemporary unfinished house stands and a small but coherent area of turf and low density cultural deposits associated with the possible “longhouse” near the fjord bottom on the western side of the farm. The coring and follow up test pit indicate that the small area to the west was not an early

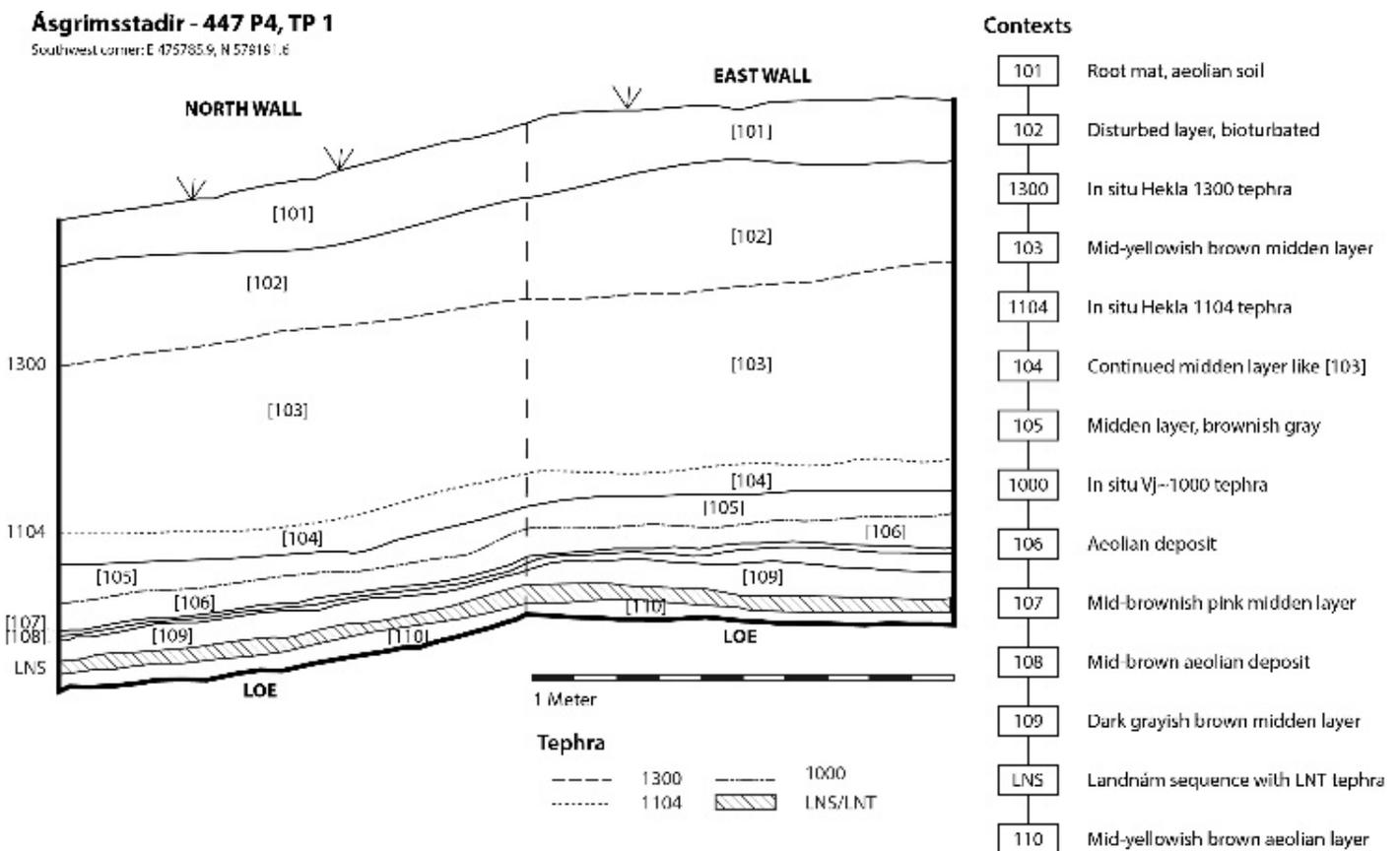


Figure 27. Ásgrímsstaðir, test pit 1, north and east profiles.

farmstead location but was more likely the site of some outbuilding and activity area that included a hearth.

The farmstead retracted noticeably after 1104. The activity area to the west was abandoned and the farm mound itself, while very similar to the pre-1104 footprint, is somewhat smaller measuring a total of 2100 m². The farmstead continued to retract in the post-1300 period dropping to only 1200 m².

Test excavations

A 1 x 1 meter test excavation (TP1) was placed on the west side of the visible farm mound at the transition between deeper and well-stratified deposits and the thinner and more variable deposits that spread further to the west. The test pit was placed just south of where two cores (#163298 and #163304) showed a sequence of early tephra and a thin layer of midden deposition at or under the ~950 tephra.

Under a layer of turf and aeolian soil [101] was a layer of bioturbated and/or bulldozed midden and turf [102] (Figure 27). This layer was treated as homogenous down to an in situ Hekla 1300 tephra, which was used to divide it from the underlying midden [103], which included bone, ash, charcoal, and shell. A distinct, white Hekla 1104 tephra capped more midden [104] that included lenses of less dense low density cultural deposits. This transitioned to a mid-brownish gray midden [105] (Figure 28). Under an in situ Vj~1000 tephra was a layer [106] of aeolian material mixed with some charcoal, bone, and fire-cracked rock that transitioned back to a denser ash midden [107]. This oscillation between aeolian mixed with anthropogenic material and midden continued with [108], a brown aeolian layer with charcoal [108] and a gray layer of ash, bone, and frequent charcoal inclusions [109]. Gray charcoal rich midden deposits appear to be frequent in the earliest layers found in many of the farm mound test excavations and may represent either a different kind of activity predating or contemporary with the earliest phases of the farms or a shift in the availability of wood for fuel in the region.

During the initial excavation only the Vj~1000 tephra layer was identified between the Hekla 1104 and LNS

sequence but a possible ~950 layer was later identified in the lowest level of the midden and sampled for tephra analysis. This possible tephra was patchy at best and was not added to the profile but was measured as depth below surface along with the location of all other tephra samples. Ásgrímsstaðir can be dated securely to before A.D. 1000 and possibly to the first half of the 10th century.

