Appendix A.10.2

Karst Survey Report

A.10.2

Galway County Council

N6 Galway City Ring Road

Karst Survey Report

GCOB-4-03-0-6.2.8_010

Issue 3 | 26 July 2018

Job number 233985-00

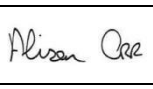
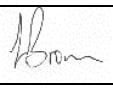
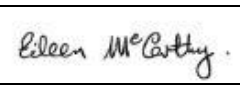
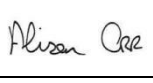
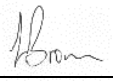
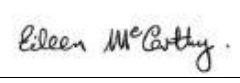
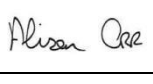
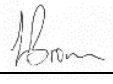
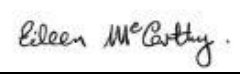
Ove Arup & Partners Ireland Ltd

Arup
Corporate House
City East Business Park
Ballybrit
Galway
H91 K5YD
Ireland
www.arup.com

ARUP

Document Verification

ARUP

Job title		N6 Galway City Ring Road		**Job number** 233985-00	
Document title		Karst Survey Report		**File reference**	
Document ref		GCOB-4-03-0-6.2.8_010			
Revision	**Date**	**Filename**	GCOB-4-03-03-6.2.8_010.docx		
Issue 1	27 Feb 2015	**Description**	Issue 1		
			Prepared by	Checked by	Approved by
		Name	Alison Orr	Les Brown	Eileen McCarthy
		Signature			
Issue 2	22 Feb 2018	**Filename**	GCOB-4-03-03-6.2.8_010.docx		
		Description	Issue 2		
			Prepared by	Checked by	Approved by
		Name	Alison Orr	Les Brown	Eileen McCarthy
		Signature			
Issue 3	26 Jul 2018	**Filename**	GCOB-4-03-03-6.2.8_010.docx		
		Description	Issue 3		
			Prepared by	Checked by	Approved by
		Name	Alison Orr	Les Brown	Eileen McCarthy
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

Executive Summary

This report documents the findings of a karst survey undertaken for the limestone region that underlies the eastern part of the Galway City Ring Road (GCRR). The objectives of the study are to identify the spatial distribution of karst features and to describe their form.

This report of June 2016 (GCOB-4-03-03-2.2.8_013) is an update of the original January 2015 desk study and site walkover issue of the report (GCOB-4-03-03-6.2.8_010 Karst Study Report), which incorporates findings from additional walkover surveys and ground investigations undertaken during 2015 and 2016.

In total 116 (No.) karst features have been identified within the limestone terrain of the project area. The features identified include enclosed depressions (dolines), springs, turloughs, stream sinks, estavelles and superficial solution features and one cave. All karst features recorded are presented in the karst database (presented as **Appendix B**).

1 Introduction

A study of karst landforms was carried out as part of the hydrogeological investigation for Galway City Ring Road (GCRR). The purpose of the study was to develop an understanding of the groundwater flow regime with emphasis on identifying areas where groundwater was emergent, which is where groundwater dependency is likely to exist either for supply or by habitats.

The initial karst study was undertaken before route selection stage. During investigations following route selection additional features were identified and included. This is the final report on the karst survey for GCRR and is an updated version of the initial study produced in January 2015.

2 Background

The eastern side of the GCRR study area is underlain by Visean Undifferentiated Limestone, which is classified by the Geological Survey of Ireland (GSI) as a regionally important karst aquifer (Rkc). The landscape has numerous karst landforms and includes springs and turloughs that are often associated with groundwater dependant terrestrial ecosystems (GWDTEs). Turloughs and springs, in particular, are indicative of pathways of preferential flow within a limestone aquifer. To the author's knowledge there are no previous studies (for example of tracer testing) published in the project area.

3 Methodology

The karst study involved a desk based study which was carried out in October 2014 and a field survey carried out in October and November 2014. This was followed up in 2015 and 2016 with further field visits and ground investigations.

3.1 Desk Based Study

Karst features were identified from the following sources:

- Geological Survey of Ireland karst database (www.dcenr.gov.ie)
- OSI Historic 6" Map (maps.osi.ie)
- GCRR ecological surveys
- Lidar Map (Office of Public Works)
- Bing Maps (www.bing.com/maps/)
- Google Maps (maps.google.ie)
- Ordnance Survey of Ireland Waterline Map (courtesy of Geological Survey of Ireland)
- EIS N6 Galway City Outer Bypass Vol 2 2006
- Ryan Hanley (2010) Study to Identify Practical Measures to Address Flooding on the Clare River Volume 1 - Report

Features were identified within the study area and in the surrounding area. Only features identified within the study area are included in this report, with the exception of seven springs, which is located on the project border.

3.2 Field survey

Karst features identified during the desk based study were visited during the field survey. Additional karst features identified while onsite were also included in this study. The following features were noted for each karst feature during the field survey:

- Feature type
- GPS coordinates
- Status of feature – identified initially in desk study or field and if there were problems with the identification, e.g. heavily vegetated areas can hinder identification of features.
- Feature dimensions
- Presence of water
- Elevation of ground surface / water surface where applicable
- Water quality parameters where water was present (temperature, electrical conductivity and pH)
- Local knowledge
- Photos

During the initial stage of the survey, in October 2014, groundwater levels were relatively low. As a result of the low water levels it was not possible to detect the presence of some features, i.e. seasonal springs, losing streams, seasonal stream sinks. These features were revisited and assessed following wetter weather in November 2014 when groundwater levels were higher.

During October 2014 a number of turloughs remained dry, likely a consequence of a very dry September. The turloughs were revisited in November 2014 when the water levels were considerably higher and many of the turloughs contained water. Visiting karst features such as turloughs and springs during low water levels allows the dimensions and potential sinks to be identified. Higher water level conditions allowed water quality measurements to be recorded and the confirmation of groundwater contribution to the feature.

3.3 Limitations

A number of limitations are associated with the method employed:

- The urban environment of Galway City was a hindrance to the identification of natural karst features. Much of the urban area is covered in hard-standing and buildings and may not reflect the natural topography. Furthermore, manmade landscaping can be mistaken for being karst landforms.
- The identification of naturally occurring karst features in areas of landscaping (e.g. Glenlo Abbey Golf Course) often made it difficult to distinguish between natural and landscaped.
- Large depressions with shallow bases are difficult to identify from lidar where the contrast in elevation is only slight.
- The variability in the groundwater level can change rapidly in karst aquifers. Springs, stream sinks and turloughs characteristically have variable flows and levels and as such seasons can have a significant influence on their characteristics.

4 Results

The desk study identified a total of 178 potential karst landforms within the study area. During the field survey a total of 79 karst features were confirmed as karst (49 initially identified at the desk study phase and a further 30 during the field survey). A total of 71 features identified at the desk study stage were found not to be karst on inspection.

Of those not confirmed a total of 37 karst features identified at the desk study stage were not able to be accessed and a total of 14 were not found. Access issues were due to locked gates or the sites being too overgrown as well as health and safety concerns from livestock.

Desk and field data for those karst features confirmed are described individually in **Appendix B**. Also, included in **Appendix B** are the desk study data for those features that could not surveyed on-site due to access issues. Together these karst features form the project karst database and referred to as a ‘K’ reference number (e.g. K1). All karst features in **Appendix B** are also presented in **Figure 1** (at the rear of this report).

The breakdown of all features identified during the desk study, whether confirmed in the field karst, confirmed as not being karst, not present or not being able to be surveyed are presented in **Table 1**.

Table 1: Summary of desk and field survey results

Results from desk and field survey	Number of Features
Confirmed as karst	79
Confirmed as not karst	85
Not present	13
Access issue	37

Further detail is provided below on the results of the field survey from features identified during the desk study.

4.1 Confirmed Karst Features

Potential features were identified during the desk study and then investigated in the field. As an example, **Figure 1a** presents the lidar image showing two clear circular shapes interpreted as likely karst landforms but also shows multiple surrounding features that are less clear. The potential features (K57 and K59) were visited and confirmed as enclosed depressions during the field survey. Survey of the surrounding features also confirmed three further enclosed depressions (K61, K62 and K64) as shown in **Figure 1b**.

The desk study methodology used is a valid tool for identifying likely karst features. However, this study shows that there is a need for follow up by field visits following the desk study to confirm features but also make field observations.

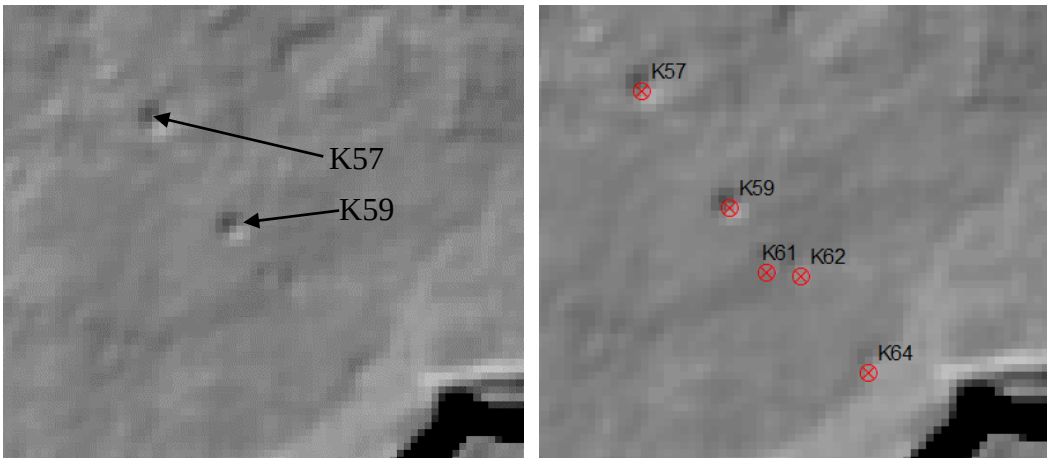


Figure 1a (left) lidar image showing two potential enclosed depressions identified from the desk study, **2b** (right) karst features confirmed during field survey

4.2 Confirmed as not karst

Figure 2a shows the lidar image of three potential enclosed depression identified from the desk study. During the site visit K88 was confirmed to be an enclosed depression, however, onsite inspection K80 and K84 were found to be mounds and therefore classified as not karst (Figure **2b**).

Other features listed as not karst during this survey include a feature at Doughiska referred to as a turlough by GSI database. The listed feature at Doughiska does not have the form of a turlough, in that it does not form a depression but also that there

was no standing water observed during the winter of 2014/2015 or 2015/16. Local observations have been made of historical flooding at the location and the surrounds during intense rainfall. There has been significant drainage implemented is this area in the last decade, which has likely reduced surface ponding.

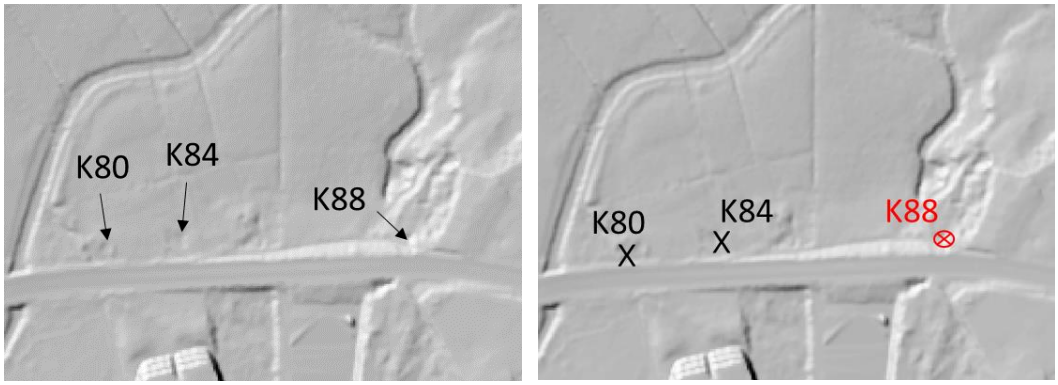


Figure 2a (left) lidar image showing three potential enclosed depressions identified from the desk study, **2b** (right) the field survey confirmed enclosed depression K88 (red circle) but also proved that K80 and K84 (black crosses) were not karst.

4.3 Feature not present

Of those karst features listed by the GSI database a total of 12 (No.) springs were classified as not present. Consultation on site with local residents indicate that in all cases these springs were historical shallow dug wells into subsoil (generally greater than 50yrs ago) for domestic or farm use. These wells have since been disused with the introduction of mains water supply and subsequently fallen into disrepair and subsequently been covered over or buried so that there is no longer a trace of them.

4.4 Unable to access feature

Features were classified as ‘access issues’ where the following situations were encountered:

- Dense vegetation prevented access to the area or covered the potential feature to an extent that it could not be confirmed or discounted
- The feature was in a highly landscaped area and could have been covered or buried
- Access was prevented due to high walls and locked gates
- Features were located beneath existing buildings
- Livestock prevented access

5 Summary

Karst features confirmed by this survey include enclosed depressions (dolines), estavelles, springs, turloughs, superficial solution features, one swallow hole (stream sink), features and one cave. Karst features that have historically been hand dug as wells are also included. The numbers of these features in the final karst database are detailed below in **Table 2**.

Of those features identified from the GSI database but not found in the field the most common were those identified as springs. In almost all cases the features identified as springs were abandoned hand dug wells. These features were not located within karst features, rather were shallow wells hand dug in subsoil but had later been buried or covered as abandonment.

Table 2: Type of karst features identified within the study area

Feature Type	Confirmed karst	Access Issue
Cave	1	0
Enclosed depression	50	32
Estavelle	3	0
Spring	16	5
Superficial solution features	3	0
Swallow hole	1	0
Turlough	3	0
Well*	2	0

*Used to identify those karst features that have historically been modified and used as wells. These features are often doline features that have been hand dug to deepen and commonly have a dry stone wall surround. These features are no longer used as a water source.

Appendix A

Figures

A1

A3

EIA REPORT

Legend

- City Boundary
- Proposed Development Boundary

Karst Features (K)

Surface Karst Features

- Enclosed Depression, Confirmed
- Enclosed Depression, Confirmation/ identification problem
- Estavelle, Confirmed
- Spring Swallow Hole, Confirmed
- Spring, Confirmed
- Spring, Confirmation/ identification problem
- Spring, Not found
- Swallow Hole, Confirmed
- Turlough, Confirmed
- Well, Confirmed
- Cave, Confirmed
- Superficial solution features, Confirmed

Clients

Comhairle Chontae na Gaillimhe
Galway County Council

N6 Galway City Transport Project

An Roinn Iompair Turasóireachta agus Spóirt
Department Transport, Tourism and Sport

Transport Infrastructure Ireland

Key Plan

Sheet 1
Sheet 2

Consultant

ARUP

Corporate House
City East Business Park
Ballybrit, Galway, Ireland

Tel +353 (0)91 460675
www.N6GalwayCity.ie
www.arup.ie

Job Title

N6 Galway City Ring Road

Scale: **1:25,000**

Date: **February 2018**

Issue	Date	By	Chkd	Appd
I2	28/09/2018	AG	LB	EMC
I1	22/02/2018	AG	LB	EMC

Drawing Title

Appendix 10.2
Karst Feature Survey Map
Sheet 1 of 2

Drawing Status

For Information

Job No	Drawing No	Issue
233985-00	**Figure 1a**	**I2**

A3

Refer to Figure 10.1.001 (Sheet 1 of 2)

EIA REPORT

Legend

- City Boundary
- Proposed Development Boundary

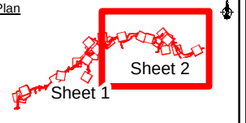
Karst Features (K)

Surface Karst Features

- Enclosed Depression, Confirmed
- Enclosed Depression, Confirmation/ identification problem
- Estavelle, Confirmed
- Spring Swallow Hole, Confirmed
- Spring, Confirmed
- Spring, Confirmation/ identification problem
- Spring, Not found
- Swallow Hole, Confirmed
- Turlough, Confirmed
- Well, Confirmed
- Cave, Confirmed
- Superficial solution features, Confirmed

Clients: Comhairle Chontae na Gaillimhe Galway County Council; N6 Galway City Transport Project; An Roinn Iompair Turasóireachta agus Spóirt Department Transport, Tourism and Sport; TII Bonneagar ompar Éireann Transport Infrastructure Ireland

Key Plan



Consultant: ARUP
Corporate House, City East Business Park, Ballybrit, Galway, Ireland
Tel +353 (0)91 460675
www.N6GalwayCity.ie
www.arup.ie

Job Title: **N6 Galway City Ring Road**

Scale: **1:25,000**

Date: **February 2018**

Issue	Date	By	Chkd	Appd
I2	28/09/2018	AG	LB	EMC
I1	22/02/2018	AG	LB	EMC

Drawing Title: **Appendix 10.2 Karst Feature Survey Map Sheet 2 of 2**

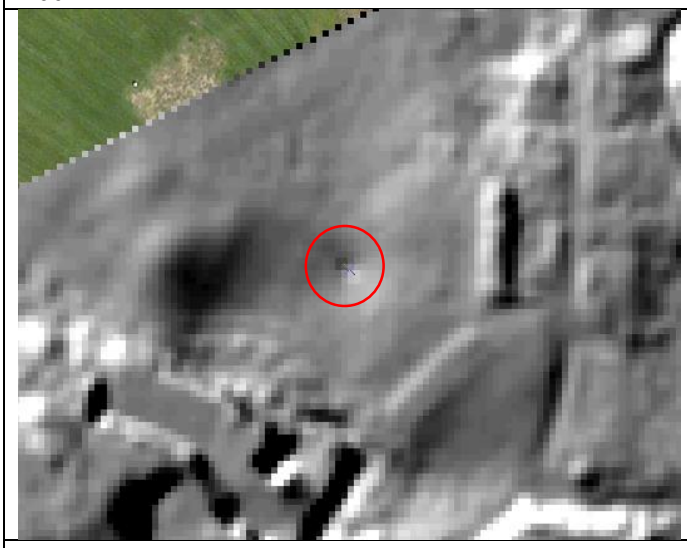
Drawing Status: **For Information**

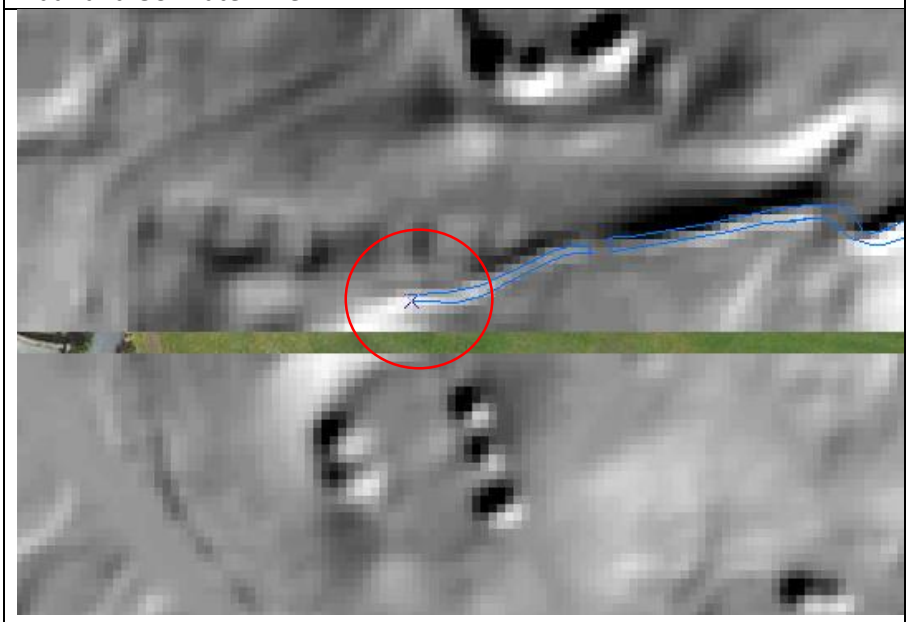
Job No	Drawing No	Issue
233985-00	Figure 1b	I2