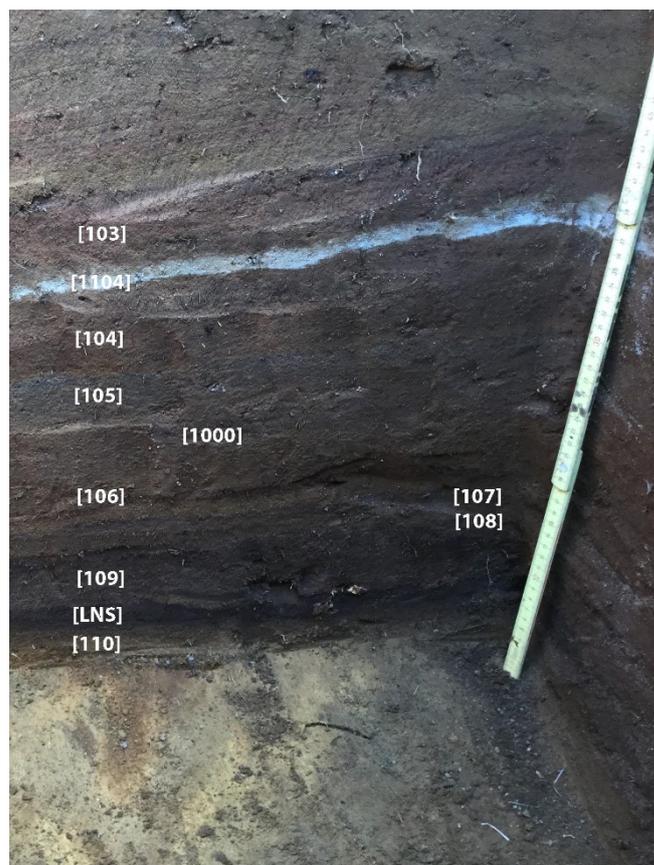


Figure 28. Ásgrímsstaðir, test pit 1, north profile below Hekla 1104 tephra.

A second test pit (TP2) was placed in the remains of the old “longhouse” at the western edge of the farmstead. The test excavation was placed a few meters south and west of the most prominent surface remains where coring revealed a thin layer of red ash under the Hekla 1104 tephra in an effort to avoid truncating any interior floor layers and instead intersect an extramural midden deposit.

The excavation revealed two main layers of midden separated by a striated layer of sand. At the top of the unit was a thick root mat and layer of aeolian

Ásgrímsstaðir - 447P4, TP 2

SW corner: E 475704, N 579227.5

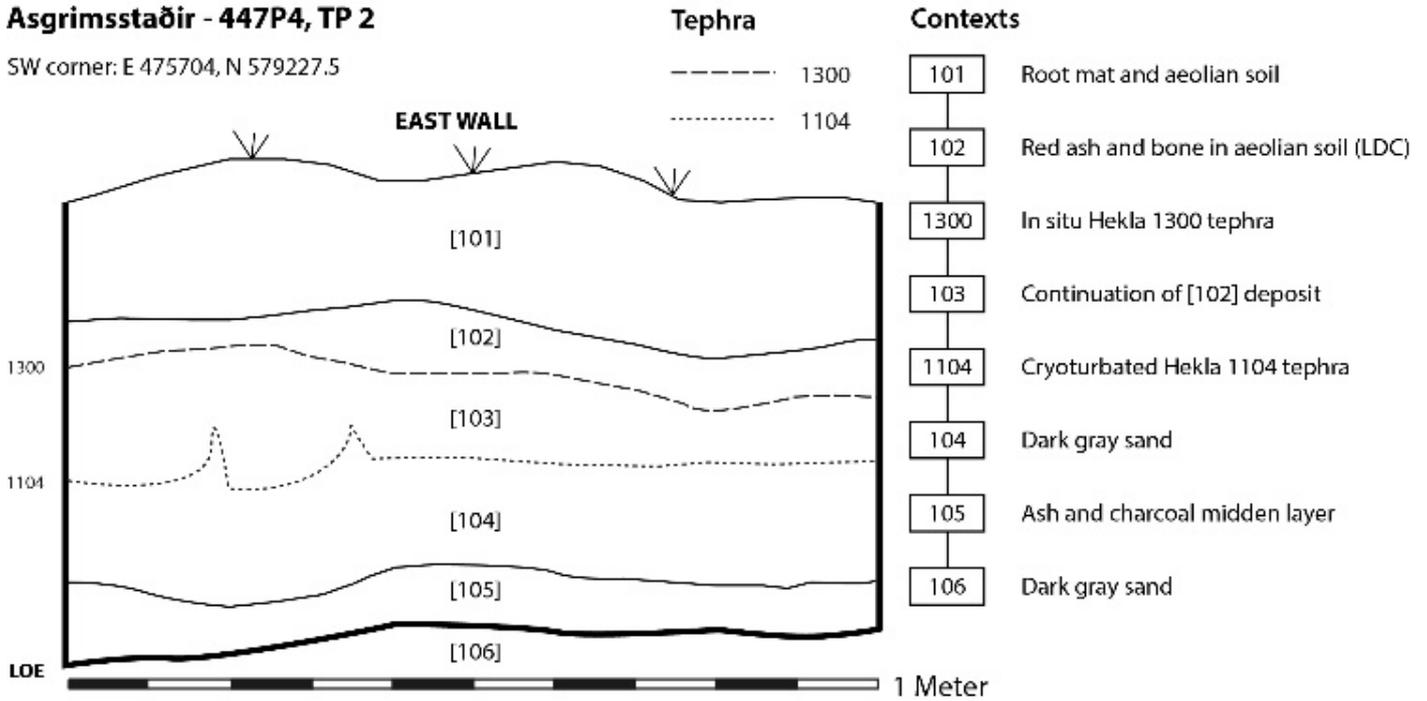


Figure 29. Ásgrímsstaðir, test pit 2, east profile.

accumulation [101] (Figure 29). Under this was a thick mixture of aeolian soil and cultural material [102] and [103] separated by an in situ Hekla 1300 tephra layer. The deposition suggested the slow accumulation of cultural material over hundreds of years. The deposit was relatively homogenous with only hints of striations or individual layers and is presumably the result of a fairly continuous process of accumulation of a very small amount of cultural material. If this is the case it suggests some sort of sustained ash-generating activity in the vicinity. The midden ended at a dramatically cryoturbated Hekla 1104 tephra with a few peaks disrupting the original surface by nearly 10 cm. The disruption appears to have taken place sometime after 1300. Immediately under the 1104 tephra is a series of dark-gray sandy washes [104].

Under the layer of sand washes is another midden [105]. The thin striated layers were partially separated by more washes of sand. The lowest band of reddish-orange midden deposition was a relatively continuous 1 cm thick layer throughout the unit and included large but poorly preserved flecks of charcoal (1-2 cm) (Figure 30). The more continuous layer of ash and flecks of charcoal are suggestive of a trampled surface but the

striated layers of ash and sand in [105] above argue against this ever having been interior space and support the reading of surface features that this spot is outside any buildings.



Figure 30. Ásgrímsstaðir, test pit 2, context 105.



Figure 31. Ásgrímsstaðir, test pit 2, east profile.

A core was taken from the bottom of TP2 in the layer of dark gray sand [106]. This sand continued for at least another 80 centimeters. The sand was relatively coarse and although no sample for texture or grain size analysis was taken it does seem more likely that the sand resulted from alluvial rather than aeolian processes. It could represent wash from the nearby Vestari-Héraðsvötn or the presence of an early beach. Either option indicates that the area just west of Ásgrímsstaðir was hydraulically active when the farm was established. The thin layers of similar sand in [103] suggest that it remained active after the establishment of the farm until around A.D. 1100.

No $V_j \sim 1000$ or ~ 950 tephra layers were identified in the unit (*Figure 31*). These could have easily been washed away by fluvial action but it is also possible that they simply were missed in the sandy layers despite the best efforts of the excavators to identify any tephra amongst the sand. The midden deposit under the Hekla 1104 and sand accumulation [104] are consonant with an early

establishment date for Ásgrímsstaðir established in TP1 but do not help refine that date and there is no reason to believe that the farmstead deposits in TP2 represent earlier activity at the site than the midden in TP1 at the main farm mound.

Outcomes of the 2016 survey and future work

In the 2016 field season the survey dated the establishment and measured the extent of nine farmsteads (table 1). With the seven farmsteads surveyed last year, this brings the total to 16 farmsteads plus the abandoned places that have been investigated as part of the Fornbýli Landscape and Archaeological Survey on Hegrernes (FLASH) project. The farmsteads areas are distributed fairly evenly from large through very small farmsteads for all periods (Figure 32). The majority of farmsteads appear to be relatively stable in size but a few show marked changes in size with a tendency to grow larger in the post-1104 periods (Table 1).

Farmstead establishment dates currently are based on the presence of midden deposits below the oldest tephra layer identified in the test excavations. These dates may change based on the chemical identification of tephra and the addition of radiocarbon dating to help refine the sequence. Based on these preliminary data, there is a general relationship between farm establishment date and farmstead size in which early

establishment correlates with larger farmstead size as measured for the pre-1104 phase (Figure 33). This relationship, however, appears to be much weaker than that identified in the neighboring region of Langholt, which showed a very high inverse correlation between establishment date and pre-1104 farmstead size (Steinberg, et al. 2016). In Hegrernes, there appears to be much greater variation in farmstead sizes with similar establishment dates. Adding in the small farms or activity areas from the FLASH project would further weaken this relationship in Hegrernes, as many of these places are both very small and early. These results are highly preliminary but they do suggest a difference in the overall settlement pattern and process when comparing Hegrernes and the neighboring region of Langholt.

Another finding is that the range of farmstead sizes in Hegrernes is broader than the range in Langholt. In Langholt, farms ranged from just under 1000 m² to about 10,000 m² for the pre-1104 period. In Hegrernes the current range is from 400 m² to 16,700 m² for the pre-1104 period.

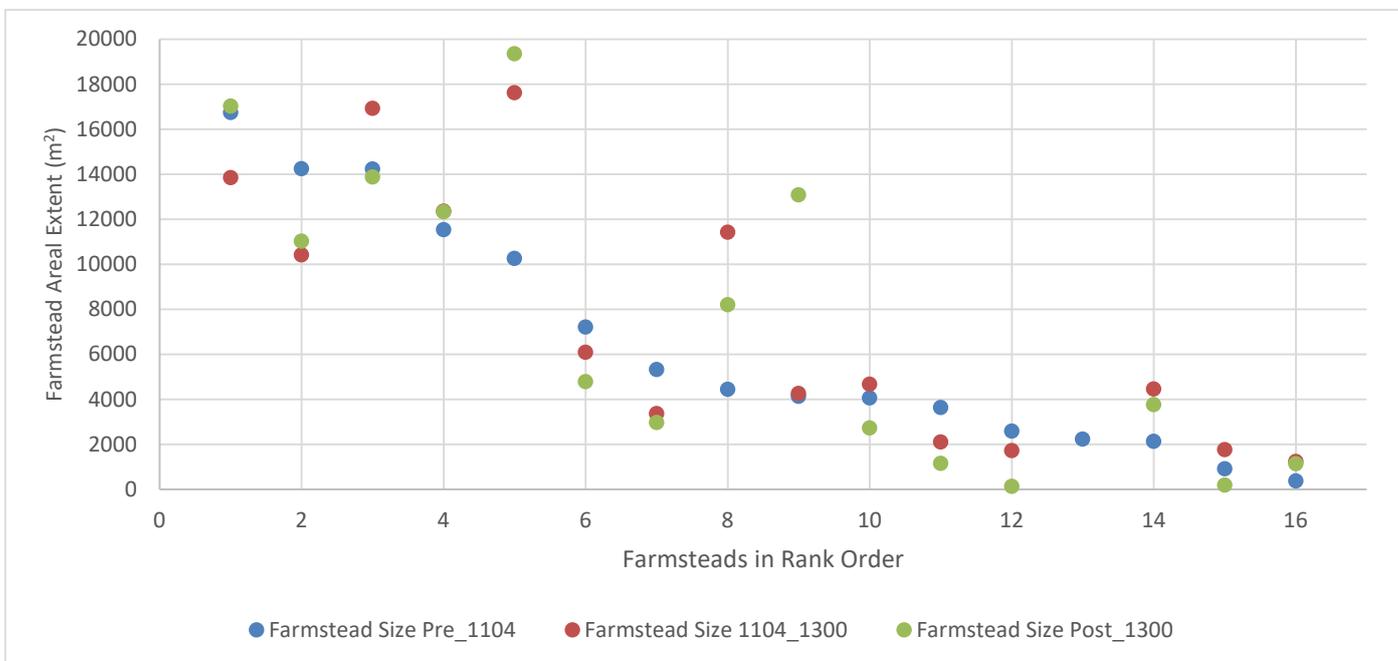


Figure 32. Pre-1104 farmstead size in rank order (largest to smallest) with 1104-1300 and post-1300 farmstead sizes. The largest changes from pre-1104 farmstead size are seen at Helluland (5th rank), Garður (8th rank) and Utanverðunes (9th rank) all of which become larger post-1104.