Appendix B

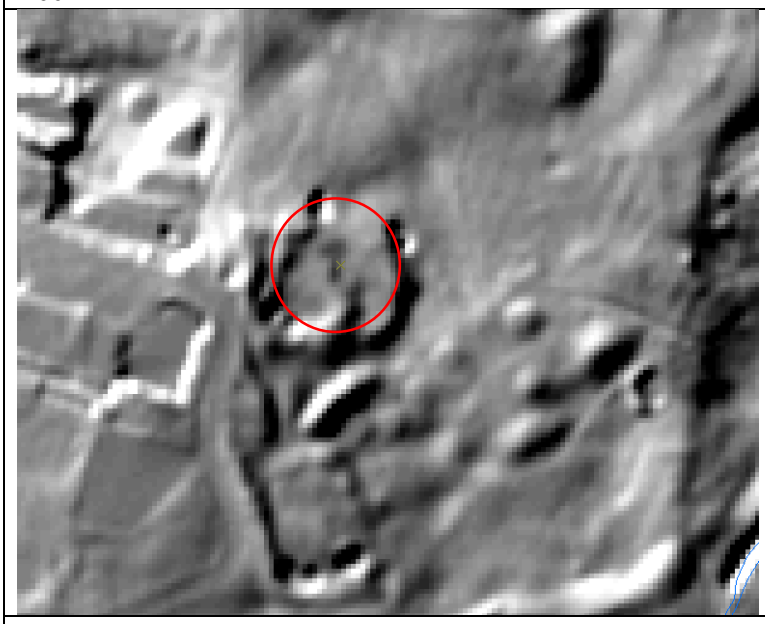
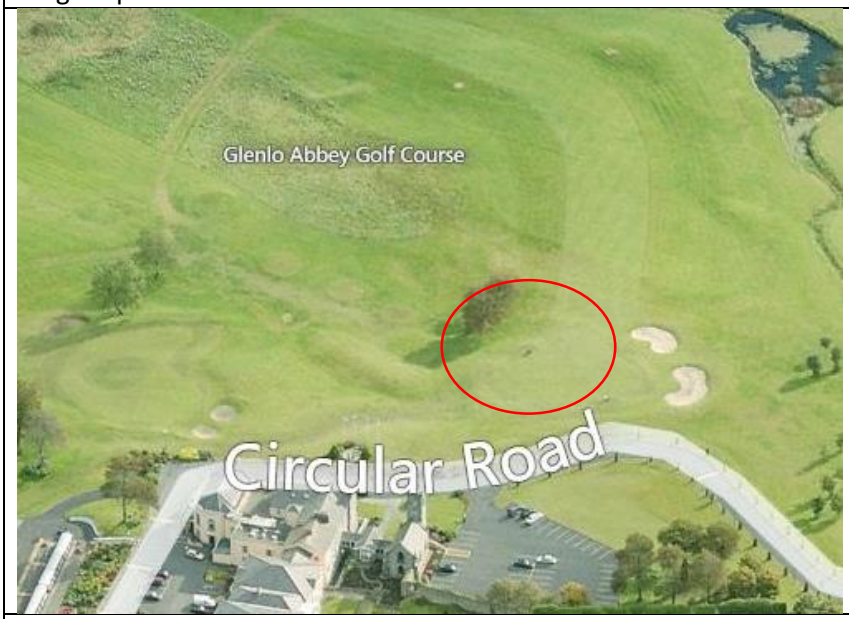
Karst Database

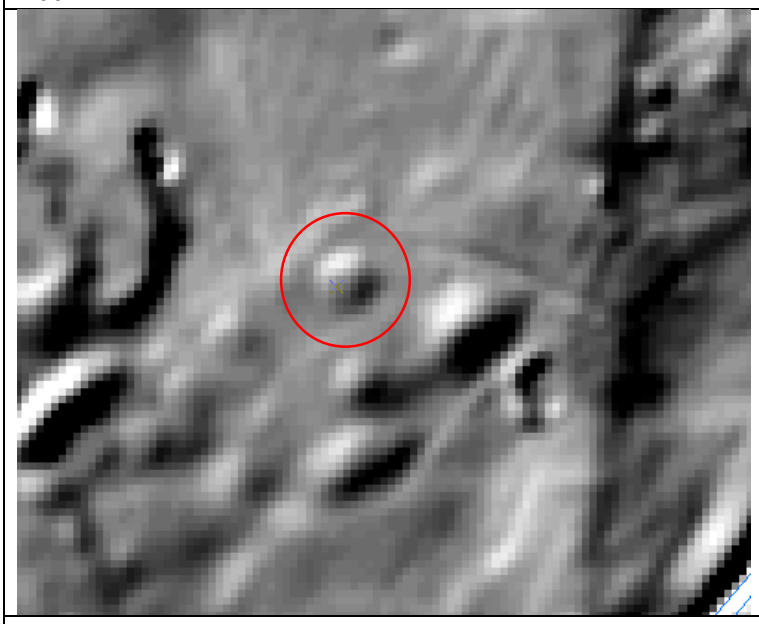
B1

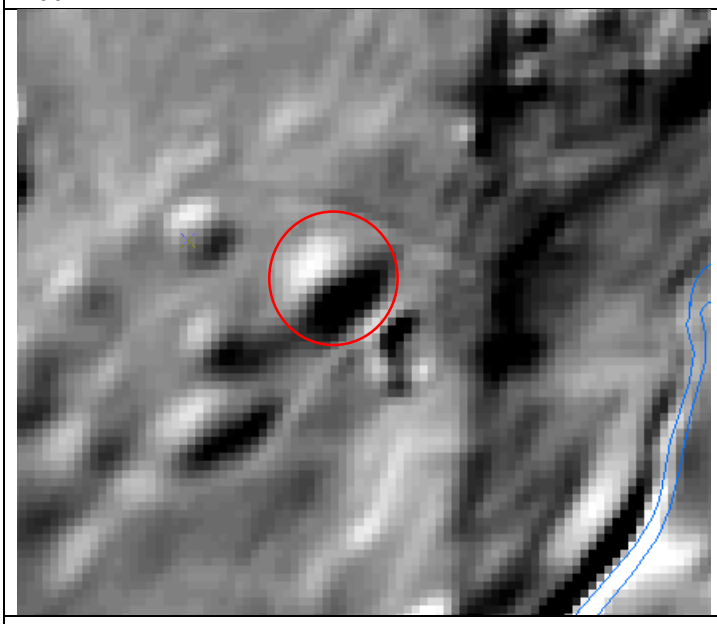
Feature ID	**K1**
Feature type	Enclosed depression
Coordinates	526676, 728520
Source	Lidar: 
	Bing Maps: 
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Within golf course. Area too landscaped to confirm presence of karst feature
Site photo	Not available

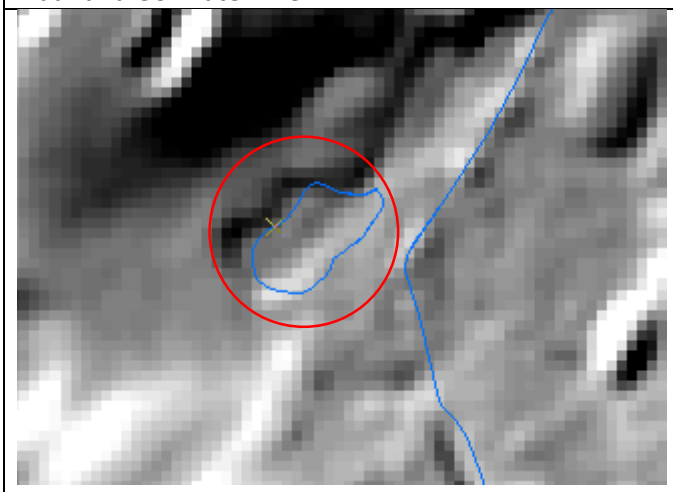
Feature ID	**K2**
Feature Type	Spring
Coordinates	526837, 728183
Source	Lidar and OSI water line: 
	Bing Maps: 
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	Yes
Additional Information	Spring discharging into large pond. Drain also discharges into the pond. The drain may be modified and contains little water on day of visit.

Site photo	

Feature ID	**K3**
Feature type	Enclosed depression
Coordinates	526879, 72836
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Within golf course. Area too landscaped to confirm presence of karst feature
Site photo	Not available

Feature ID	**K4**
Feature type	Enclosed depression
Coordinates	526952, 728343
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Within golf course. Area too landscaped to confirm presence of karst feature
Site photo	Not available

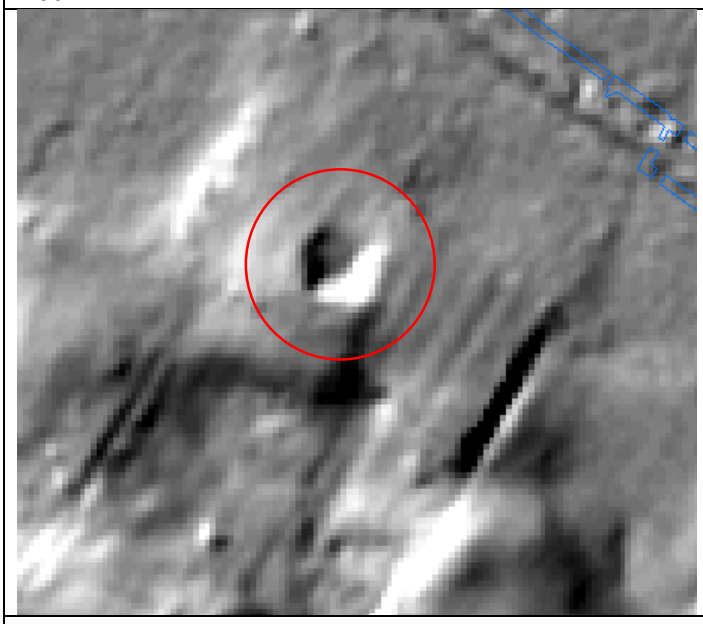
Feature ID	**K5**
Feature type	Enclosed depression
Coordinates	526985, 728332
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Within golf course. Area too landscaped to confirm presence of karst feature
Site photo	Not available

Feature ID	**K6**
Feature type	Enclosed depression
Coordinates	527186, 728282
Source	Lidar and OSI water line: 
	Bing Maps: 
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Within golf course. Area too landscaped to confirm presence of karst feature
Site photo	Not available

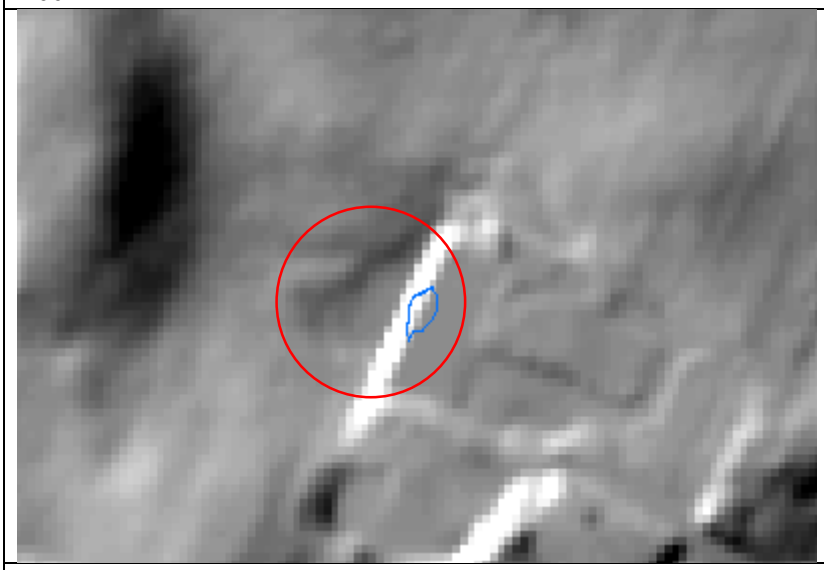
Feature ID	**K7**
Feature type	Spring
Coordinates	527195, 728079
Source	Field Survey
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	Yes
Additional Information	
Site photo	

Feature ID	**K9**
Feature type	Spring
Coordinates	527285, 728284
Source	Field Survey
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	Yes
Additional Information	
Site photo	

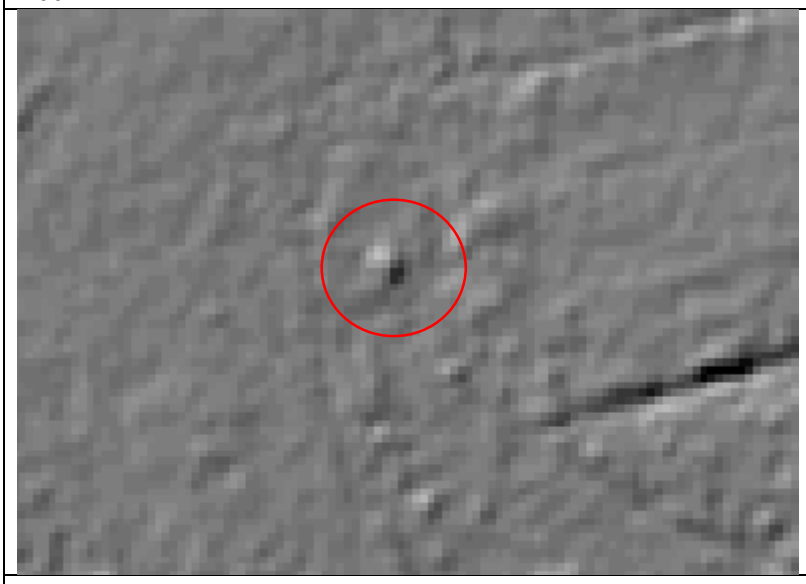
Feature ID	**K10**
Feature type	Enclosed depression
Coordinates	527301, 728143
Source	Field Survey
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	1 m diameter small enclosed depression, base contains loose rocks
Site photos	 

Feature ID	**K11**
Feature type	Enclosed depression
Coordinates	527396, 728307
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	15m diameter enclosed depression.

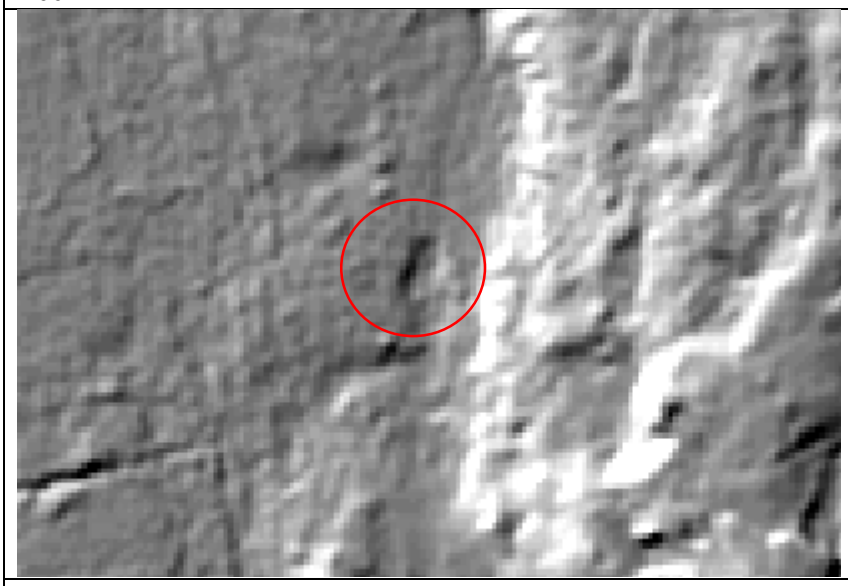
Site photo	 

Feature ID	**K12**
Feature type	Enclosed depression
Coordinates	527555, 728068
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	20m diameter enclosed depression with gently slopped sides.

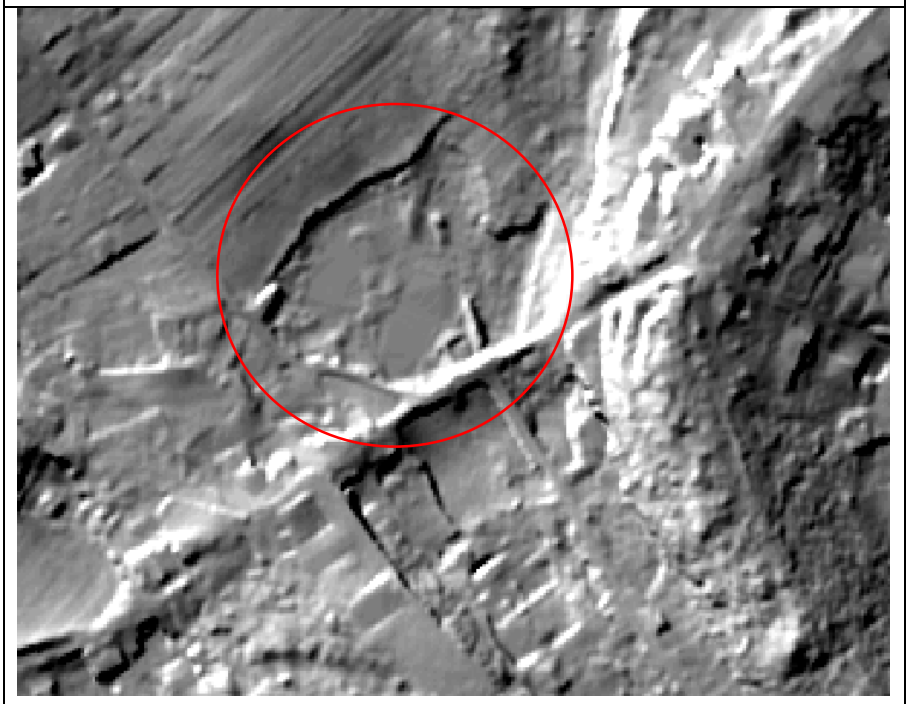
Site photo	

Feature ID	**K15**
Feature type	Enclosed depression
Coordinates	527954, 728876
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	17/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Cannot locate. Dense vegetation
Site photo	Not available

Feature ID	**K17**	
Feature type	Spring	
Coordinates	528345, 728630	
Source	Field Survey	
Field survey date	17/10/2014	11/11/2014
Field survey status	Confirmed	Confirmed
Water present	Yes Electrical conductivity: 520 uS/cm Temperature: 13.8 °C pH: 7.83	Yes Electrical conductivity: 622 uS/cm Temperature: 12 °C pH: 6.87
Water elevation	n/a	6.12 mAOD
Additional Information	Constructed pond (2 m diameter) covered in algae surrounded by constructed stone wall beside path.	
Site photos	 	

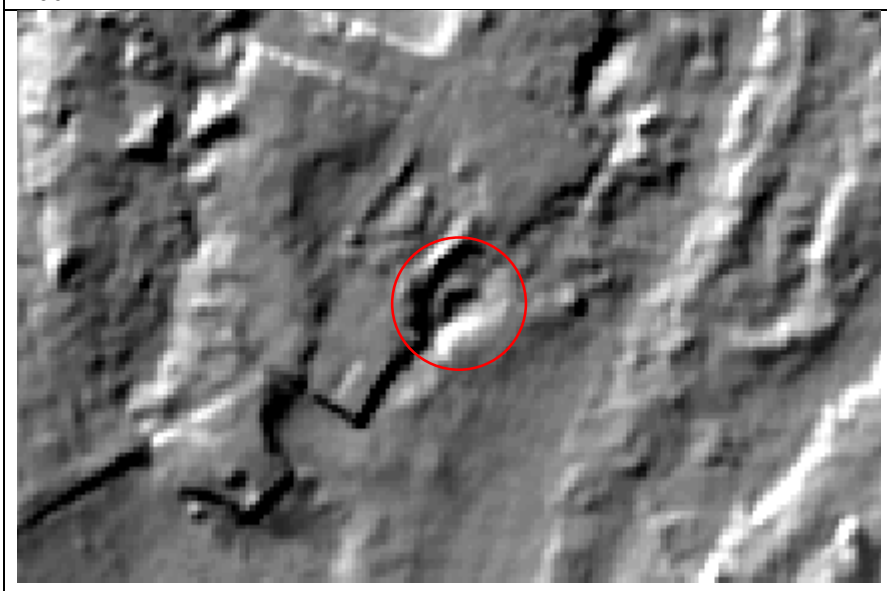
Feature ID	**K18**
Feature type	Enclosed depression
Coordinates	528356, 728948
Source	Lidar:
	
	Bing Maps:
	
	Other sources: aerial photography
Field survey date	17/10/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 350 uS/cm Temperature: 14.2 °C pH: 8.72
Additional Information	Water logged depression in field.