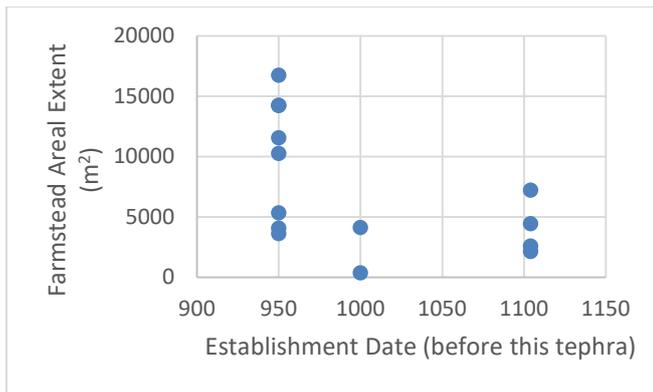


Figure 33. Farm establishment date as estimated by midden deposition under the earliest tephra layer and pre-1104 farmstead size.

The two seasons of survey fieldwork have generated new questions:

- Does Hegranes exhibit a substantially different settlement pattern than the neighboring region of Langholt? Hegranes appear to have a higher percentage of farms that were established before the mid-10th century tephra layer. This is unlike neighboring Langholt where less than half of the farmsteads were established by that time.
- Is the range of farmstead size different in Hegranes than in Langholt and, if so, does this

represent (1) differences in the wealth or productive capacity between the farms in the two regions, or (2) differing relationships between the archaeologically measurable of farmstead extent and underlying farmstead organization or farm productivity?

Goals for 2017:

- Continue general reconnaissance for buried farmstead locations in Hegranes.
- Continue geophysical reconnaissance of potential buried farmsteads in Hegranes.
- Continue coring at known farmstead locations to estimate farmstead sizes for the pre-1104, 1104-1300, and post-1300 occupational phases.
- Continue farmstead test excavations to estimate earliest occupation date for farmsteads.
- Continue systematic reconnaissance of potential household and communal cemetery and church sites at Hegranes farms.
-

Farmstead	Establishment	Farmstead Areal Extent (m ²)		
	Date	Pre-1104	1104-1300	Post-1300
1. Egg	<950	16700	13900	17000
2. Ríp	<950	14300	10400	11000
3. Ás	<1000	14200	16900	13900
4. Keldudalur	<950	11500	12400	12300
5. Helluland		10300	17600	19400
6. Hamar	1000-1104	7200	6100	4800
7. Hróarsdalur	<950	5300	3400	3000
8. Garður	<1104	4700	11400	8200
9. Utanverðunes	<1000	4100	4300	13100
10. Keflavík	<950	4100	4700	2700
11. Ásgrímsstaðir	<950	3600	2100	1200
12. Lower Keflavík	<1000	2600	1700	100
14. Hegranesþing		3100	1800	200
15. Keta	<1104	2100	4500	3800
16. Rein	<1000	400	1200	1100

Table 1. Distribution of pre-1104 farmstead extent among survey farms. Farms reported here are in bold.

Appendix A: Spatial Controls: Coring, test excavations, geophysical survey grids, and ground control points for low-altitude aerial photography and photogrammetry

All spatial measurements collected in the survey utilize the ISNET 93 coordinate system.

Core locations

Core locations were measured using three methods: 1) location capture using the internal assisted GPS in the Apple iPads used for in-field data recording; 2) secondary measurement of core locations using a Topcon Hiper SR GNSS with RTK correction; 3) post processed core locations using Trimble GeoXH with Zepher antenna. The internal iPad location capture is only accurate to within approximately ± 5 meters, which was generally sufficient for broad reconnaissance survey. The Hiper SR utilized a RTK correction from the local Sauðárkrókur base station via ÍSMAR and has an estimated accuracy of ± 1 centimeter in the horizontal and ± 2 centimeters in vertical location. The post processed Trimble GeoXH data has an estimated accuracy of ± 30 centimeters.

Test trench locations

The corners of all test excavations were measured using the Hiper SR. All measurements and excavation geometries are stored in an ESRI-formatted geodatabase.

Spatial measurements: total station, kite- and pole-based low altitude aerial photography, photogrammetry

Spatial measurements were made using a Topcon total station or based on kite- and pole-based orthorectified images generated from multiple camera positions using Agisoft Photoscan photogrammetry software. All measurements use the ISNET93 coordinate system. For each photographic run, ground control points (GCPs) were placed in the subject area and measured with the total station for input into Photoscan to generate orthorectified composite images and corners of the excavation area and pinned in place to use as GCPs for

the kite photos. Blue poker chips were used for the pole photos.

Ricoh GR was used with the kite and a Nikon Coolpix A was used with the pole. Both cameras have a fixed 18.33mm f/2.8 lens (28mm equivalent in a 35mm camera) and built in intervalometer, which was set to take photographs every 5 seconds. Both cameras were set to record data in RAW format. RAW photos were converted to TIFF using Adobe Photoshop for photogrammetry modeling in Photoscan.