Site photo	 

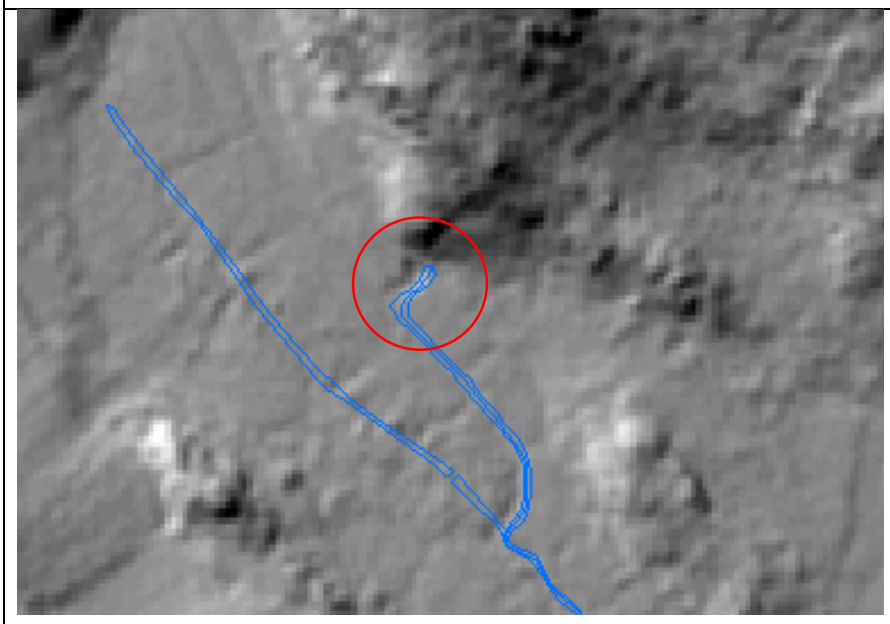
Feature ID	**K20**	
Feature type	Turlough	
Coordinates	528764, 728605	
Source	Scott Cawley ecology survey	
	Lidar: 	
	Bing Maps: 	
	Other sources: aerial photography	
Field survey date	17/10/2014	11/11/2014
Field survey status	Confirmed	Confirmed
Water present	No	Yes Electrical conductivity: 481 uS/cm Temperature: 9.8 °C pH: 7.64

Water elevation		10.42 mAOD
Additional Information	A plug hole was not found	
Site photos 17/10/2014	 	

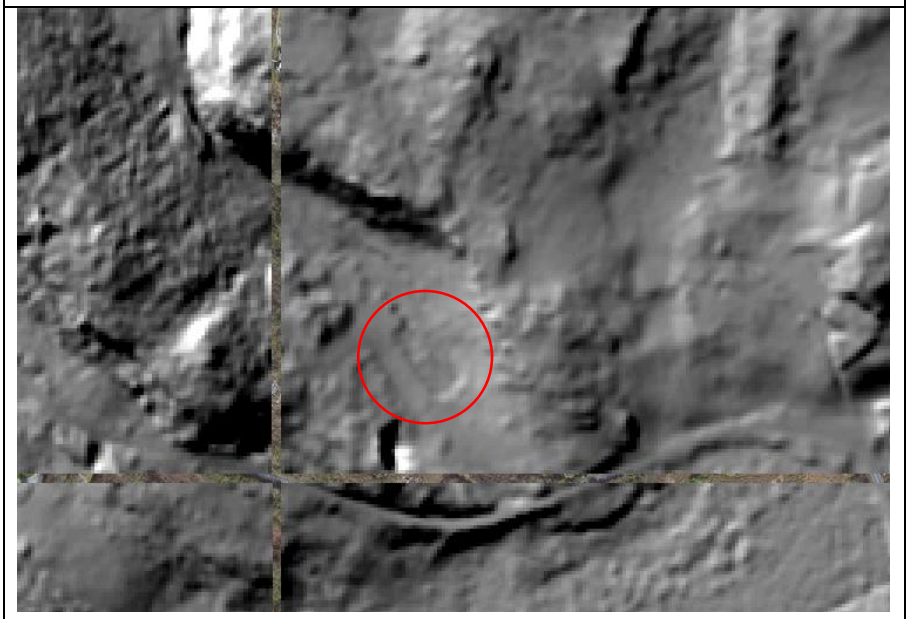
Site Photos
11/11/2014

Feature ID	**K21**
Feature type	Enclosed depression
Coordinates	528803, 729053
Source	Lidar: 
	Bing Maps: 
	Other sources: aerial photography
Field survey date	17/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Area covered in briars and vegetation preventing access.

Site photo	

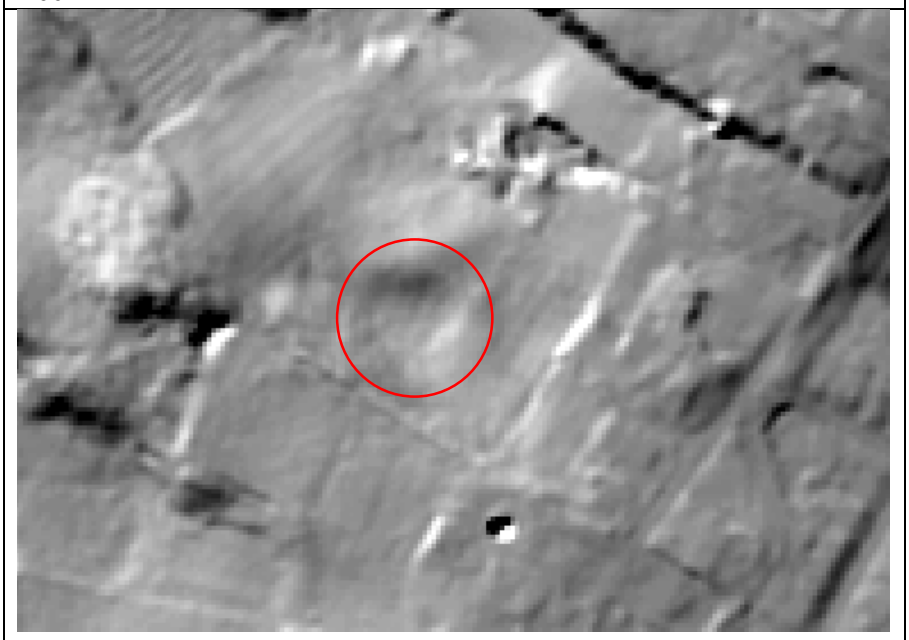
Feature ID	**K25**	
Feature type	Spring	
Coordinates	529045, 727934	
Source	Lidar and OSI water line: 	
	Bing Maps: 	
Field survey date	17/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	Yes Electrical conductivity: 490 uS/cm Temperature: 10.4 °C pH: 7.74	Yes Electrical conductivity: 480 uS/cm Temperature: 10.7 °C pH: 7.31
Water elevation		Water level elevation: 6.06 mAOD Elevation was recorded where the water is discharging beneath briars.

Additional Information	Stream channel from spring location contains considerable vegetation. Flow not measurable due to thick vegetation within channel Flow from spring discharge point was audible on the 12/11/2014.
Site photo	Spring discharge location  Spring discharge channel containing thick vegetation 

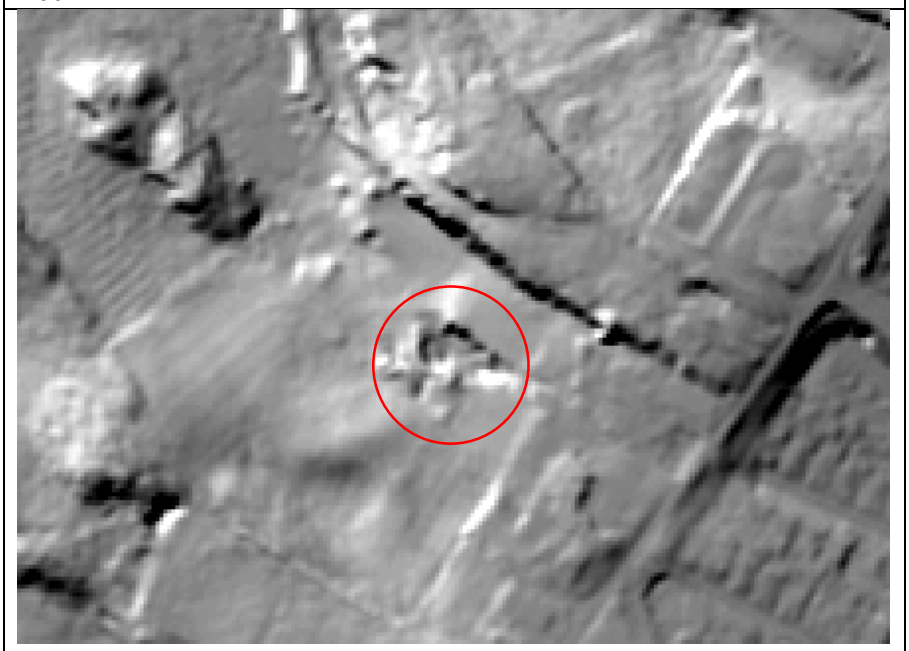
Feature ID	**K31**
Feature type	Turlough
Coordinates	529332, 728227
Source	Scott Cawley Ecologists Surveys
	Lidar:
	
	Bing Maps:
	
Field survey date	17/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Turlough is divided in two parallel sections with relatively well defined edges. The elevation of the eastern section is lower than the western section. A potential plug hole evident in the upper western section

Site photo	 

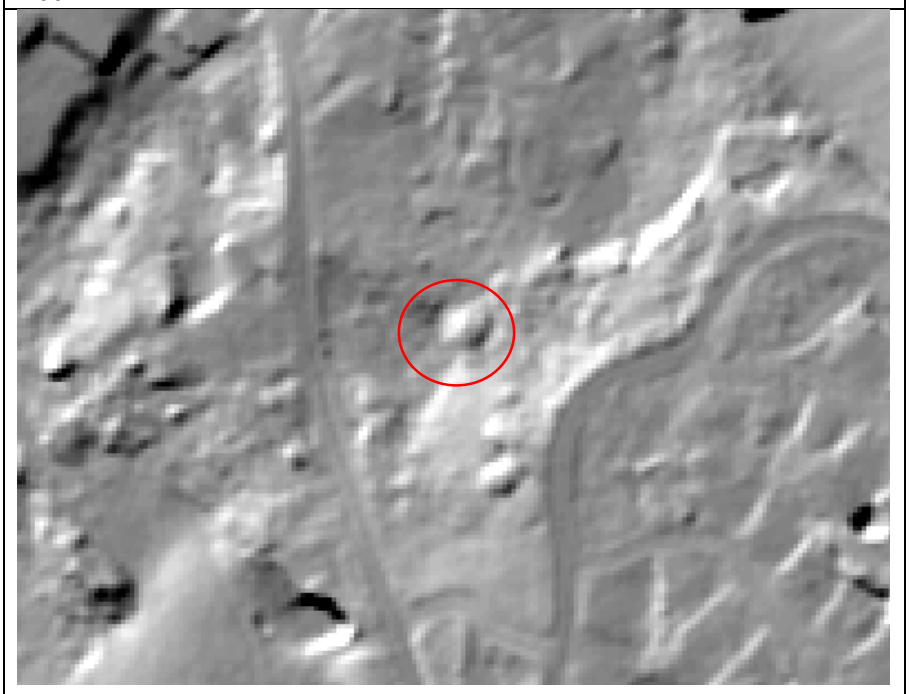
Feature ID	**K37**
Feature type	Enclosed depression
Coordinates	529562, 729011
Source	Field Survey
Field survey date	23/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Very shallow depression Approx. 20m x 19 m
Site photo	Not available
Bing map	

Feature ID	**K39**
Feature type	Enclosed depression
Coordinates	529566, 726981
Source	Lidar: 
	Bing Maps: 
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	30 m diameter enclosed depression. However this feature is questionable as there may be disposal of material to the east of the depression.

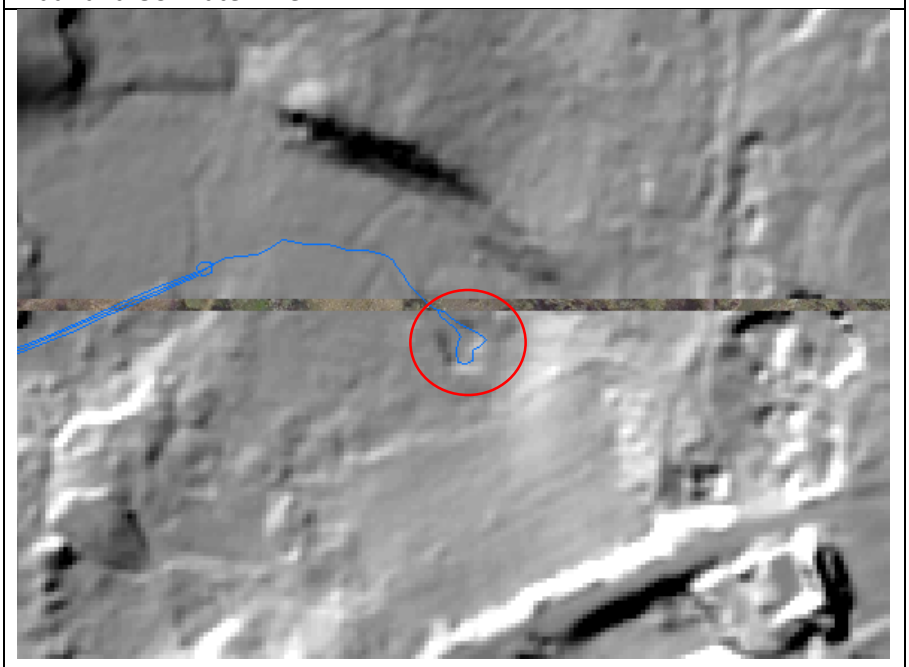
Site photos

Feature ID	**K40**
Feature type	Enclosed depression
Coordinates	529607, 727062
Source	Lidar:  Bing Maps: 
Field survey date	20/10/2014
Field survey status	Confirmation/identification problem
Water present	Unknown
Additional Information	May be enclosed depression but access inhibited by dense vegetation

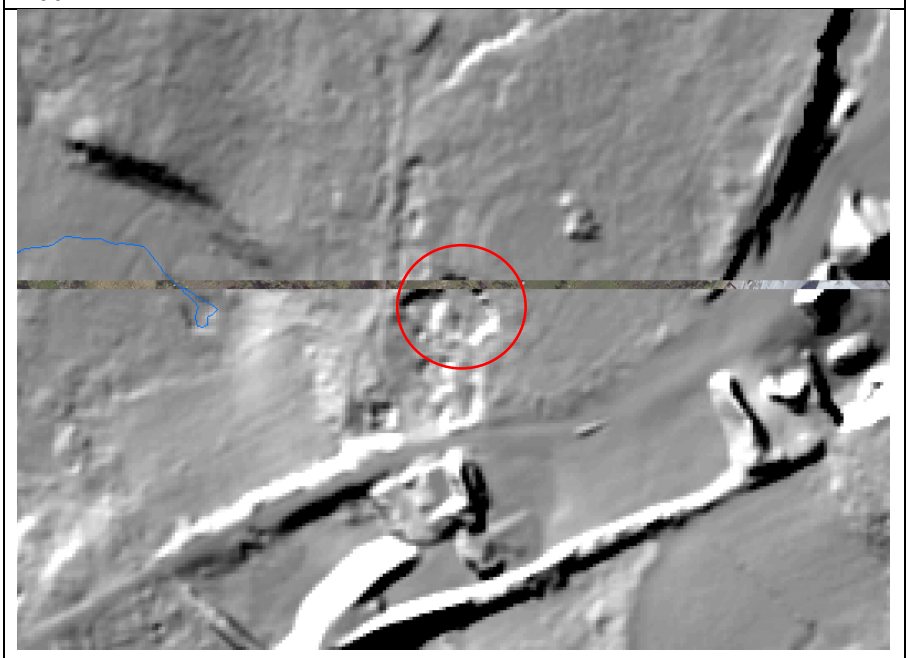
Site photos	

Feature ID	**K44**
Feature type	Enclosed depression
Coordinates	529836, 727798
Source	Lidar:  Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Small depression with rock exposed Approx. 2 m diameter and 1 m depth

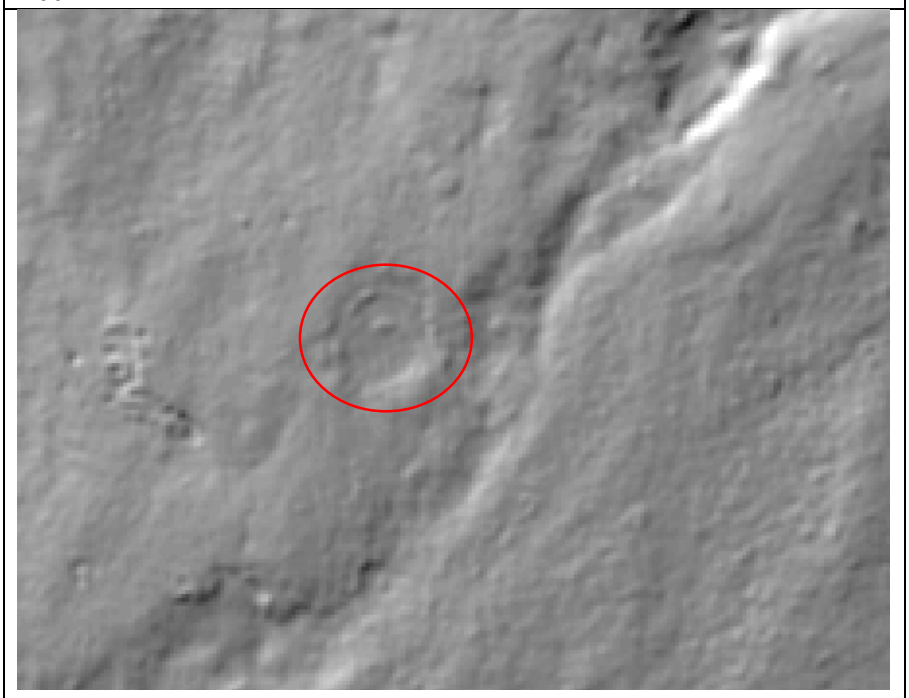
Site photo	

Feature ID	**K45**
Feature type	Spring
Coordinates	529900, 728162
Source	Lidar and OSI water line:  Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 680 uS/cm Temperature: 15.1 °C pH: 7.28
Additional Information	

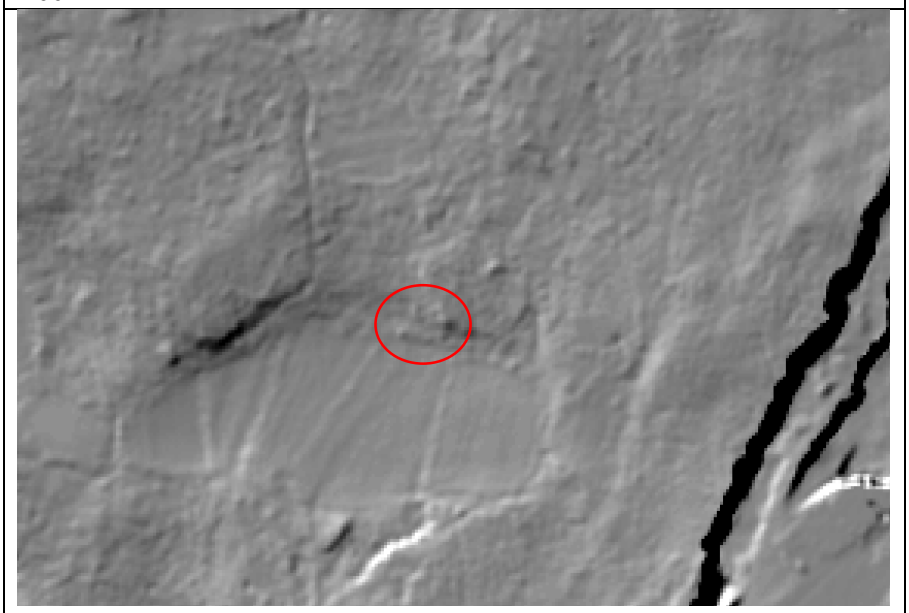
Site photo	
	

Feature ID	**K49**
Feature type	Enclosed depression
Coordinates	530028, 728162
Source	Lidar: 
	Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Exposed rock at northern side and gentle slope on Southern side Approx. 20 m diameter 2 m depth

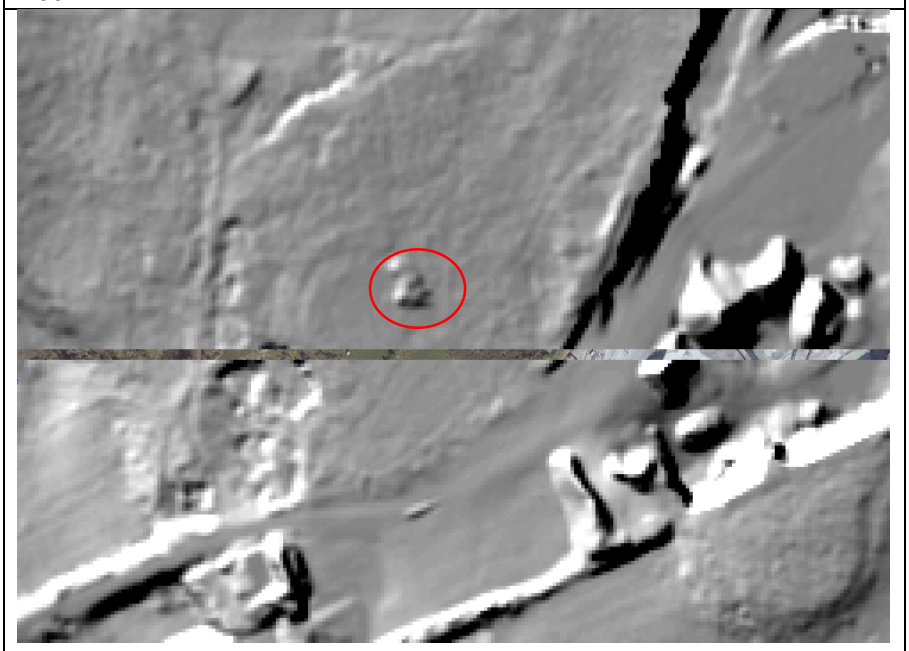
Site photos	
	

Feature ID	**K50**
Feature type	Enclosed depression
Coordinates	530041, 729241
Source	Lidar: 
	Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Slight enclosed depression which may be filled in