For kite photos, the Ricoh GR camera was enclosed in layers of closed-cell polyethylene foam inside a Ziploc brand plastic box, which was hung from the kite line via a "Picavet" string suspension. For kite photos, the photo rig was suspended from an Air Affairs Sutton Flow Form 16. This design proved effective in protecting the camera during "hard landings" and in keeping the camera pointed downward at near-vertical angles during flight. Our standard photograph collecting procedure was for the kite operator to walk a loose grid pattern, walking a set number of strides, stopping long enough for the camera to take 2-3 shots, and repeating. When available, a second person stood either directly under the camera or to the side in order to keep the operator apprised of the area being photographed. Kite photos were collected at the beginning of fieldwork before site opening, at two occasions as excavation proceeded, and again at the end of the excavation prior to site closure.

Pole photos were collected of various contexts, structures, and of graves. The Nikon Coolpix A was suspended from a 4-meter extension pole topped by a mount that allows the camera to self-balance pointing down. For some features, such as the bottom of graves, the camera was simply held by hand and oblique shots were collected in addition to the top-down shots to

better aid in 3d modelling of complex features in Photoscan.

The resulting photographs can be georeferenced and used to establish a visual overview of site and surface conditions including the location of visible ruins, vegetation and other surface features to aid in the interpretation of geophysical anomalies. Agisoft's Photoscan photogrammetry software was used to produce 3d models of features. These models can be output as georeferenced orthophotos and digital elevation models (DEMs) for incorporation in GIS.

Kite-based and pole-based photography datasets include:

- 1) Unprocessed RAW images. Full collection of digital photos from each kite flight and pole run.
- 2) Selected TIFF converted images.
- 3) 3d models in Photoscan format.
- 4) Orthorectified composite images generated from 3d models in Photoscan.
- 5) Digital elevation models generated from 3d models in Photoscan.

Appendix B: Excavations, Contexts, Samples, Finds, and Photos

Rein (Jarđatal Johnsen farm number 452; Place number 0)

Excavation type: Test Pit 1, 1x1 meter

Opening date: 20 July 2016; Closing date: 21 July 2016

Southwest corner, east: 478874; north: 572156

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Root mat and aeolian soil	DJB	07/20/2016
102	Aeolian Deposit	Aeolian soil with mixed H3 tephra	GMC	07/20/2016
103	Aeolian Deposit	Turfy aeolian soil on top of H1	GMC	07/20/2016
1104	Tephra	Patchy H1 tephra with midden (104) poking through near west side of excavation unit.	JPM	07/20/2016
104	Midden	Midden with rounded cobbles of fire-cracked rock	JPM	07/20/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	103	Flotation		GMC	07/20/2016
2	104	Flotation		GMC	07/20/2016
3	104	Flotation		DJB	07/20/2016
4	104	Bone, Animal		GMC	07/20/2016

Finds

FIND	CONTEXT	RETRIEVAL	MATERIAL TYPE	OBJECT TYPE	DESCRIPTION	ID	DATE
1	104	Screen	Metal	Nail	Iron	JPM	07/20/2016
2	101	Screen	Glass		green glass		07/21/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
1	New York	101	Down	Top of CXT 102	GMC	07/20/2016
2	New York	101	Down	Top of CXT 102	GMC	07/20/2016
3	New York	101	East	Top of CXT 102	GMC	07/20/2016
4	New York	102	East	Top of 103	GMC	07/20/2016
5	New York	102	Down	Top of 103	GMC	07/20/2016
6	New York	103	East	Top of 1104	JPM	07/20/2016
7	New York	103	East	Top of 1104	JPM	07/20/2016
8	New York	103	Down	Top of 1104	JPM	07/20/2016
9	New York	1104	Down	Top of 104	GMC	07/20/2016

Rein (Jarđatal Johnsen farm number 452; Place number 0)

Excavation type: Test Pit 2, 1x1 meter

Opening date: 22 July 2016; Closing date: 25 July 2016

Southwest corner, east: 478840; north: 572187

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Root mat, aeolian soil	AHS	07/22/2016
102	Cultural Layer	Turfy aeolian soil mixed with low density cultural deposit; rooty	AHS	07/22/2016
1766	Tephra	Patchy dark grey tephra	AHS	07/22/2016
103	Midden	Midden	AHS	07/22/2016
1300	Tephra	Blue grey tephra across whole unit	AHS	07/22/2016
104	Midden	Midden		07/22/2016
1104	Tephra	H1 tephra	DJB	07/25/2016
105	Midden	Midden, dominantly deep red peat ash	GMC	07/25/2016
106	Midden	Midden, light yellowish-pink	GMC	07/25/2016
1000	Tephra	Grayish green tephra with midden [106] on top, small trench cut through on south side (see sketch in DJB notebook)	DJB	07/25/2016
107	Cultural Layer	Thin (5mm? maybe 1 cm) mixed cultural layer below 1000 tephra, mixed H3 with small bits of charcoal and flecks of peat ash, maybe some turf parts; directly on yellowish aeolian with H3 mixed in	DJB	07/25/2016
108	Aeolian Deposit	Yellowish aeolian with mixed H3 throughout	DJB	07/25/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	102	Flotation	102 soil sample	AHS	07/25/2016
2	102	Bone, Animal	102 Bone	GMC	07/22/2016
4	103	Flotation	Soil Sample	GMC	07/22/2016
5	103	Bone, Animal	Bone	GMC	07/22/2016
6	104	Flotation	Soil sample from top of 104 (under 1300)	GMC	07/22/2016
8	104	Flotation	Soil sample from 20cm into 104 (under 1300)	GMC	07/22/2016
9	104	Flotation	Just above h1	JPM	07/25/2016
10	105	Flotation	Just below 1104, top of 105	DJB	07/25/2016
11	105	Bone, Animal	105	GMC	07/25/2016
12	106	Flotation	Float	JPM	07/25/2016
13	106	Bone, Animal		DJB	07/25/2016
14	107	Flotation		JPM	07/25/2016
15	1000	Tephra		DJB	07/25/2016
16	108	Flotation	Float from context below cultural	DJB	07/25/2016
17	106	Flotation		DJB	07/25/2016

Finds

FIND	CONTEXT	RETRIEVAL	MATERIAL TYPE	OBJECT TYPE	DESCRIPTION	ID	DATE
3	102	Screen	Slag		Slag	GMC	07/22/2016
4	103	Screen	Metal		Copper	GMC	07/25/2016