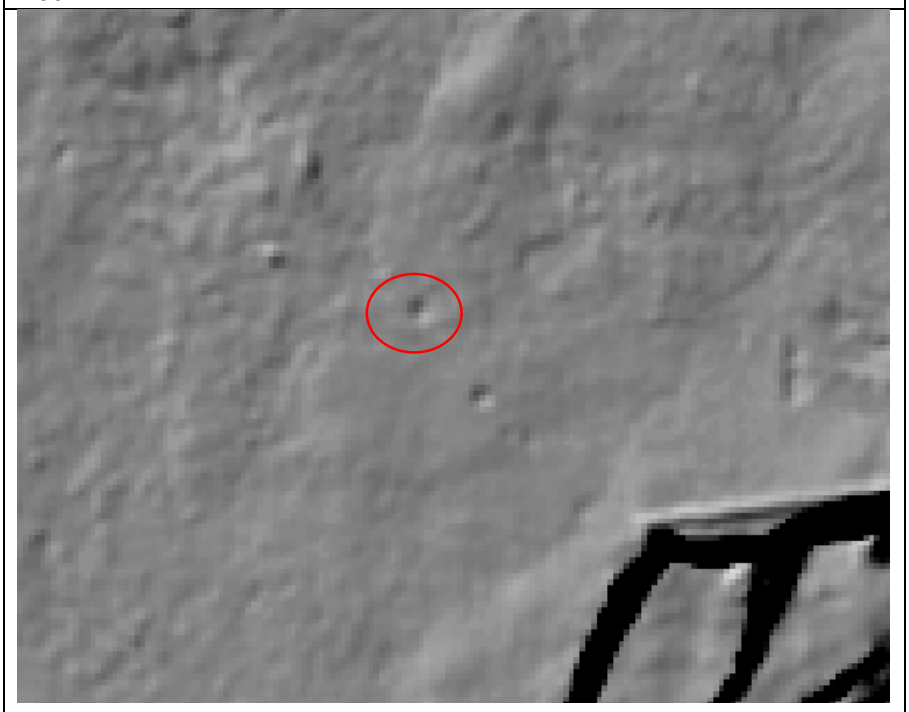
Site photos

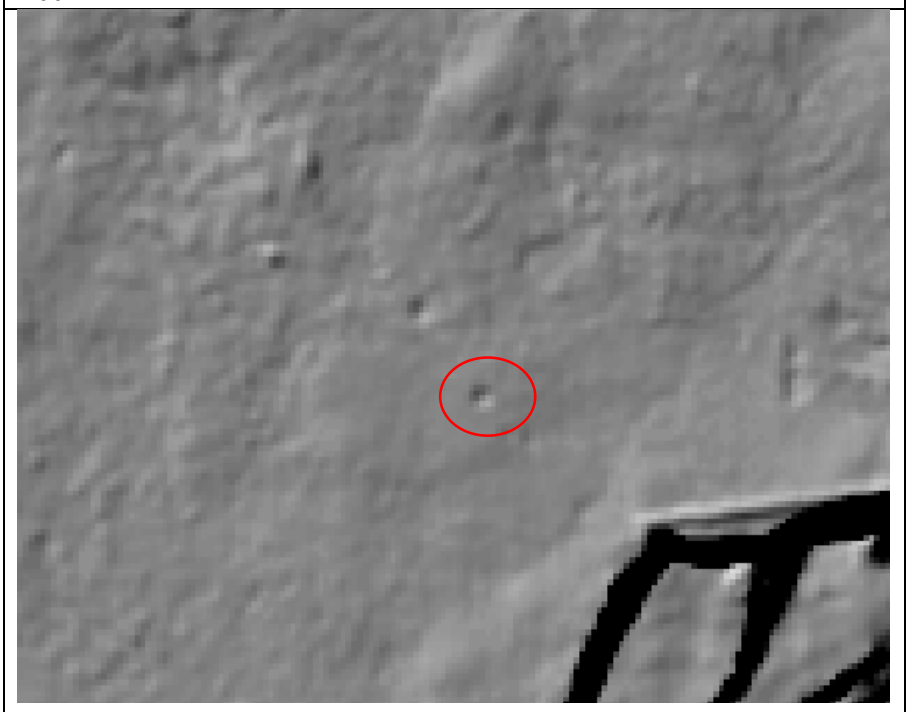
Feature ID	**K51**
Feature type	Enclosed depression
Coordinates	530084, 728466
Source	Lidar:  Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Very small enclosed depression plug hole not obvious but probably due to covering of moss

Site photos	

Feature ID	**K54**
Feature type	Enclosed depression
Coordinates	530120, 728208
Source	Lidar:  Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Could not locate. Unpredictable Livestock in field and appears very overgrown where the feature is located.

Site photos	

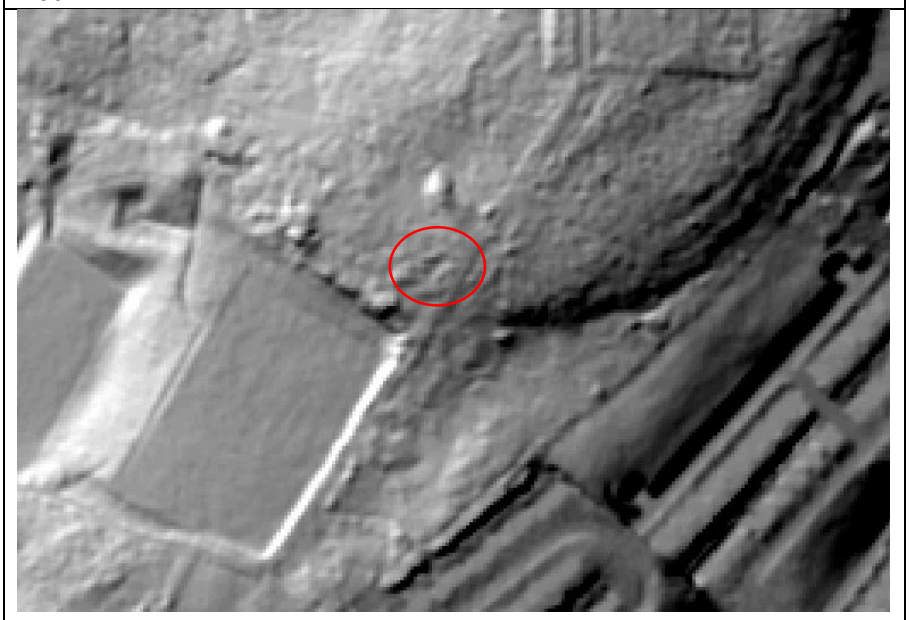
Feature ID	**K57**
Feature type	Enclosed Depression
Coordinates	530327, 728691
Source	Lidar:  Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 5m diameter 0.5 m depth
Site photo	Not available

Feature ID	**K59**
Feature type	Enclosed Depression
Coordinates	530352, 728656
Source	Lidar: 
	Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Enclosed depression is in line of depressions running EW
Site photo	Not available

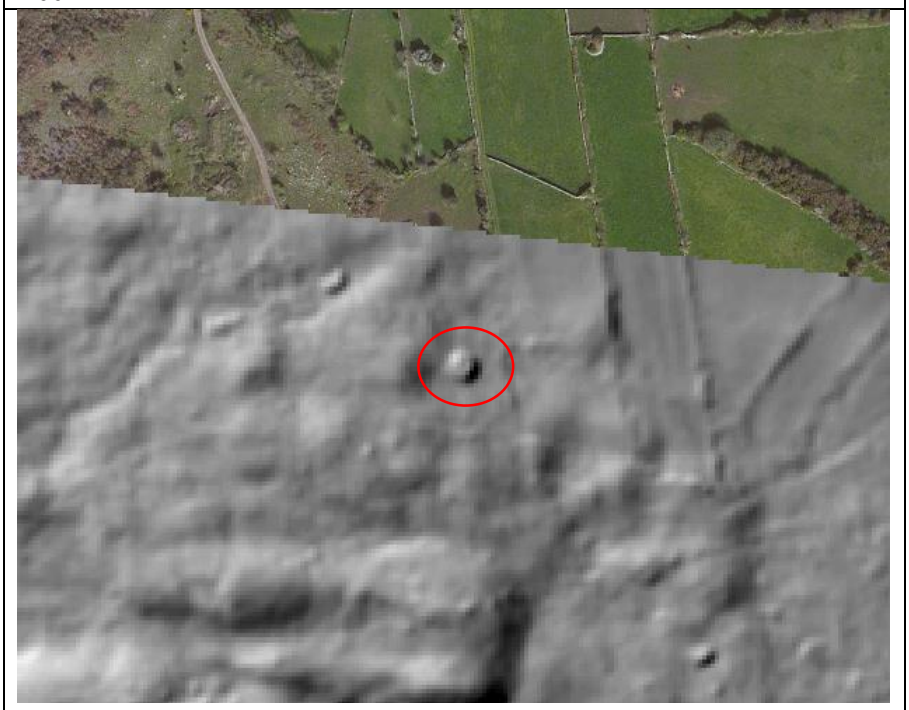
Feature ID	**K61**
Feature type	Enclosed Depression
Coordinates	530360, 728644
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 1m diameter Enclosed depression is in line of depressions running EW
Site photo	

Feature ID	**K62**
Feature type	Enclosed Depression
Coordinates	530369, 728642
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 2m diameter and less than 0.5 m in depth. Enclosed depression is in line of depressions running EW
Site photo	

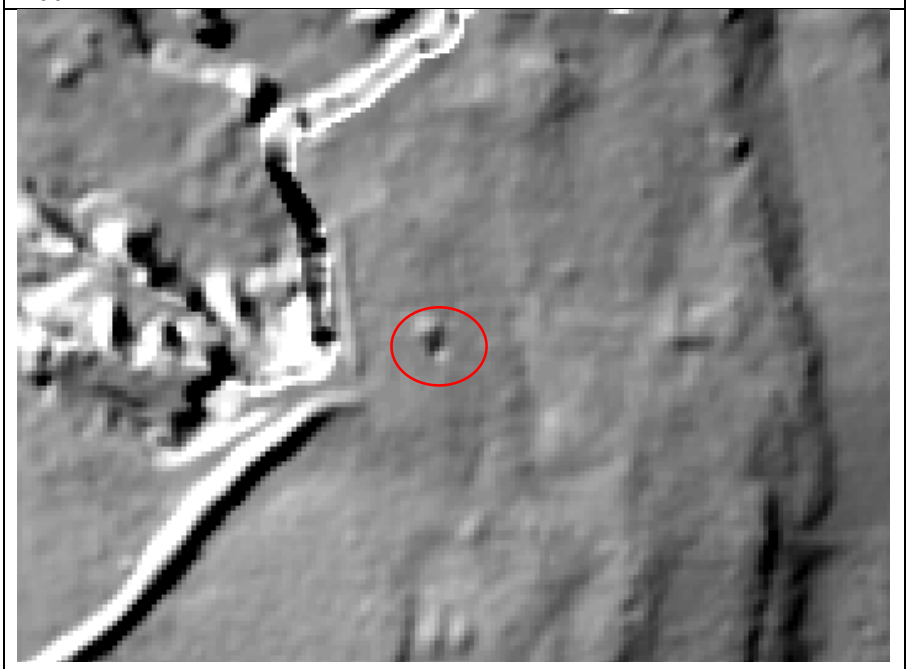
Feature ID	**K64**
Feature type	Enclosed Depression
Coordinates	530386, 728617
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 2m diameter and less than 0.5 m in depth. Enclosed depression is in line of depressions running EW
Site photo	

Feature ID	**K65**
Feature type	Enclosed Depression
Coordinates	530452, 727738
Source	Lidar: 
	Bing Maps: 
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	2 depressions 3 m diameter and 1 m diameter less than 0.5 m depth. Larger depression is filled with a fire pit

Site photo	 

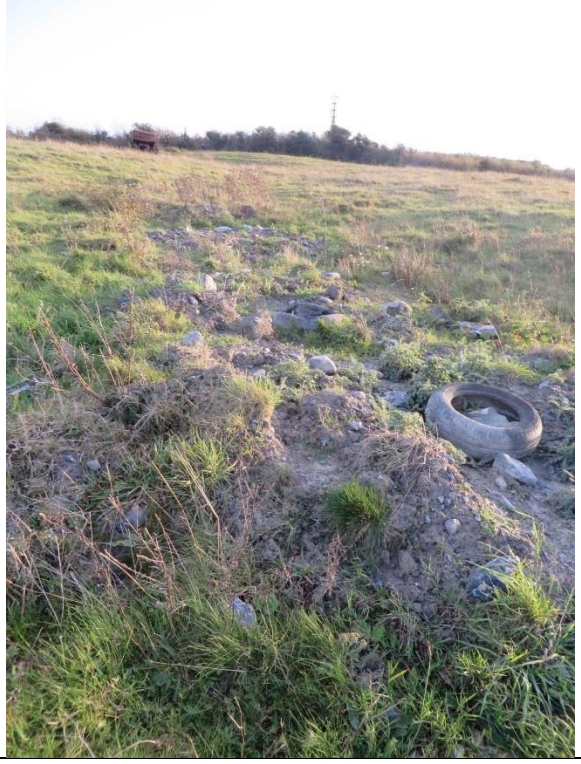
Feature ID	**K66**
Feature type	Enclosed Depression
Coordinates	530474, 729558
Source	Lidar:  Bing Maps: 
Field survey date	17/10/2014
Field survey status	Confirmation/identification problem
Water present	Unknown
Additional Information	Circle of brambles. Looks like a dip in the middle but covered in brambles preventing access.

Site photo	

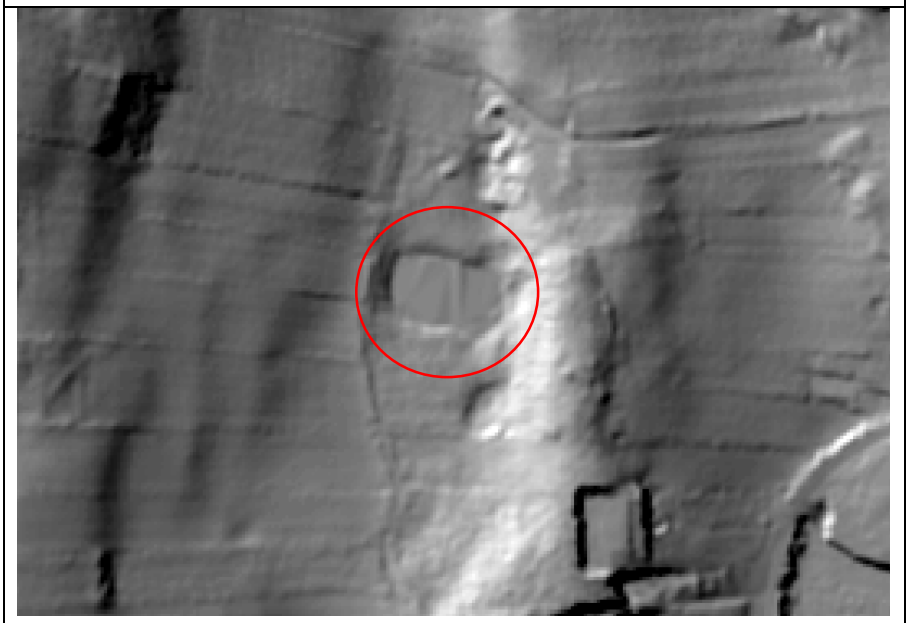
Feature ID	**K67**
Feature type	Enclosed Depression
Coordinates	530629, 728329
Source	Lidar: 
	Bing Maps: 
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Numerous boulders in depression Approx. 20 x 10m diameter and depth of 2m

Site photo	

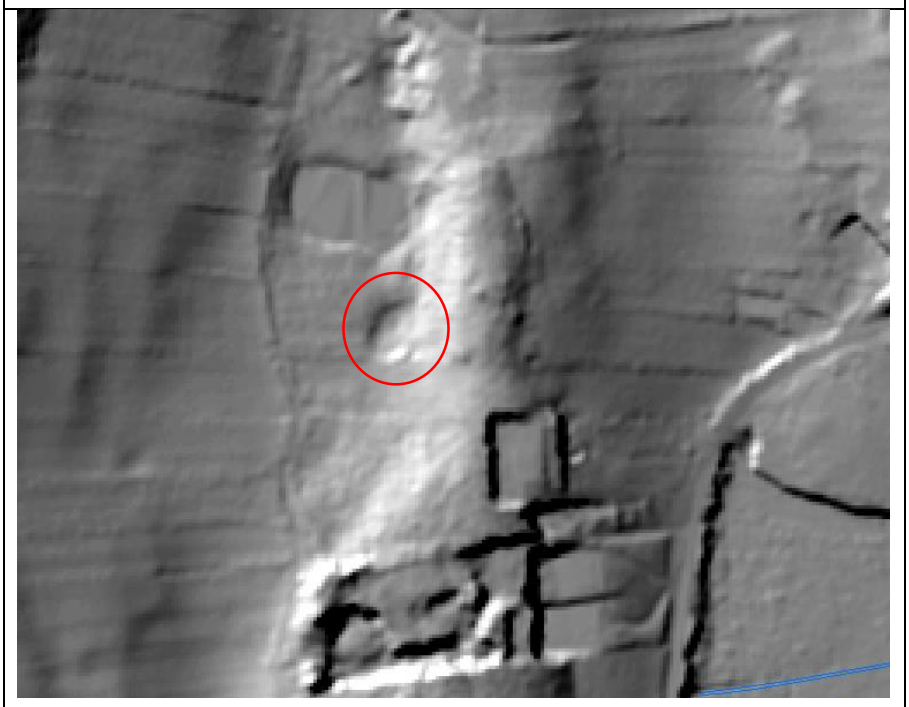
Feature ID	**K69**
Feature type	Enclosed depression
Coordinates	530669, 729123
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Two adjacent enclosed depressions; 10 x 30m diameter and 5m diameter
Site photo	 

Feature ID	**K70**
Feature type	Enclosed depression
Coordinates	530671, 728317
Source	Field Survey
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	15 x 3 m diameter enclosed depression Possibly filled in depression
Site photo	 

Feature ID	**K71**
Feature type	Enclosed depression
Coordinates	530694, 728662
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	2m by 4m along slope line Small depression near top of slope contains exposed rock
Site photo	

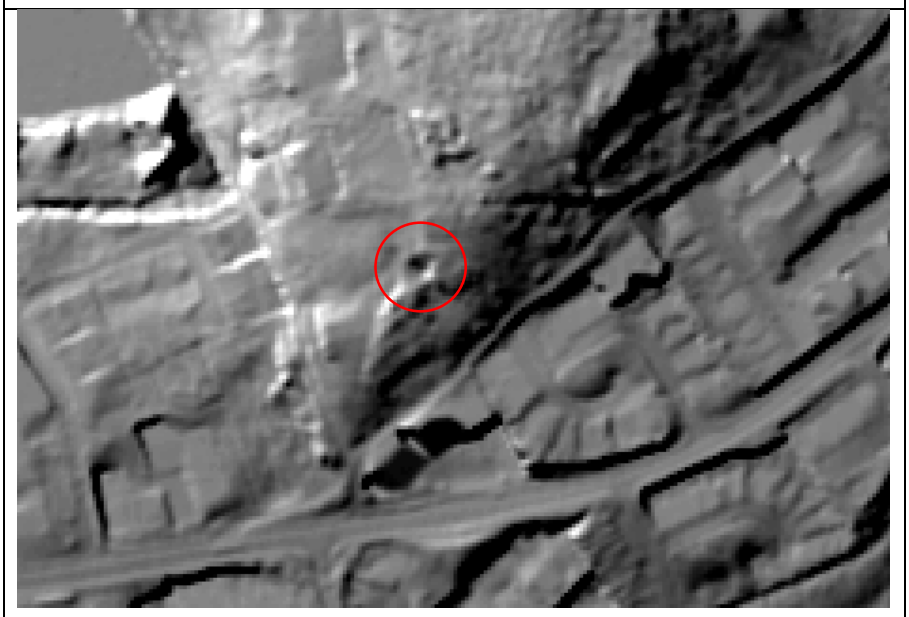
Feature ID	**K72**
Feature type	Turlough
Coordinates	530946, 729099
Source	Scott Cawley Ecologists Surveys
	Lidar:
	
	Bing Maps:
	
Field survey date	12/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 513 uS/cm Temperature: 9.2 °C pH: 7.37
Water elevation	14.13 mAOD

Additional Information	Turlough visited while in flood Estimated highest extend of water is 15.37 mAOD measured in adjacent field
Site photo	 

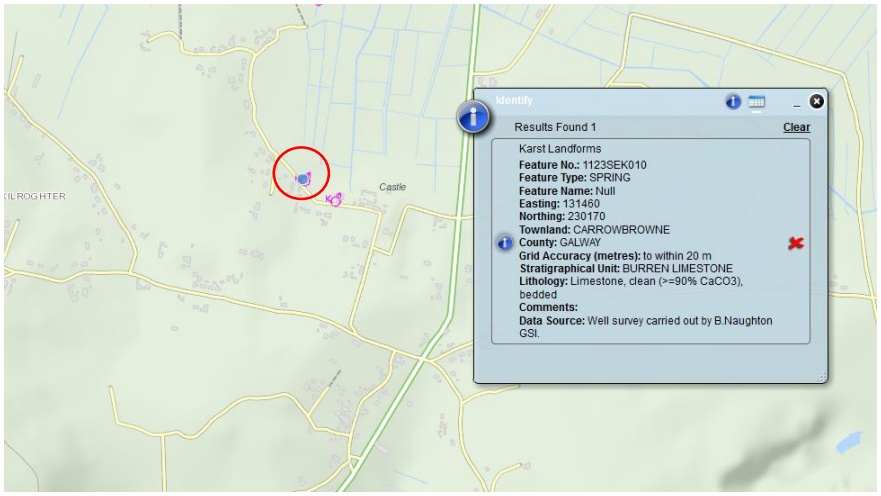
Feature ID	**K73**
Feature type	Enclosed depression
Coordinates	530964, 729035
Source	Lidar:  Bing Maps: 
Field survey date	12/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	15.46 mAOD, Estimated elevation. Elevation not recorded within feature due to tree coverage. Elevation reading taken 20 m south and approx.. 1m higher elevation (actual recorded elevation was 16.456)
Additional Information	Area mossy and covered with trees
Site photo	

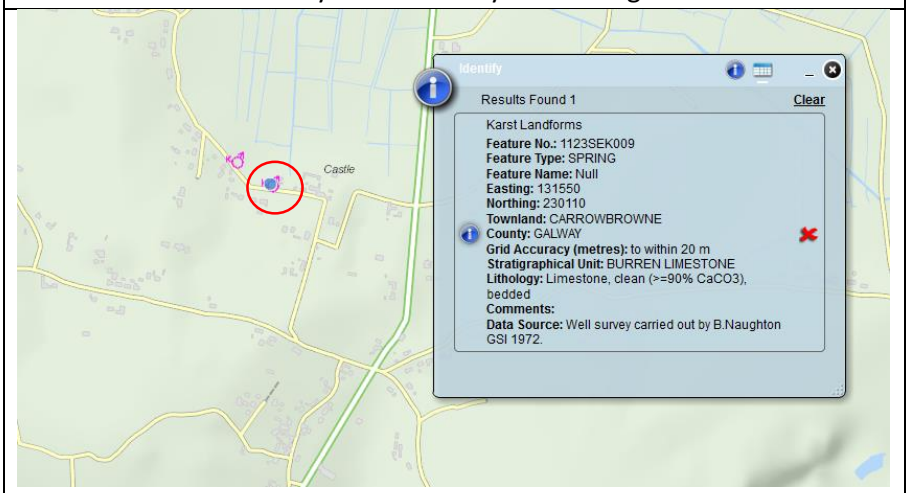
Feature ID	**K75**
Feature type	Enclosed Depression
Coordinates	531193, 727242
Source	Lidar:  Bing Maps: 
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	Unknown
Additional Information	Cannot access depression. Access hindered due to dense vegetation.

Site photo	

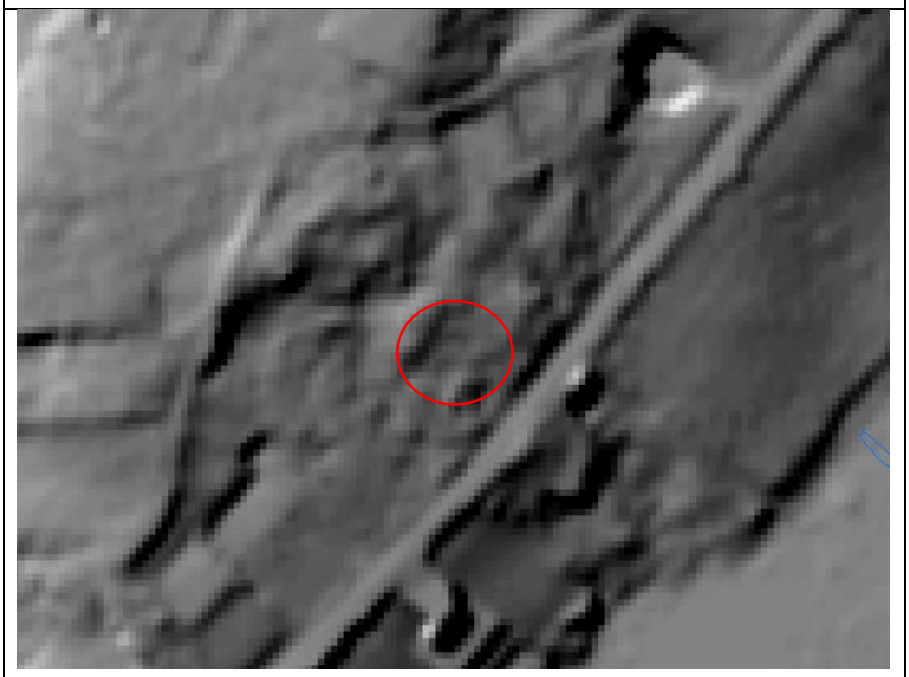
Feature ID	**K76**
Feature type	Enclosed Depression
Coordinates	531254, 727960
Source	Lidar: 
	Bing Maps: 
Field survey date	20/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	10m diameter 4m depth. Steep sides with exposed rock May also be as result of rock excavation

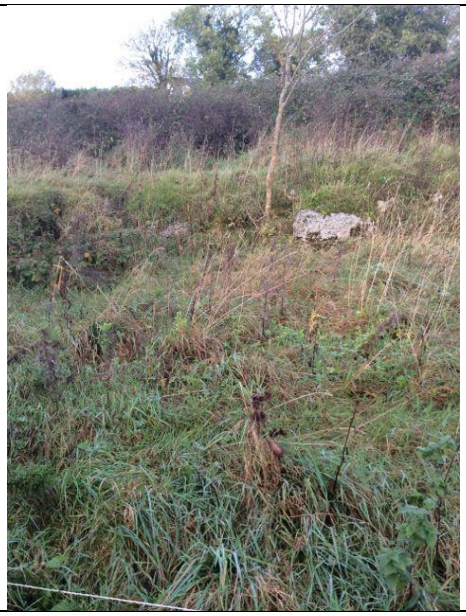
Site photo	 

Feature ID	**K77**
Feature type	Spring
Coordinates	531312, 730126
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.
	
Field survey date	12/11/2014
Field survey status	Cannot locate
Water present	n/a
Additional Information	
Site photo	n/a

Feature ID	**K81**
Feature type	Spring
Coordinates	531384, 730074
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.
	
Field survey date	12/11/2014
Field survey status	Cannot locate
Water present	n/a
Additional Information	
Site photo	n/a

Feature ID	**K82**
Feature type	Enclosed depression
Coordinates	531437, 729244
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	10 m diameter. Possible enclosed depression slightly questionable
Site photo	

Feature ID	**K83**
Feature type	Enclosed depression
Coordinates	531449, 729223
Source	Lidar:  Bing Maps: 
Field survey date	12/11/2014
Field survey status	Confirmation/identification problem
Water present	Unknown
Additional Information	Could not access very overgrown
Site photo	

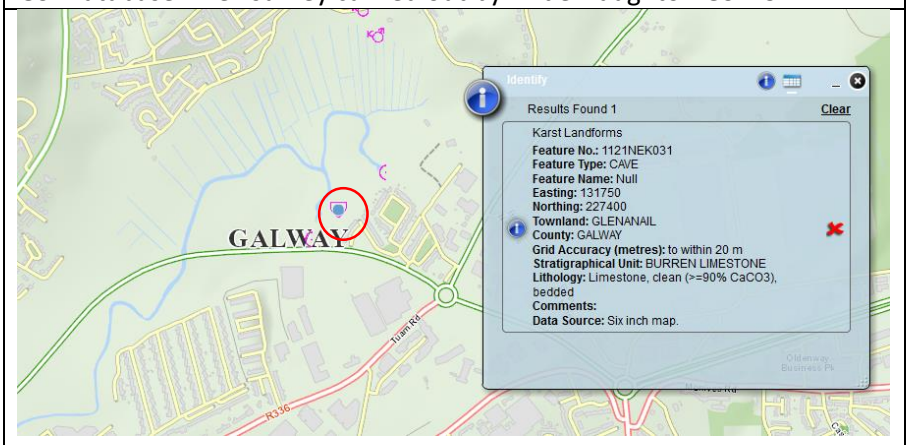
Feature ID	**K85**
Feature type	Enclosed depression
Coordinates	531456, 729194
Source	Field Survey
Field survey date	16/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	10 m diameter semicircle intercepted by wall/road (N84). Possible enclosed depression slightly questionable as it could be as a result of excavation for N84 road construction
Site photo	

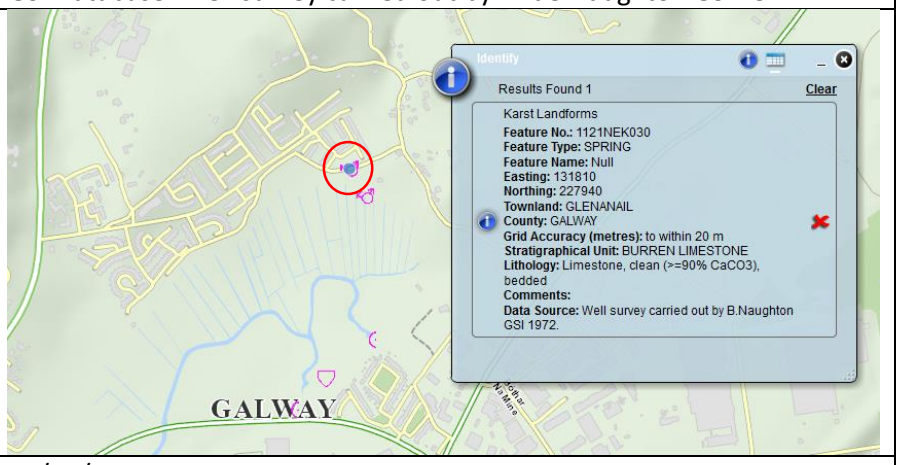
Feature ID	**K86**	
Feature type	Estavelle	
Coordinates	531476, 729108	
Source	EIS N6 Galway City Outer Bypass Vol 2 2006	
Field survey date	16/10/2014	11/11/2014
Field survey status	Confirmed	Confirmed
Water present	No	Yes Electrical conductivity: 590 uS/cm Temperature: 9 °C pH: 7.52 No flow to permit flow measurement
Water elevation	n/a	8.927
Additional Information	Drain runs from estavelle location near break in slope towards Ballindooley lough	
Site photo	Estavelle location  Shallow ditch running between the estavelle and Ballindooley Lough: 	

Feature ID	**K87**	
Feature type	Estavelle (Pollavurleen West)	
Coordinates	531666, 727406	
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.	
	Lidar:	
		
	Bing Maps:	
		
Field survey date	22/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	Yes	Yes

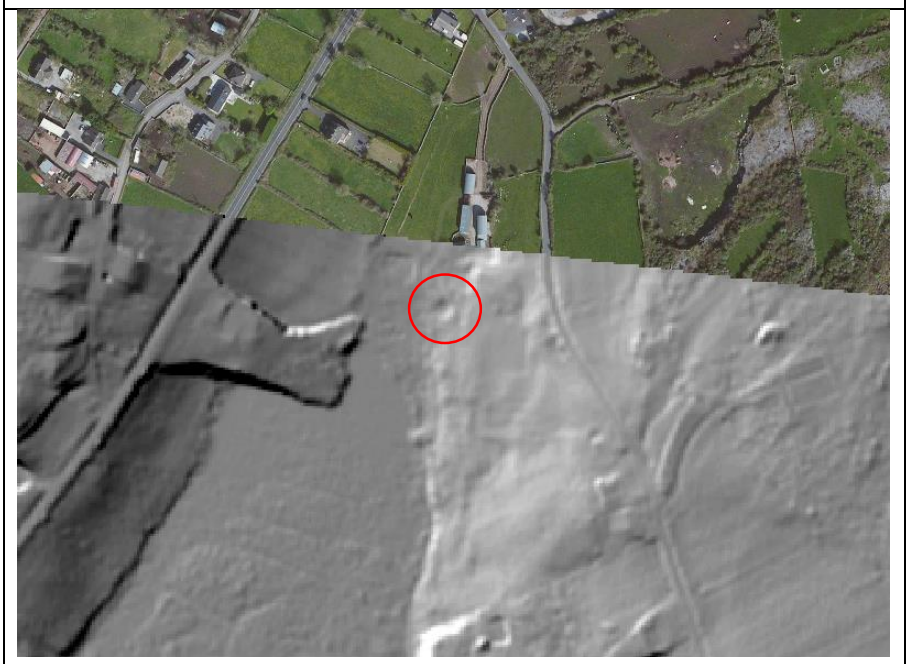
	Electrical conductivity: 320 uS/cm Temperature: 11.4 °C pH: 7.76 Flow direction into swallow hole No flow measurement taken	Electrical conductivity: 781 uS/cm Temperature: 10.3 °C pH: 7.5 Flow direction into swallow hole Flow: 400 l/s
Water level elevation	n/a	1.79 mAOD
Additional Information	Terryland River discharges into or can be fed by this spring / swallow hole. The Feature contains three discrete discharge points to ground where flow was visible discharging to ground during both field survey visits.	
Site photo	 	

Feature ID	**K88**
Feature type	Enclosed depression
Coordinates	531671, 727351
Source	Field Survey
Field survey date	22/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approximate dimensions: 30m x 5m Elongated depression in an ESE WNW direction. The ESE wall is approx. 4m high. The depression contains numerous trees.
Site photo	

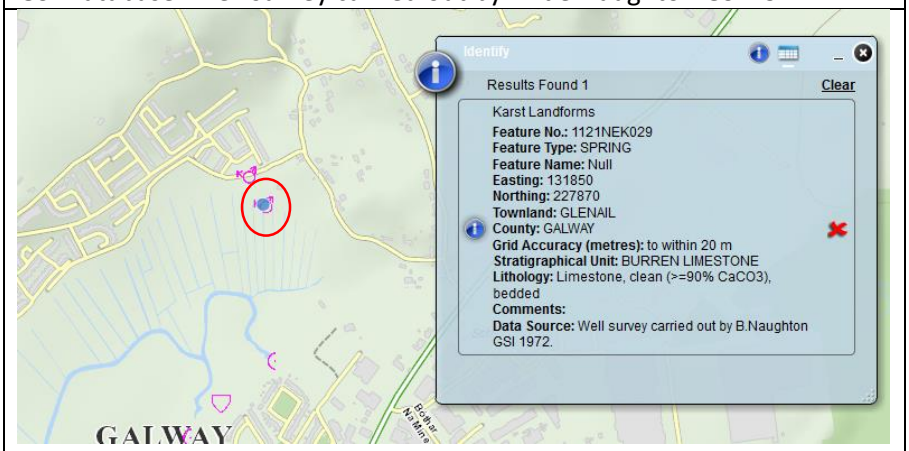
Feature ID	**K89**
Feature type	Cave (Cooper's Cave)
Coordinates	531725, 727427
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	22/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 3m wide x 1 m high opening to cave
Site photo	

Feature ID	**K90**
Feature type	Spring
Coordinates	531776, 727969
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.
	
Field survey date	21/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	
Site photo	Not available

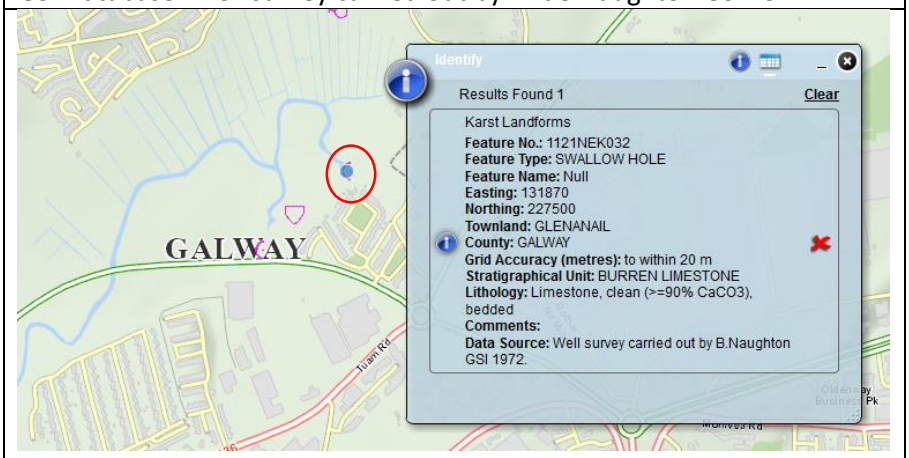
Feature ID	**K92**
Feature type	Well/ spring
Coordinates	531781, 729453
Source	Field Survey
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 370 uS/cm Temperature: 11.1 °C pH: 7.61
Additional Information	Approximate dimension: 2m diameter Old well surrounded by stone wall
Site photo	

Feature ID	**K94**
Feature type	Enclosed depression
Coordinates	531814, 729415
Source	Lidar: 
	Bing Maps: 
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 15m diameter Access inhibited due to cattle in field

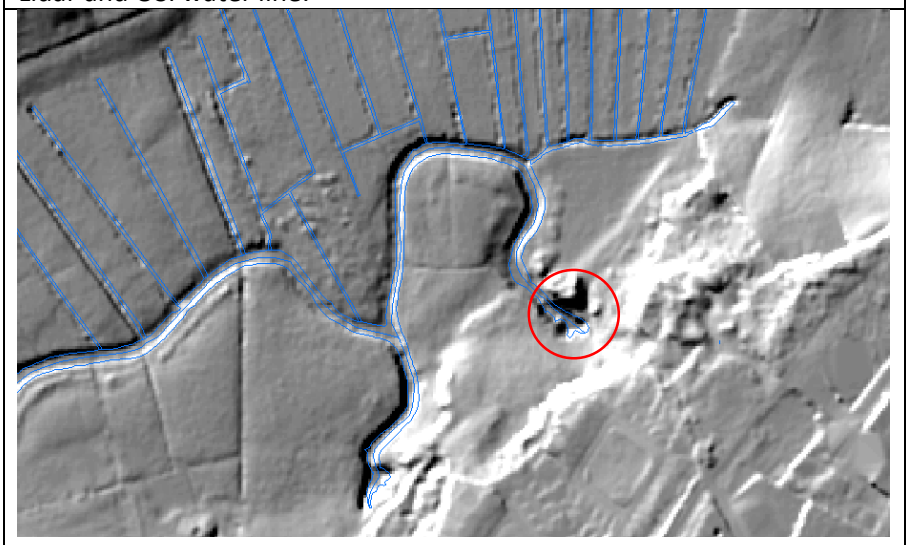
Site photo	 

Feature ID	**K95**	
Feature type	Spring	
Coordinates	531828, 727964	
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972. 	
Field survey date	12/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	No	Yes Electrical conductivity: 728 uS/cm Temperature: 10.9 °C pH: 7.06
Water level elevation	n/a	3.73 mAOD
Additional Information	Approx. 2 m diameter Notice beside spring states that the feature is known as Castlegar well. It also notes that the stream that feeds the well was capped in 2004.	
Site photo		

Feature ID	**K96**
Feature type	Estavelle (Pollavurleen East)
Coordinates	531837, 727535
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.