5	104	Screen	Stone	Round stone	smooth white translucent stone	DJB	07/25/2016
6	104	Screen	Metal		iron object	GMC	07/22/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
10		1104	East	Top of 104	GMC	07/20/2016
1	Manila	101	East	Top of 102	GMC	07/22/2016
2	Manila	102	East	Top of 1766	JPM	07/22/2016
3	Manila	102	East	Top of 103	JPM	07/22/2016
4	Manila	1300	East	Top of 1300	JPM	07/22/2016
5	Seoul	1104	East	1104	DJB	07/25/2016
6	Seoul	1104	East	1104	JPM	07/25/2016
7	Seoul	106	East		DJB	07/25/2016
8	Seoul	106	East	1000	DJB	07/25/2016
9	Seoul	106	East	1000	DJB	07/25/2016
10	Seoul	Profile	East	1000	DJB	07/25/2016
10	Seoul	108	East	Top of 108 (subsoil)	DJB	07/25/2016

Keta (Jarđatal Johnsen farm number 454; Place number 0)

Excavation type: Test Pit 1, 1x1 meter

Opening date: 29 July 2016; Closing date: 30 July 2016

Southwest corner, east: 478960; north: 573223

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Loose topsoil with large rocks. Obviously disturbed by bulldozing activity.	DJB	07/29/2016
102	Midden	Firm and dry midden layer. Very compressed turf contributes to the firm and dry nature of the layer.	DJB	07/29/2016
1300	Tephra	Layer of bluish gray 1300 tephra.	DJB	07/29/2016
103	Midden	Midden, pre 1300, mixed with fair amount of aeolian in turf, layers of 2-5 lenses of peat ash and aeolian in turf	DJB	07/29/2016
1104	Tephra	H1 tephra layer across entire unit	DJB	07/30/2016
104	Midden	Very lensed peat ashy midden. Turfy stuff is mottled brown. Light pink to mid red peat ash lenses.	DJB	07/30/2016
105	Midden	A new layer of midden under another midden layer. separated for better carbon dating ability.	DJB	07/30/2016
106	Midden	Another layer of midden under a midden layer arbitrarily declared.	DJB	07/30/2016
107	Aeolian Deposit	Subsoil beneath 106.	DJB	07/30/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	101	Misc. modern finds	Modern ceramics	LKK	07/29/2016
2	1300	Tephra	Whirl bag tephra sample	LKK	07/30/2016
3	103	Flotation	Below 1300	LKK	07/29/2016
3	103	Flotation		LKK	07/29/2016
4	103	Bone, Animal		JPM	07/30/2016
5	103	Flotation	Above H1	JPM	07/30/2016
6	104	Flotation	Below H1	JPM	07/30/2016
7	104	Bone, Animal		JPM	07/30/2016
8	105	Flotation		LKK	07/30/2016
9	105	Bone, Animal		LKK	07/30/2016
10	106	Flotation		LKK	07/30/2016
11	106	Bone, Animal		LKK	07/30/2016
12	106	Flotation	Taken from the bottom of CXT 106	LKK	07/30/2016
13	107	Flotation		LKK	07/30/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
28	Osaka iPad	104	East	Close of 1104, top of 104	LKK	07/30/2016
29	Osaka iPad	105	East	Close of 104, open of 105	JPM	07/30/2016
30	Osaka iPad	106	East	Close of 105, open of 106	JMS	07/30/2016
31	Osaka iPad	107	East	Close of 106, open of 107	JPM	07/30/2016
119	Manila iPad	101	East	Close of 101, open of 102	LKK	07/29/2016
121	Manila iPad	102	East	Close of 102, open of 1300	LKK	07/29/2016
124	Manila iPad	1300	East	Close of 1300, open of 103	LKK	07/29/2016

Utanverðunes (Jarðatal Johnsen farm number 446; Place number 0)

Excavation type: Test Pit 1, 1x1 meter

Opening date: 4 August 2016; Closing date: 10 August 2016

Southwest corner, east: 476157; north: 583782

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
102	Midden	Modern midden, very dry in profile.	DJB	08/04/2016
103	Mixed Turf	Turf	DJB	08/04/2016
104	Midden	Midden	DJB	08/04/2016
1766	Tephra		KRW	08/08/2016
105	Midden	Striated midden	KRW	08/08/2016
1300	Tephra		KRW	08/08/2016
106	Fill	Fill with H3 inclusions in NW corner	KRW	08/08/2016
107	Midden	Midden	KRW	08/08/2016
1104	Tephra		KRW	08/08/2016
108	Hearth	Peat ash hearth deposit	KRW	08/08/2016
110	Upcast	Upcast patches with H3	JPM	08/09/2016
111		Early turf collapse with midden	DJB	08/09/2016
112	Floor	Floor laminations. A top layer that is grey with charcoal with unburnt bone. Patches of peat ash and charcoal. On top of a layer of all black charcoal. Layer does not seem to cover the whole unit.	DJB	08/09/2016
113	Floor	Grey charcoal floor as a part of group 112.	DJB	08/09/2016
114	Floor	Black charcoal floor deposit	DJB	08/09/2016
115	Mixed Turf	Mashed turf layer with inclusions. Fine wood and clay inclusions	DJB	08/09/2016
116	Midden	Layer covers SE half of unit	DJB	08/09/2016
117	Mixed Turf	Mixed turf	DJB	08/09/2016
118	Tephra	Gley with Tephra, sterile, beneath some subsoil	DJB	08/10/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	105	Flotation	Above 1300	KRW	08/08/2016
2	1300	Tephra		KRW	08/09/2016
3	107	Flotation	Under 1300	KRW	08/08/2016
4	107	Bone, Animal		KRW	08/08/2016
5	107	Flotation	Above 1104	KRW	08/08/2016
6	1104	Tephra		KRW	08/08/2016
7	108	Flotation	Below 1104	KRW	08/08/2016
8	108	Tephra	Patches In Cxt 108	KRW	08/08/2016
9	108	Flotation	Bottom of context	NZ	08/08/2016
10	108	Bone, Animal		JPM	08/08/2016
12	110	Flotation		KRW	08/09/2016
13	111	Flotation		JPM	08/09/2016
14	111	Bone, Animal		JPM	08/09/2016
15	113	Flotation	Context 113 floor layer	NZ	08/09/2016
16	114	Flotation	Southern section of unit. Black burn	NZ	08/09/2016
17	114	Bone, Animal	Small fragments	NZ	08/09/2016
18	115	Flotation	Sample of mashed turf	NZ	08/09/2016