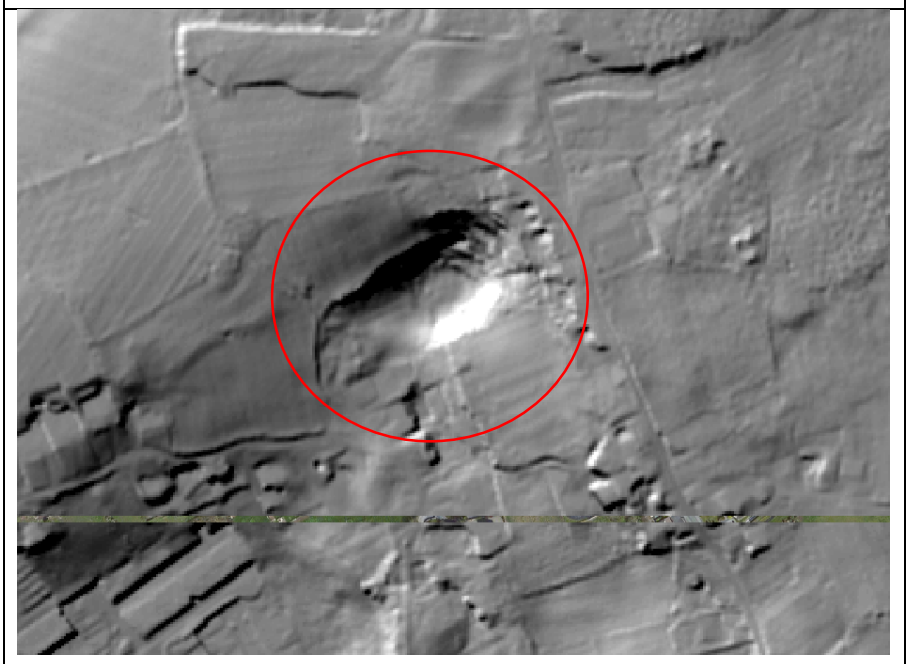


Lidar and OSI water line:

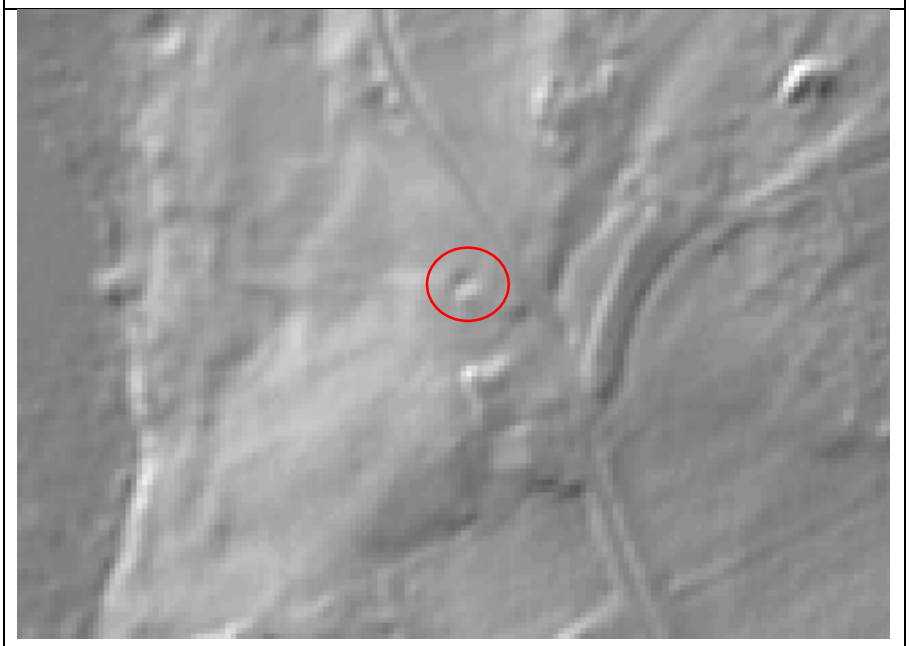


Bing Maps:

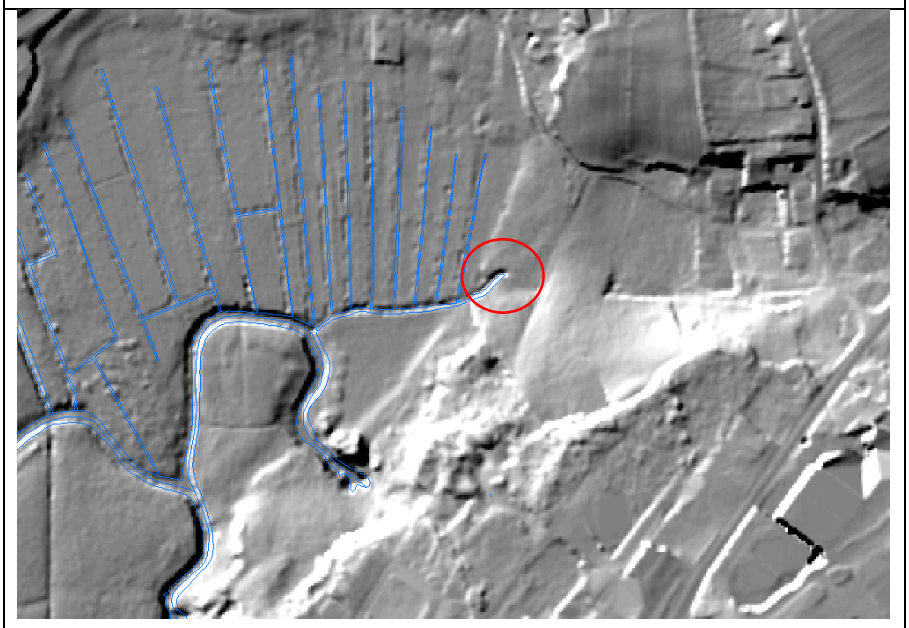
Field survey date	22/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	Yes Electrical conductivity: 370 uS/cm Temperature: 11.3 °C pH: 7.76 Flow direction into swallow hole No flow measurement taken	Yes Electrical conductivity: 576 uS/cm Temperature: 10.6 °C pH: 7.52 Flow direction into swallow hole Flow: 765 l/s
Water level elevation	n/a	1.77 mAOD
Additional Information	Terryland River discharges into or can be fed by this spring / swallow hole.	
Site photo	 	

Feature ID	**K97**	
Feature type	Enclosed depression	
Coordinates	531945, 728372	
Source	Lidar: 	
	Bing Maps: 	
Field survey date	21/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	No	Yes Electrical conductivity: 219 uS/cm Temperature: 8.1 °C pH: 6.4
Elevation measurements	n/a	Ground level in centre: 12.11 mAOD Standing water: 12.17 mAOD (531947, 728372) & 12.22 mAOD (531934, 728379)
Additional Information	Approx 40 m diameter flat bottom depression. Soft muddy base. Sides and base composed of subsoil. No seepages.	

Site photo	 

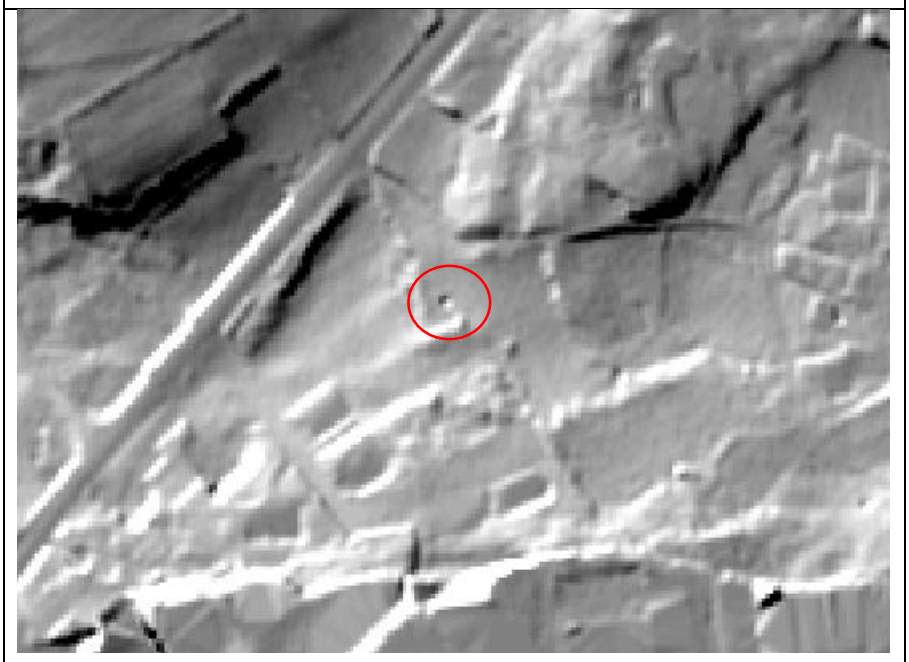
Feature ID	**K98**
Feature type	Enclosed Depression
Coordinates	531924, 729321
Source	Lidar:  Bing Maps: 
Field survey date	21/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 3m diameter depression

Site photos	 

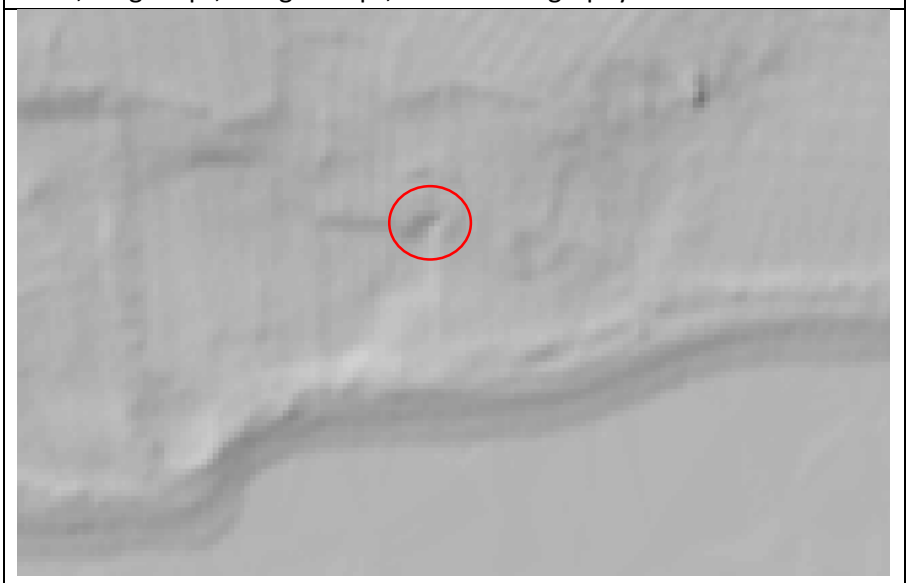
Feature ID	**K99**	
Feature type	Spring	
Coordinates	531963, 727732	
Source	Lidar: 	
	Bing Maps: 	
Field survey date	21/10/2014	12/11/2014
Field survey status	Confirmed	Confirmed
Water present	No	Yes Electrical conductivity: 995 uS/cm Temperature: 12 °C pH: 7.06 Flow not great enough for flow measurement
Additional Information	Drain leading from spring towards Terryland River	

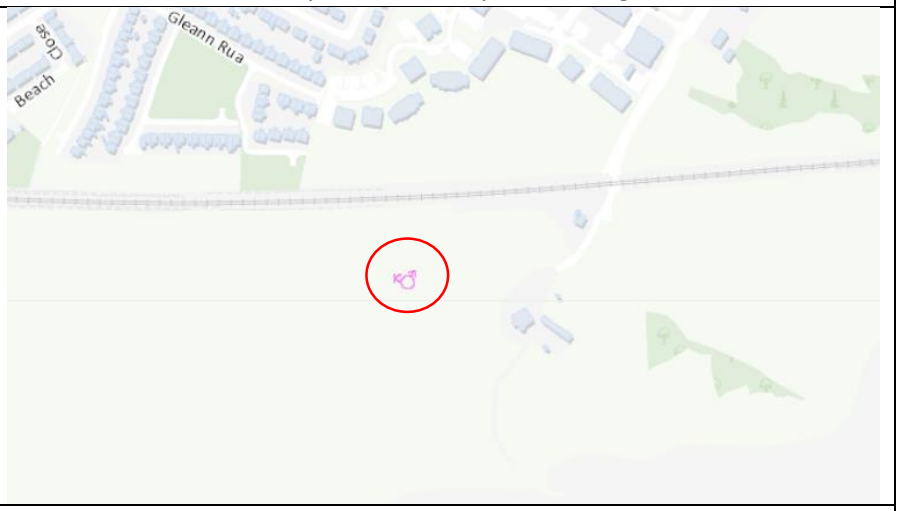
Site photos	

Feature ID	**K100**
Feature type	Enclosed depression
Coordinates	532049, 729396
Source	Lidar:  Bing Maps: 
Field survey date	21/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Feature not found. Access hindered due to dense hazel scrub
Site photos	Not available

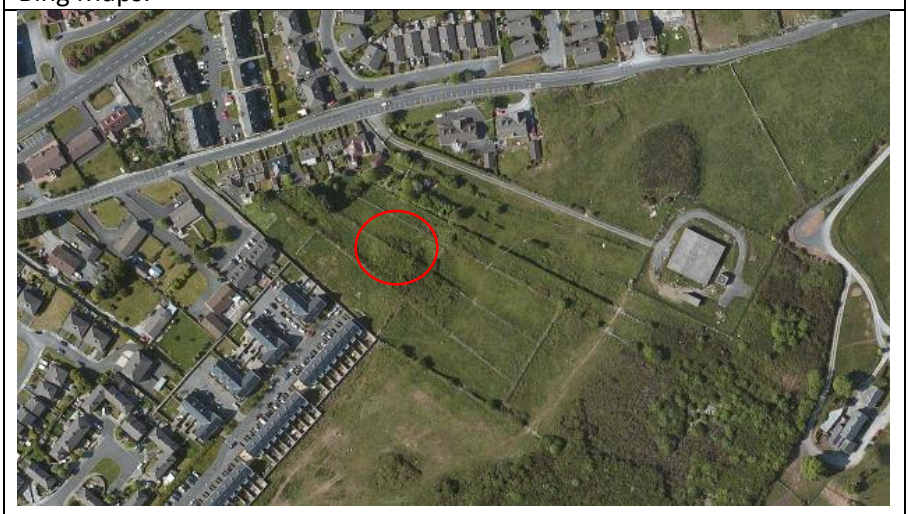
Feature ID	**K104**
Feature type	Enclosed depression
Coordinates	532465, 727750
Source	Lidar: 
	Bing Maps: 
Field survey date	12/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	24.01 mAOD at base of depression
Additional Information	Approx. dimensions: 3m diameter, 2m depth. Very steep sides. Likely to be an old dug well.

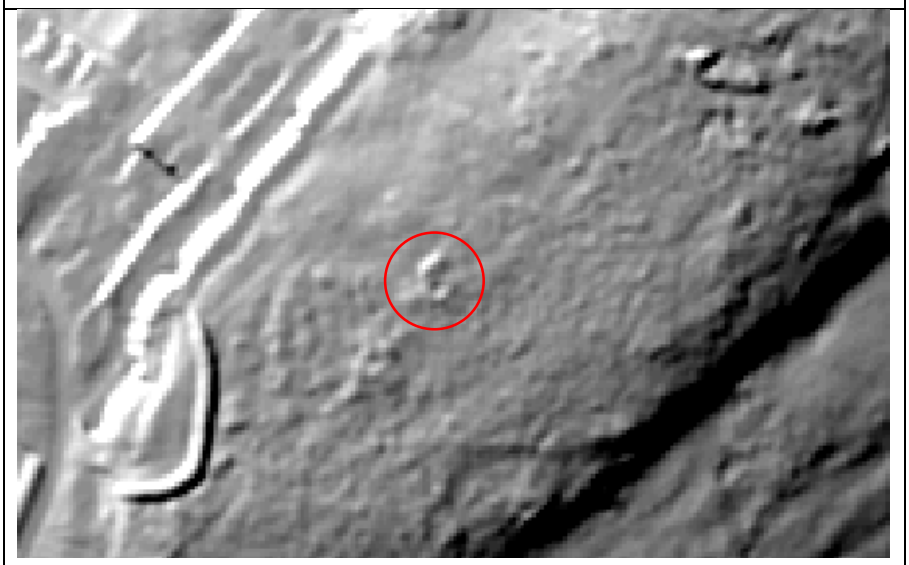
Site photos	

Feature ID	**K106**
Feature type	Spring
Coordinates	532878, 724776
Source	Lidar, Bing Maps, Google Maps, Aerial Photography
	
	Bing Maps:
	
Field survey date	13/11/2014
Field survey status	Confirmation/identification problem
Site photos	Not available

Feature ID	**K107**
Feature type	Spring
Coordinates	532985, 724939
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	13/11/2014
Field survey status	Confirmation/identification problem
Site photos	Not available

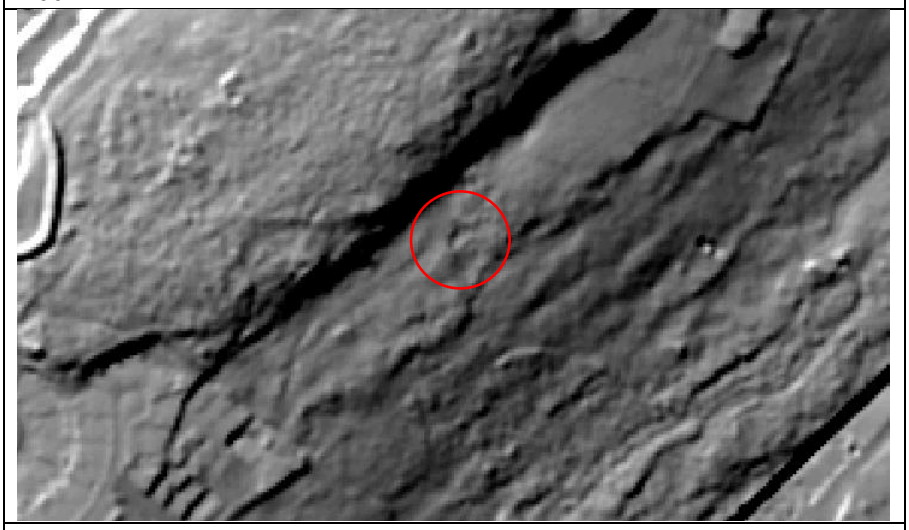
Feature ID	**K112**
Feature type	Enclosed Depression
Coordinates	533207, 725629
Source	Field Survey
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 2 m diameter and 0.5 m depth Small depression in forest
Site photos	Not available

Feature ID	**K122**
Feature type	Enclosed depression
Coordinates	533536, 726925
Source	Lidar:  Bing Maps: 
Field survey date	14/11/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Access issue due to dense coverage of vegetation
Site photos	Not available

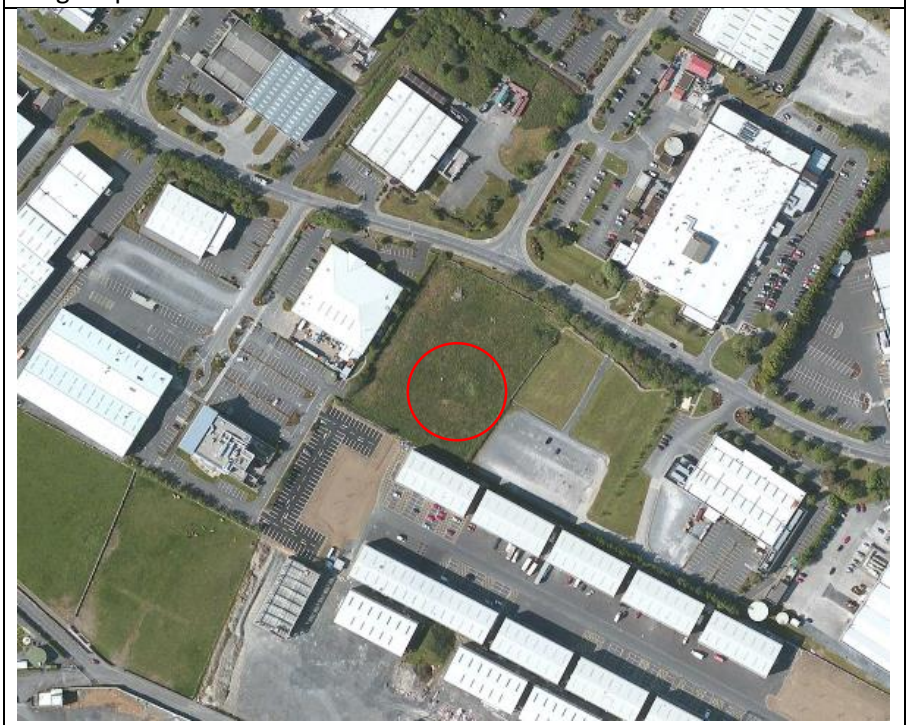
Feature ID	**K124**
Feature type	Enclosed depression
Coordinates	533566, 726759
Source	Lidar:  Bing Maps: 
Field survey date	13/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to dense vegetation cover
Site photos	Not available

Feature ID	**K126**
Feature type	Seepage
Coordinates	533644, 726504
Source	Field Survey
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 474 uS/cm Temperature: 10.4 °C pH: 7.38
Water level elevation	48.56 mAOD
Additional Information	Seepage in middle of field
Site photos	Seepage from down gradient:  Seepage from up gradient: 

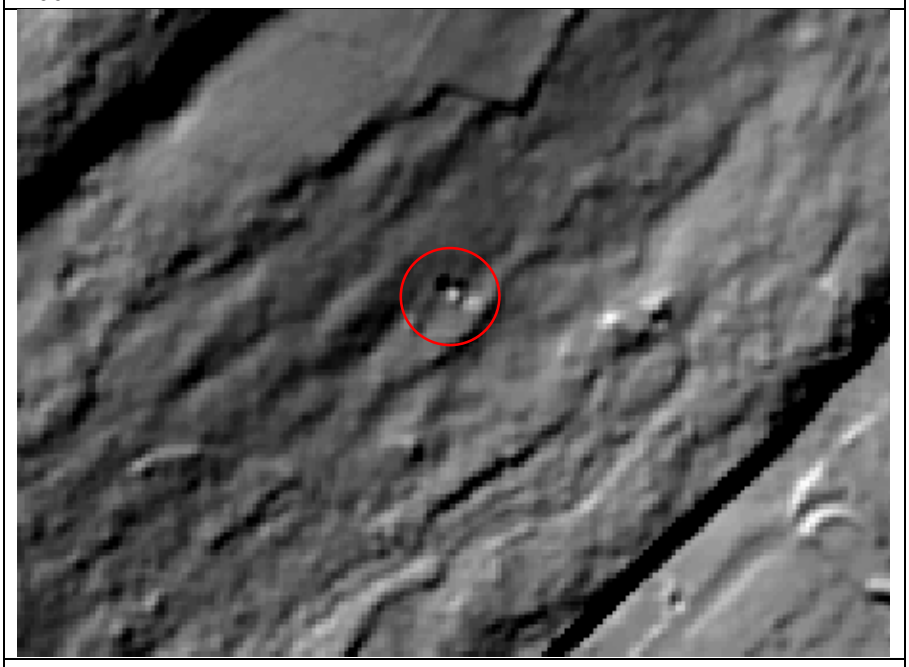
Feature ID	**K129**
Feature type	Seepage
Coordinates	533701, 726678
Source	Field Survey
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 470 uS/cm Temperature: 11.2 °C pH: 7.68
Water level elevation	55.95 mAOD
Additional Information	Small stream from seepage feeding K130 enclosed depression. Very low flow cannot get flow measurement
Site photos	 

Feature ID	**K130**
Feature type	Enclosed depression
Coordinates	533711, 726665
Source	Lidar:  Bing maps: 
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 199 uS/cm Temperature: 7.1 °C pH: 8.13
Elevation levels	Base of enclosed depression: 54.74 mAOD Water level elevation: 55.01 mAOD
Additional Information	Enclosed depression filled with water from stream k314.

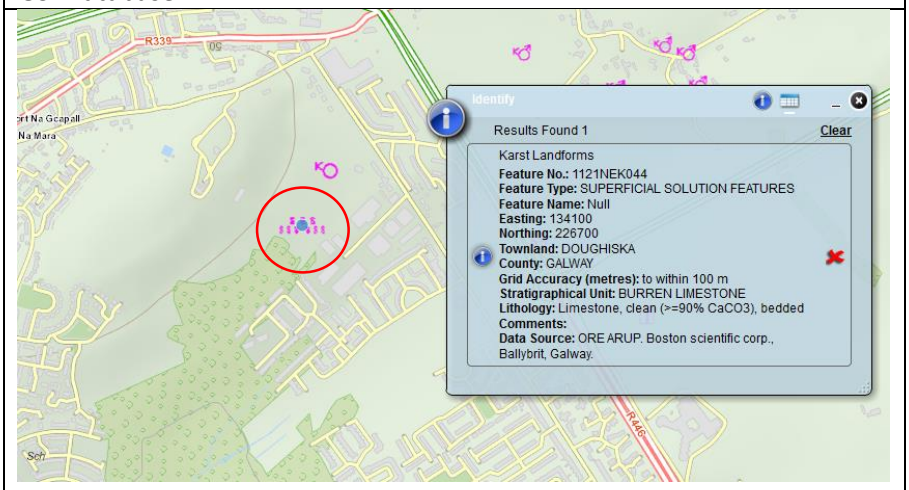
Site photos	

Feature ID	**K131**
Feature type	Enclosed depression
Coordinates	533815, 728265
Source	Lidar:  Bing maps: 
Field survey date	22/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 10m diameter and 1.5m depth

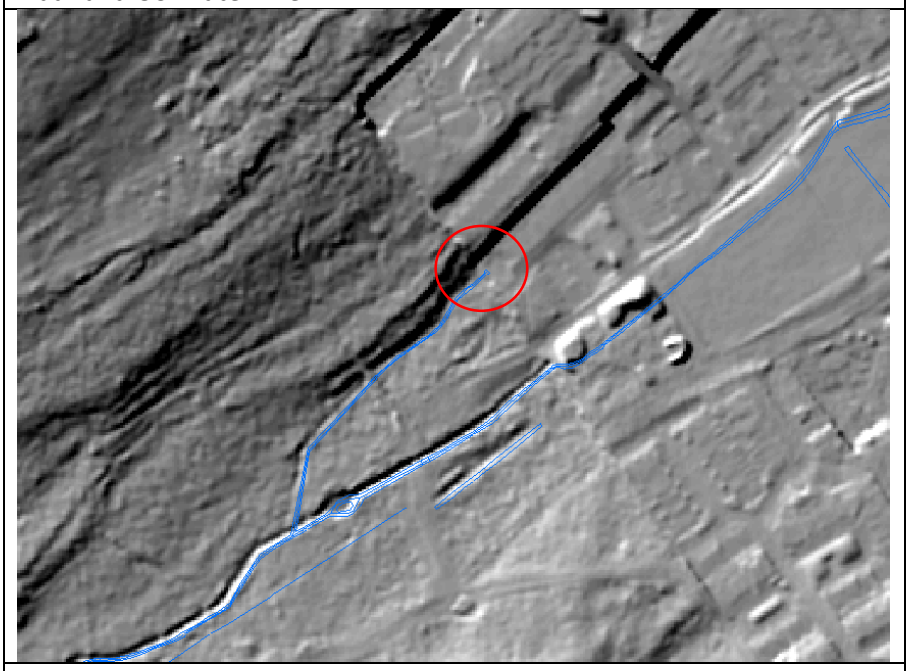
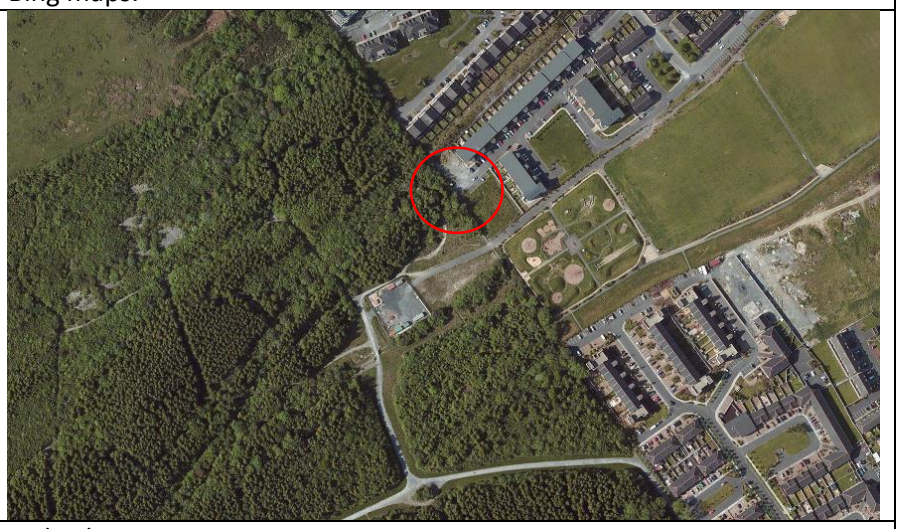
Site photos	

Feature ID	**K132**
Feature type	Enclosed depression
Coordinates	533886, 726657
Source	Lidar:
	
	Bing maps:
	
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 553 uS/cm Temperature: 11.5 °C pH: 7.27
Water elevation	46.03 mAOD
Additional Information	Initially identified in the desk study as a potential enclosed depression. Approx. 3m diameter pond.

Site photos	 

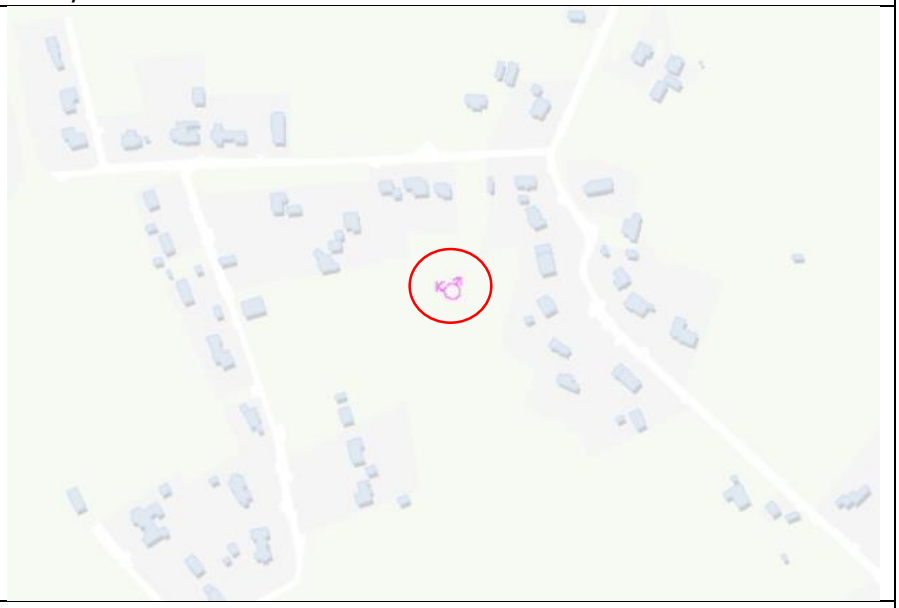
Feature ID	**K134**
Feature type	Superficial solution features
Coordinates	533959, 726686
Source	GSI Database: 
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	44.19 mAOD
Additional Information	Area of superficial solution features noted by GSI database but not very obvious in field. Some rock visible with solution erosion, see photo.
Site photos	

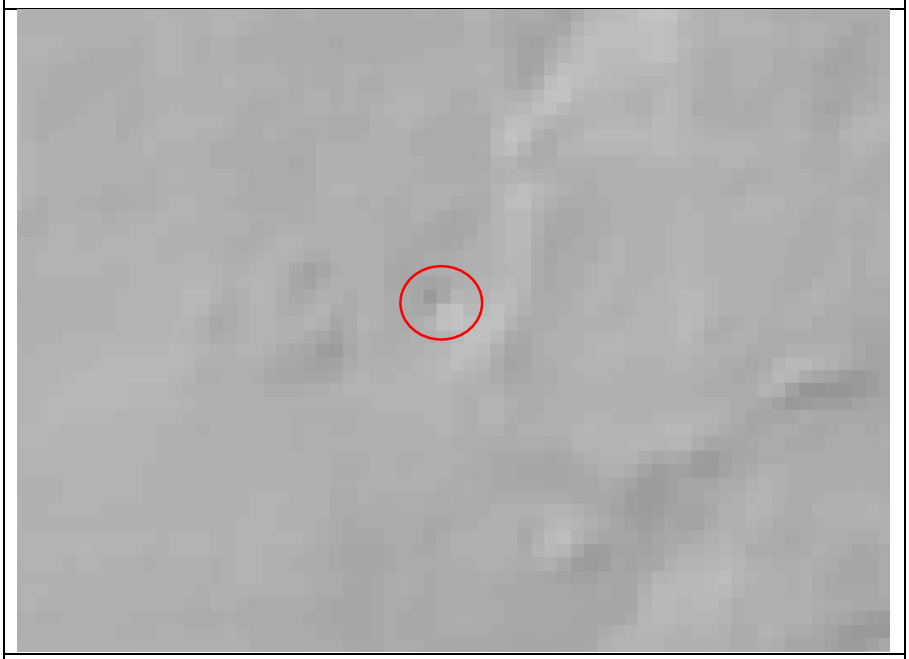
Feature ID	**K135**
Feature type	Enclosed Depression
Coordinates	533959, 726688
Source	Field Survey
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	Yes
Additional Information	Very shallow and wide depression.
Site photos	

Feature ID	**K136**
Feature type	Possible Spring
Coordinates	533980, 726321
Source	Lidar and OSI water line:  Bing maps: 
Field survey date	13/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	No springs at the location.
Site photos	Not available

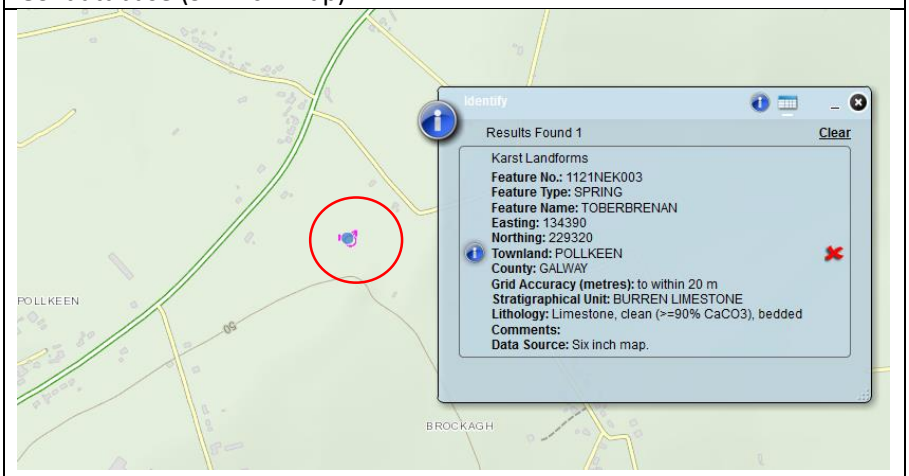
Feature ID	**K140**
Feature type	Flooded land (possible spring)
Coordinates	534085, 725198
Source	Field Survey
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	Yes
Additional Information	Field with areas of flooding. A local informed that there were springs in the field.
Site photos	

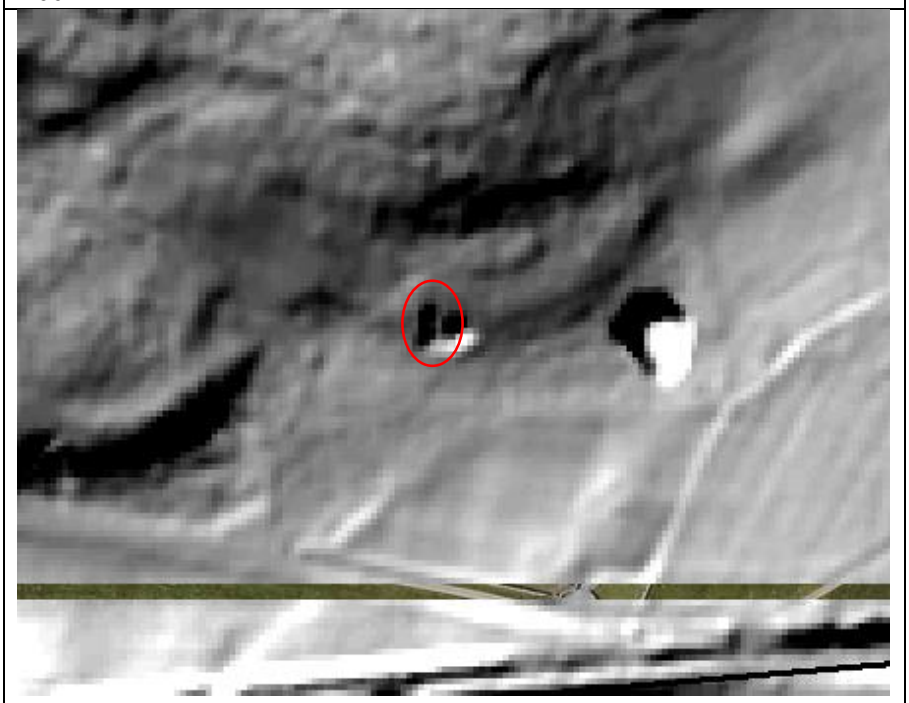
Feature ID	**K142**
Feature type	Enclosed Depression
Coordinates	534166, 724582
Source	Field Survey
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	
Site photos	

Feature ID	**K143**
Feature type	Spring
Coordinates	534185, 724619
Source	GSI Database: GSI Groundwater and karstification in mid- Galway, S.Mayo and N.Clare.
	
Field survey date	13/11/2014
Field survey status	Not found
Site photos	Not available

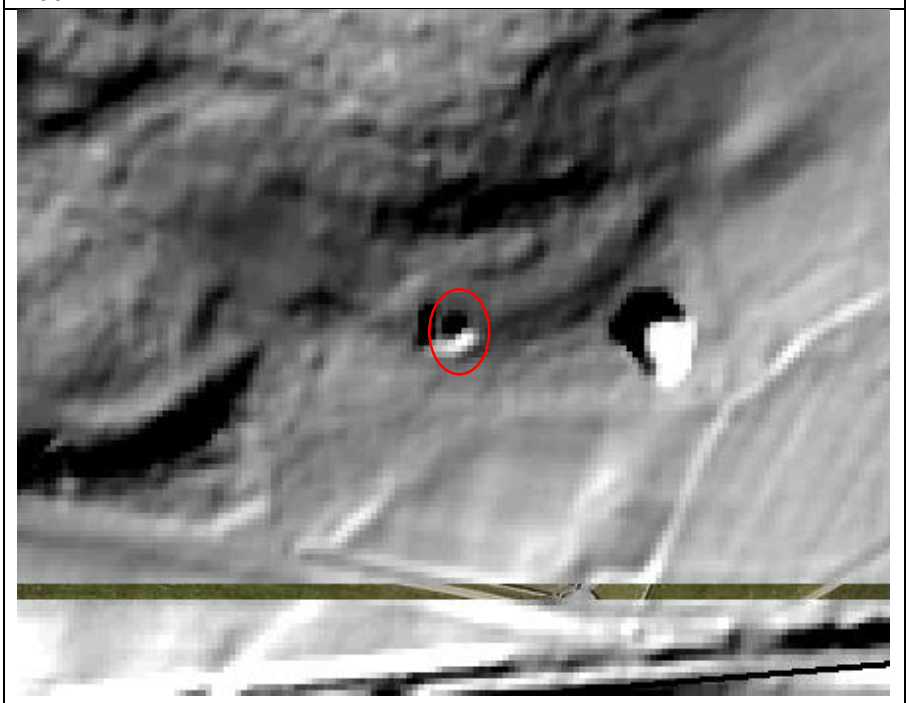
Feature ID	**K145**
Feature type	Enclosed Depression
Coordinates	534209, 724682
Source	Lidar
	
	Bing maps
	
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 2 m in diameter and 1m deep

Site photos	

Feature ID	**K147**
Feature type	Spring
Coordinates	534254, 729385
Source	GSI database (Six inch map): 
Field survey date	22/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	Cannot locate spring. The landowner noted that there has been mention of a spring in the field behind his house but he didn't know exactly where it is. He also mentioned that the area around his house and field to the south has flooded in the past so it is likely that the spring exists but is covered/buried.
Site photos	Not available

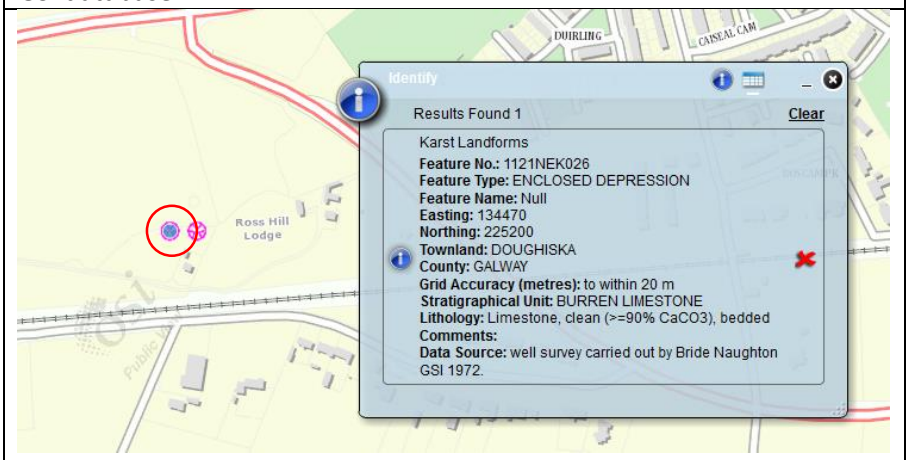
Feature ID	**K151**
Feature type	Enclosed Depression
Coordinates	534393, 725257
Source	Lidar: 
	Bing maps 
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 5m diameter, but not circular. Adjacent to K152.