19	115	Bone, Animal	Bone fragments	NZ	08/09/2016
20	116	Bone, Animal	Fragments, mandible and tooth	NZ	08/09/2016
21	116	Flotation	Sample of 116	NZ	08/09/2016
22	117	Flotation	Sample of 117	NZ	08/09/2016
23	118	Tephra	Sample of 118, gley with unknown tephra	JPM	08/10/2016

Finds

FIND	CONTEXT	RETRIEVAL	MATERIAL TYPE	OBJECT TYPE	DESCRIPTION	ID	DATE
1	107	Screen	Slag			KRW	08/08/2016
2	107	Screen	Slag			KRW	08/08/2016
2	108	Point	Slag		Slag sample	KRW	08/08/2016
2	111	Point	Stone	Round stone	White stone	DJB	08/09/2016
4	116	Point	Stone	Round stone	White stone	JPM	08/09/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
74	Seoul	110	East	Top 110	DJB	08/09/2016
75	Seoul	110	East	Top 110	DJB	08/09/2016
76	Seoul	110	East	Top 110	DJB	08/09/2016
77	Seoul	111	East	Top of Cxt 111	JPM	08/09/2016
77		112	North	Top of level	NZ	08/09/2016
78	Seoul	111	East	Top of Cxt 111	JPM	08/09/2016
79	Seoul	111	East	Top of Cxt 111	JPM	08/09/2016
80		113	North	Context 113 open	NZ	08/09/2016
82		114	North	113 opening	NZ	08/09/2016
84		116	North	Top of level	NZ	08/09/2016
86		117	North	Top of level	NZ	08/09/2016
136	Manilla	102	East	Top of 102	DJB	08/04/2016
137	Manilla	102	East	Top of 102	DJB	08/04/2016
145		1104	North	1104 tephra	KRW	08/08/2016
146		1104	North	1104 tephra	KRW	08/08/2016
147		108	North	Top of cxt 108	KRW	08/08/2016
148		108	North	Top of cxt 108	KRW	08/08/2016
149		108	North	Top of cxt 108	KRW	08/08/2016
153		1300	North	1300 tephra	KRW	08/08/2016
154		1300	North	1300 tephra	KRW	08/08/2016
155		1300	North	1300 tephra	KRW	08/08/2016

Utanverðunes (Jarðatal Johnsen farm number 446; Place number 0)

Excavation type: Test Pit 2, 1x1 meter

Opening date: 10 August 2016; Closing date: 10 August 2016

Southwest corner, east: 476163.88; north: 583734.32

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Topsoil	EDJ	08/10/2016
102	Mixed Turf	Heavily Bioturbated and/or bulldozed turf layer with patches of midden. Caught H1 under 102 only in N portion of unit.	EDJ	08/10/2016
1104	Tephra	H1 tephra layer. Patchy and only really found in N portion of unit.	EDJ	08/10/2016
103	Aeolian Deposit	Aeolian deposit under 1104, above 1000.	EDJ	08/10/2016
1000	Tephra	Greenish gray tephra layer. Possibly 934. Patchy and thin.	EDJ	08/10/2016
104	Midden	Pre1000 greyish midden.	EDJ	08/10/2016
105	Midden	Pre1000 midden. Heavy peat ash and charcoal mottling. In situ burning marks bottom of context.	EDJ	08/10/2016
106	Aeolian Deposit	Subsoil. LNL spotted in sidewall. See profile.	EDJ	08/10/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	1000	Tephra	Greenish gray tephra. Labeled as 1000.	EDJ	08/10/2016
2	104	Flotation	Pre1000 midden.	EDJ	08/10/2016
3	105	Flotation	Pre1000 midden. From opening of 105	EDJ	08/10/2016
4	104	Bone, Animal	Pre1000 midden	EDJ	08/10/2016
5	105	Flotation	Pre1000 midden. Entirely from charcoal lens at bottom of unit.	EDJ	08/10/2016
6	105	Flotation	Pre1000 midden. Entirely from bottom of 105	EDJ	08/10/2016
7	106	Flotation	Subsoil under LNL in some parts	EDJ	08/10/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
94	Seoul	102	East	102, mid-context. Coming down on patch of intact midden in 102.	BND	08/10/2016
95	Seoul	1000	East	1000 tephra layer. Close of 103, open of 104	EDJ	08/10/2016
96	Seoul	1000	East	1000 tephra layer. Close of 103, open of 104	EDJ	08/10/2016
97	Seoul	105	East	Close of 104, open of 105	EDJ	08/10/2016
98	Seoul	105	East	Close of 104, open of 105	EDJ	08/10/2016
99	Seoul	106	East	Close of 105. Opening of 106	EDJ	08/10/2016
100	Seoul	106	East	Close of 105. Opening of 106	EDJ	08/10/2016
101	Seoul	106	East	Close of 105. Opening of 106	EDJ	08/10/2016

Ásgrímsstaðir (Jarðatal Johnsen farm number 447 [Helluland]; Place number 4)

Excavation type: Test Pit 1, 1x1 meter

Opening date: 8 August 2016; Closing date: 9 August 2016

Southwest corner, east: 475785.93; north: 579190.52

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Root mat, aeolian soil	EDJ	08/08/2016
102	Aeolian Deposit	Bioturbated and/or bulldozed layer under topsoil.	EDJ	08/08/2016
1300	Tephra	1300 tephra layer. ~5 mm in thickness	EDJ	08/08/2016
103	Midden	Pre1300, post1104 midden.	EDJ	08/08/2016
1104	Tephra	1104/H1 Tephra	EDJ	08/09/2016
104	Midden	Pre1104 Midden	EDJ	08/09/2016
105	Midden	Grey pre-1104 midden.	EDJ	08/09/2016
1000	Tephra	Dark greenish gray tephra, possibly the 1000 or 934. Labeling as 1000. Thin, but consistent layer throughout.	EDJ	08/09/2016
106	Aeolian Deposit	Aeolian deposit, pre -1000	EDJ	08/09/2016
107	Midden	Pre-1000 peat ash midden	EDJ	08/09/2016
108	Aeolian Deposit	Pre-1000 aeolian deposit. Under peat ash midden [107]. Above oldest midden deposit [109].	EDJ	08/09/2016
109	Midden	Pre-1000 grayish midden on top of LNS in places. Heavy charcoal inclusions.	EDJ	08/09/2016
871	Tephra	Landnam layer/sequence	EDJ	08/09/2016
110	Aeolian Deposit	Aeolian deposit under LNS	EDJ	08/09/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	102	Bone, Animal		EDJ	08/08/2016
2	103	Bone, Animal		EDJ	08/09/2016
3	103	Flotation	Pre-1300 midden. Mid-cxt	EDJ	08/09/2016
4	104	Flotation	Pre1104 midden	EDJ	08/09/2016
5	104	Bone, Animal		EDJ	08/09/2016
6	105	Flotation	Float sample from top of context	EDJ	08/09/2016
7	105	Flotation	Float sample from bottom of cxt/top of 1000	EDJ	08/09/2016
8	1000	Flotation		EDJ	08/09/2016
9	106	Flotation	Top of 106 under 1000	EDJ	08/09/2016
10	107	Flotation	Almost all of 107 sampled	EDJ	08/09/2016
11	108	Flotation	Bottom of 108	EDJ	08/09/2016
12	109	Flotation		EDJ	08/09/2016
13	109	Bone, Animal		GMC	08/09/2016
14	871	Flotation	LNS	EDJ	08/09/2016
15	110	Flotation		EDJ	08/09/2016

Photos

IMAGE	CAMERA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
50	Osaka	1104	N	Close of 103, open of 104. H1 tephra.	EDJ	08/09/2016
51	Osaka	105	N	Open of 105, close of 104.	EDJ	08/09/2016

52	Osaka	105	N	Open of 105, close of 104	EDJ	08/09/2016
54	Osaka	1000	N	1000 tephra, close of 105, open of 106	EDJ	08/09/2016
55	Osaka	1000	N	1000 tephra, close of 105, open of 106	EDJ	08/09/2016
56	Osaka	1000	Above	1000 tephra, close of 105, open of 106	EDJ	08/09/2016
57	Osaka	107	Above	Open of 107, close of 106	EDJ	08/09/2016
58	Osaka	107	Above	Open of 107, close of 106	EDJ	08/09/2016
59	Osaka	109	Above	Open of 109, close of 108	EDJ	08/09/2016
60	Osaka	109	Above	Open of 109, close of 108	EDJ	08/09/2016
61	Osaka	871	Above	Close of 109, open of 871	EDJ	08/09/2016
62	Osaka	871	Above	Close of 109, open of 871	EDJ	08/09/2016
72	Seoul	101	N	Opening of unit	EDJ	08/08/2016
73	Seoul	1300	S	1300 tephra	EDJ	08/08/2016
74	Seoul	1300	S	1300 tephra	EDJ	08/08/2016

Ásgrímsstaðir (Jarðatal Johnsen farm number 447 [Helluland]; Place number 4)

Test Pit 2, 1x1 meter

Opening date: 10 August 2016; Closing date: 11 August 2016

Southwest corner, east: 475704; north: 579227.5

Contexts

CONTEXT	CLASS	DESCRIPTION	ID	DATE
101	Topsoil	Root mat and aeolian soil	NZ	08/10/2016
102	Cultural Layer	Low Density Cultural in Aeolian soil	JPM	08/10/2016
1300	Tephra	1300 tephra very patchy in LDC	JPM	08/10/2016
103	Cultural Layer	Small bit of LDC below 1300, continued from 102	JPM	08/10/2016
1104	Tephra	H1 cryoturbated with sand and aeolian soil	JPM	08/10/2016
104	Fill	Sand	JPM	08/10/2016
105	Midden	Midden	JPM	08/10/2016
106	Alluvial deposit	Sand, continues at least to 80cm in core	JPM	08/10/2016

Samples

SAMPLE	CONTEXT	TYPE	DESCRIPTION	ID	DATE
1	103	Flotation	103	JPM	08/10/2016
2	104	Flotation	Top of 104	JPM	08/10/2016
3	105	Flotation	Top of 105	JPM	08/10/2016
4	105	Flotation	Bottom of 105	JPM	08/10/2016
5	106	Flotation	Subsoil/Sand	JPM	08/10/2016

Photos

IMAGE	CAMARA	CONTEXT	DIRECTION	DESCRIPTION	ID	DATE
44	New York	102	North	Top of 102	JPM	08/10/2016
45	New York	1104	North	Top of 1104	JPM	08/10/2016
46	New York	104	North	Top of 104	JPM	08/10/2016
47	New York	104	North	Top of 104	JPM	08/10/2016
48	New York	105	East	Top of 105	JPM	08/10/2016
49	New York	105	East	Top of 105	JPM	08/10/2016
50	New York	106	North	Top of 106	JPM	08/10/2016
51	New York	106	North	Top of 106	JPM	08/10/2016

Kite photos for photogrammetry

LOCATION	DATE	CAMERA	BASE	CONDITIONS	PHOTO RANGE	GCPS	NOTES
Keldudalur	07/21/2015	Ricoh GR	Flow Form 16	Windy	3404-3504; 3703-4082	GPS plates	Overview of farm mound
Ás	07/23/2015	Ricoh GR	Fled	Low wind, then rising	4243-4671	GPS plates	Overview of farm mound
Ás	07/27/2015	Ricoh GR	Flow Form 16	Windy, overcast	5424-6431	GPS plates	Overview of farm mound, includes long stationary sequence while dog chased horses.
Ás (Minni-Ás)	07/29/2015	Ricoh GR	Fled	Low wind, overcast	6875-7508	GPS plates	Overview
Hegranesþing	07/30/2015	Ricoh GR	Flow Form 16	Mostly sunny, winds high but dropping	7509-8407	GPS plates	Overview of Litli-Garður homefield area
Keldudalur (Járngerðarhóll)	08/03/2015	Ricoh GR	Fled	Mostly cloudy, mod. to low winds	8408-9206	GPS plates	Overview of (likely) iron-working site. Two flights in quick succession
Ás (Túnfótur)	08/13/2015	Ricoh GR	Flow Form 16	Windy, partly cloudy	9991-10723	GPS plates	Overview of walled field

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