Site photos	

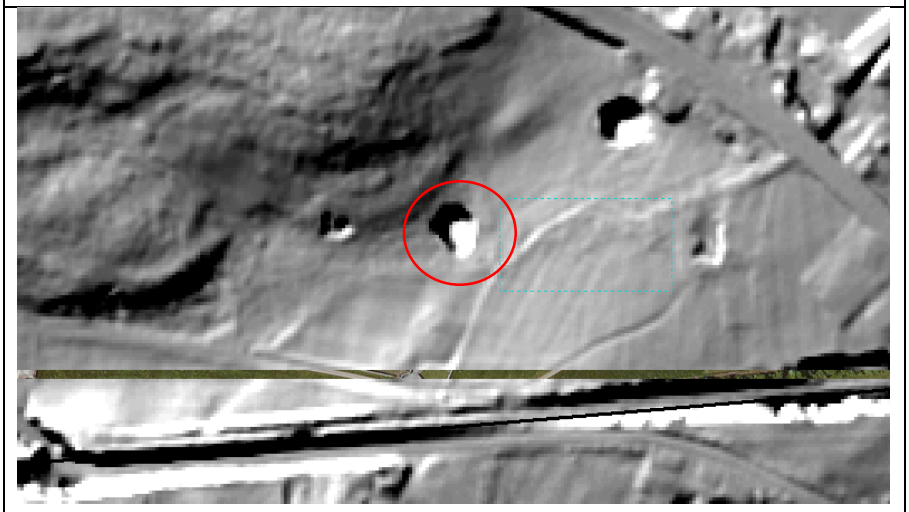
Feature ID	**K152**
Feature type	Enclosed Depression
Coordinates	534397, 725257
Source	Lidar: 
	Bing maps 
Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 7m diameter. Adjacent to K151

Site photos	

Feature ID	**K154**
Feature type	Enclosed Depression
Coordinates	534460, 725261
Source	GSI database



Lidar:

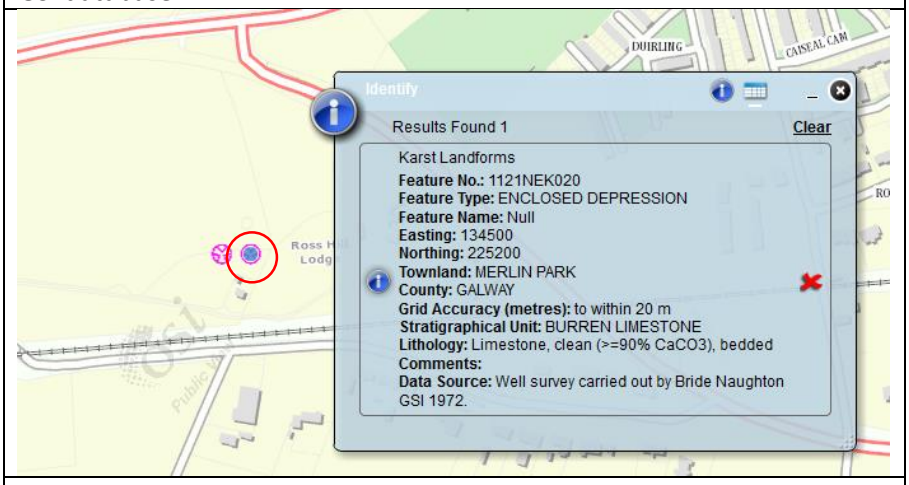


Bing maps

Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 40 m diameter 20 m deep. Potential plug hole evident The large enclosed depression is fenced off preventing access. A plug hole opening is evident at the base of the enclosed depression. This may contain water, however access is not possible due to protective fencing.
Site photos	 Plug hole / opening at base of enclosed depression 

Feature ID	**K158**
Feature type	Spring
Coordinates	534481, 726554
Source	OSI water line and Bing map
	
Field survey date	14/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot locate, possible location beneath school building. Also, it could be a manmade drain, there is no spring noted at this location on the GSI database
Site photos	Not available

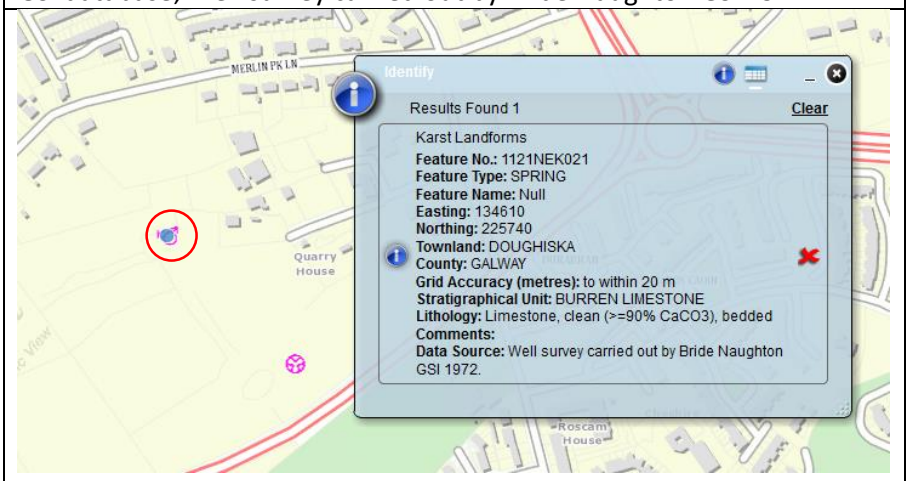
Feature ID	**K159**
Feature type	Enclosed Depression
Coordinates	534562, 725325
Source	GSI database

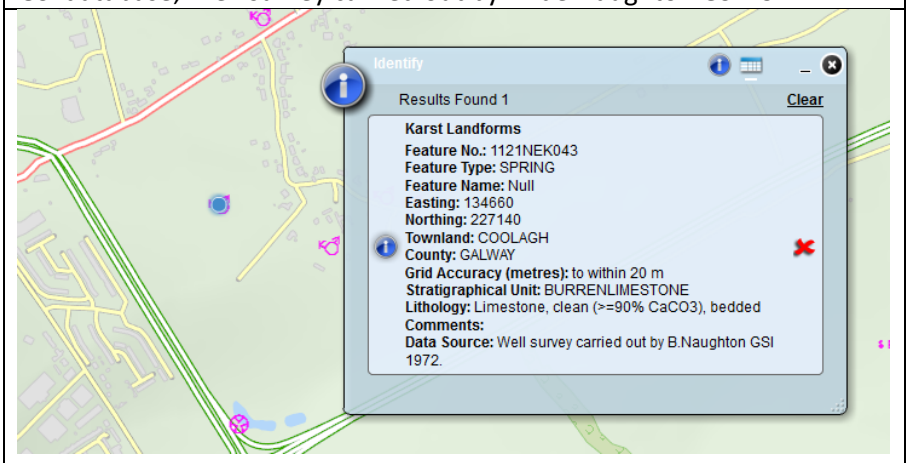


Lidar:

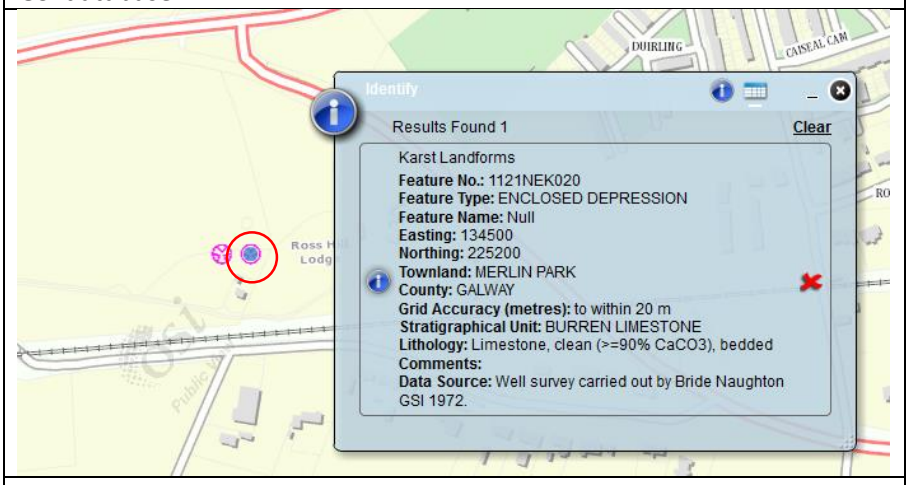
Bing maps

Field survey date	13/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 30 m diameter 20 m deep. Contains waste Possible plug hole identified
Site photos	 

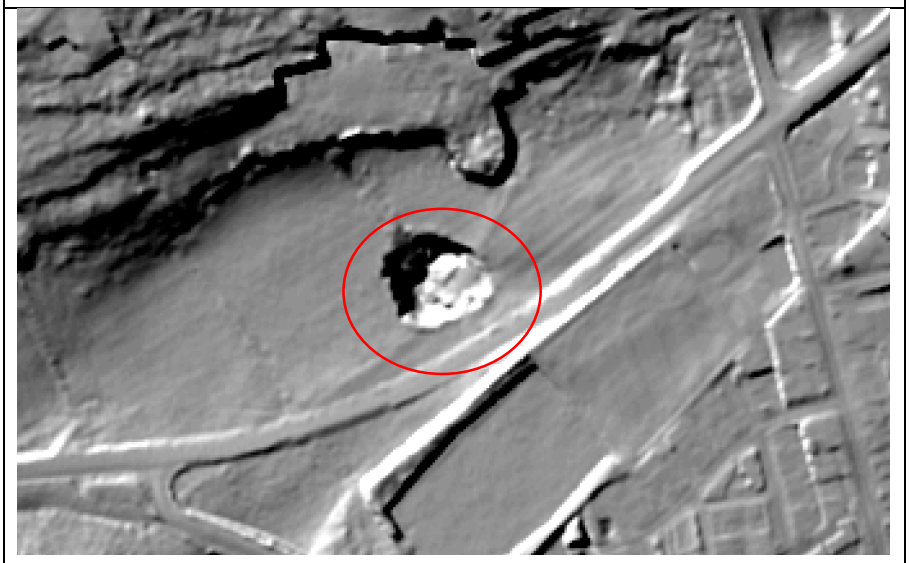
Feature ID	**K160**
Feature type	Spring (Quarry inflow)
Coordinates	534588, 725786
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 490 uS/cm Temperature: 12 °C pH: 8.23
Additional Information	Feature is located in old quarry. Water is discharging from fractures approx. 5m above ground level.
Site photos	

Feature ID	**K161**
Feature type	Spring
Coordinates	534625, 727169
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	23/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	During the field survey two local men were asked about springs in the Briarhill area. One man was not aware of any springs in the area. The other informed that there were a number of springs but that they were not in use any more and were likely covered up since the area was connected to the mains water supply. It is possible these were dug wells
Site photos	Spring not found.

Feature ID	**K163**
Feature type	Enclosed depression
Coordinates	534677, 725607
Source	GSI database

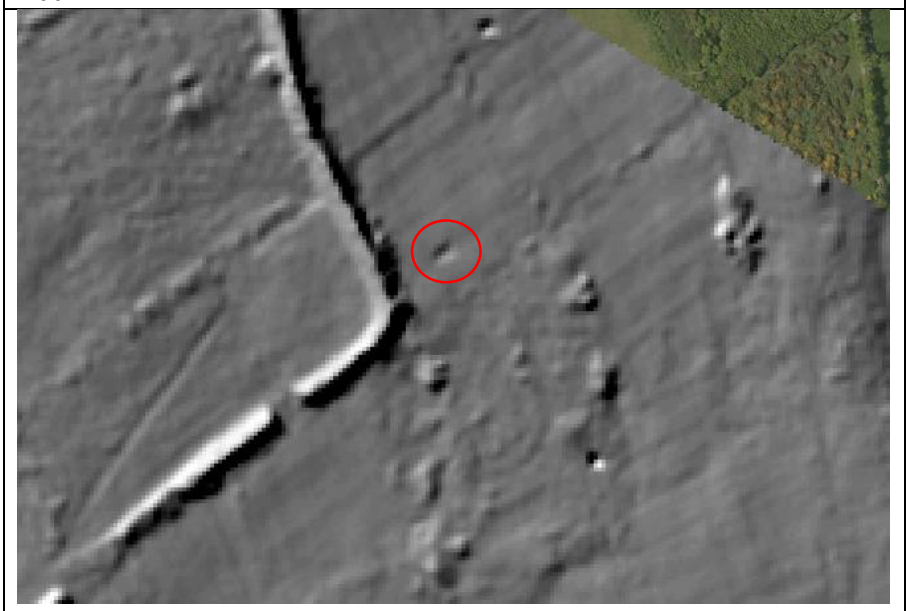


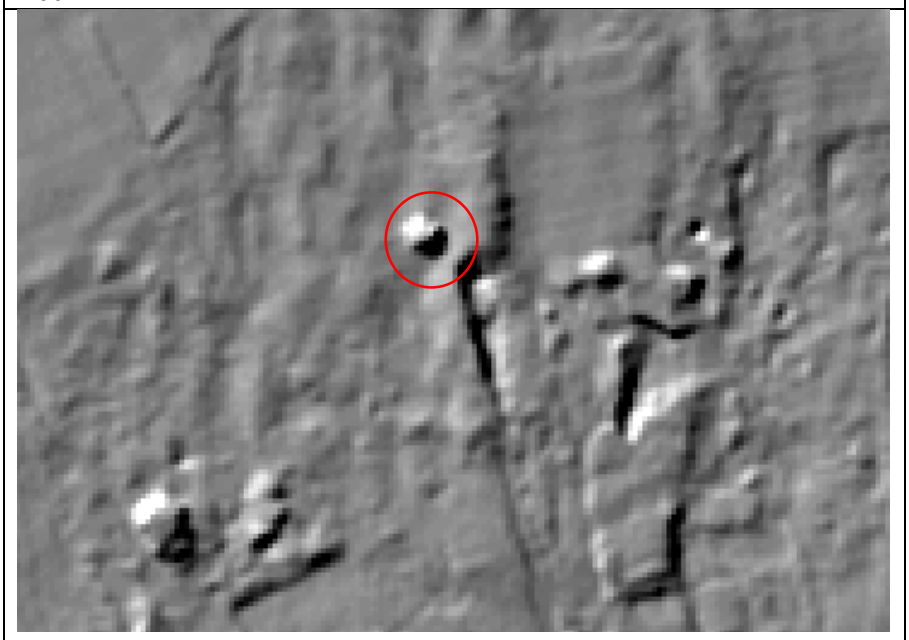
Lidar:

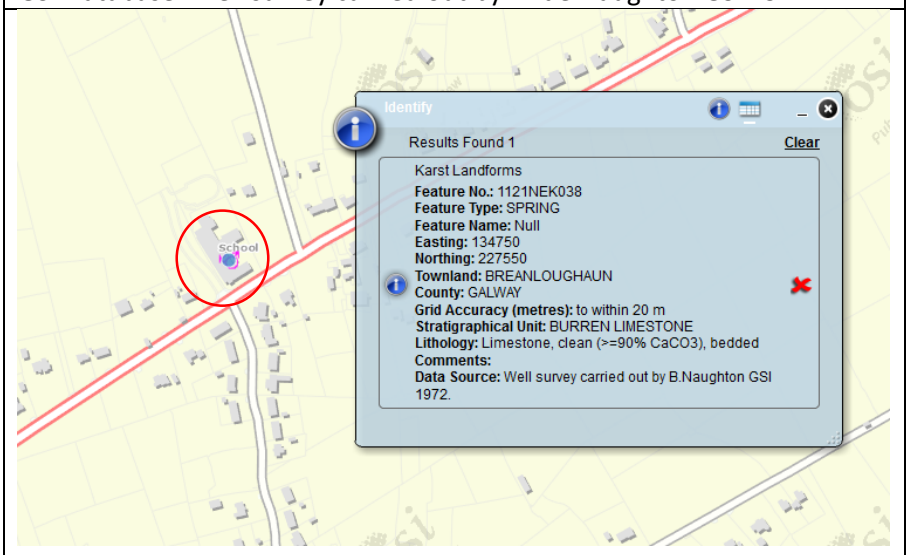


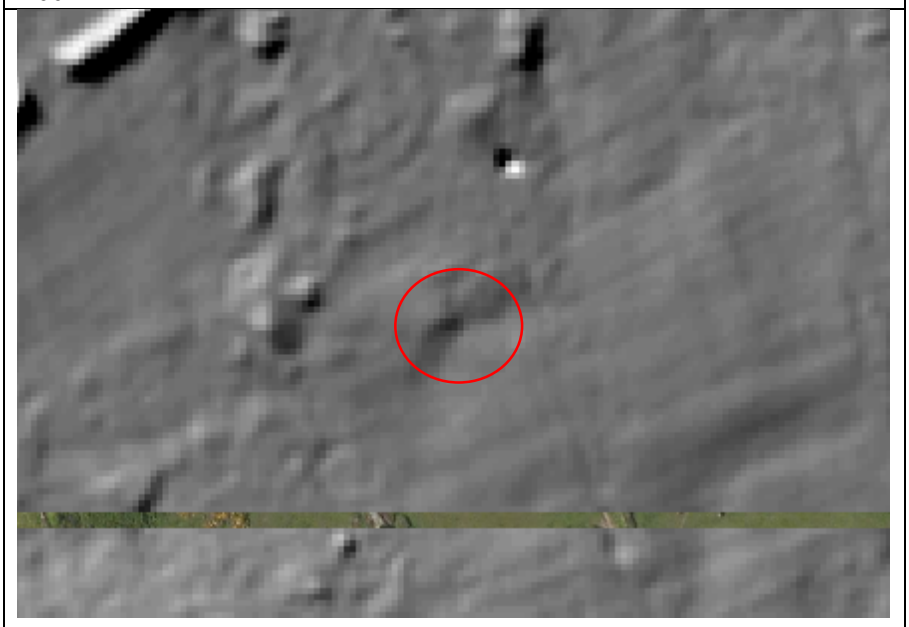
Bing maps

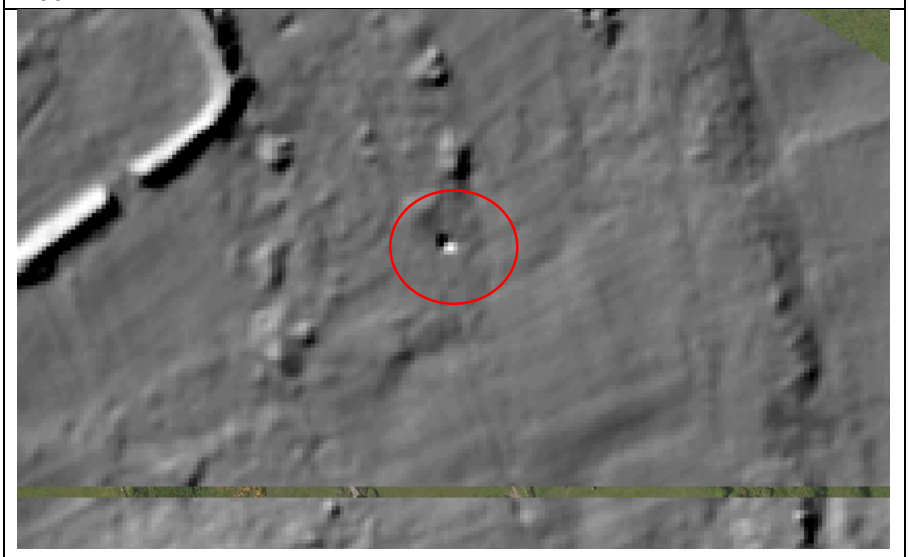
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	Elevation within depression 13.39 mAOD. This is not the base of the depression
Additional Information	Very large depression. Large part of enclosed depression is filled in with waste and material.
Site photos	 

Feature ID	**K164**
Feature type	Enclosed depression
Coordinates	534706, 728396
Source	Lidar: 
	Bing maps 
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot locate. Dense vegetation
Site photos	Not available

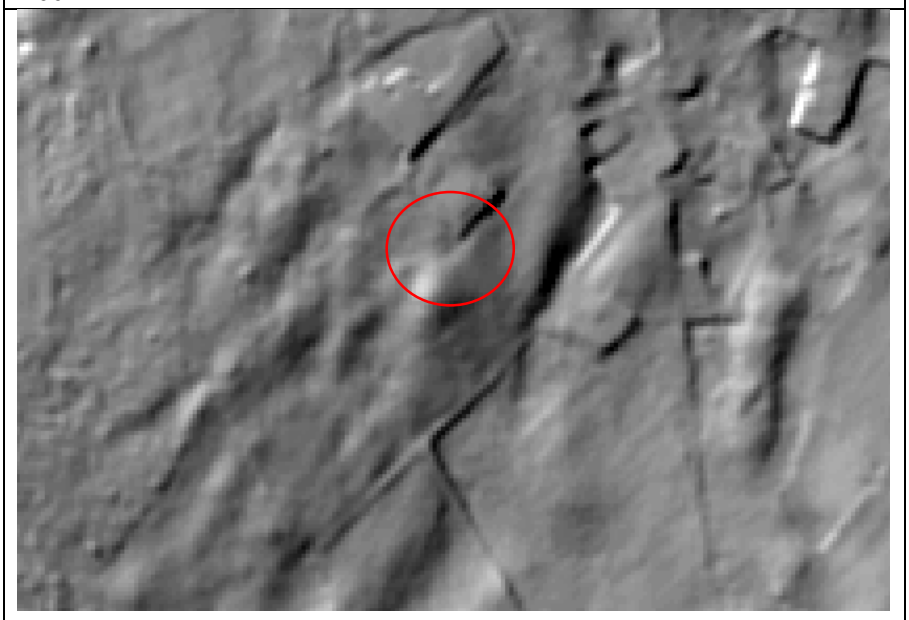
Feature ID	**K165**
Feature type	Enclosed depression
Coordinates	534715, 727838
Source	Lidar: 
	Bing maps 
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot locate due to dense vegetation
Site photos	Not available

Feature ID	**K166**
Feature type	Spring
Coordinates	534715, 727579
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	22/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	Could not locate spring. Location is within a school. A man working in the school informed us that there is a spring to the left of the school entrance but it could not be located.
Site photos	Not available

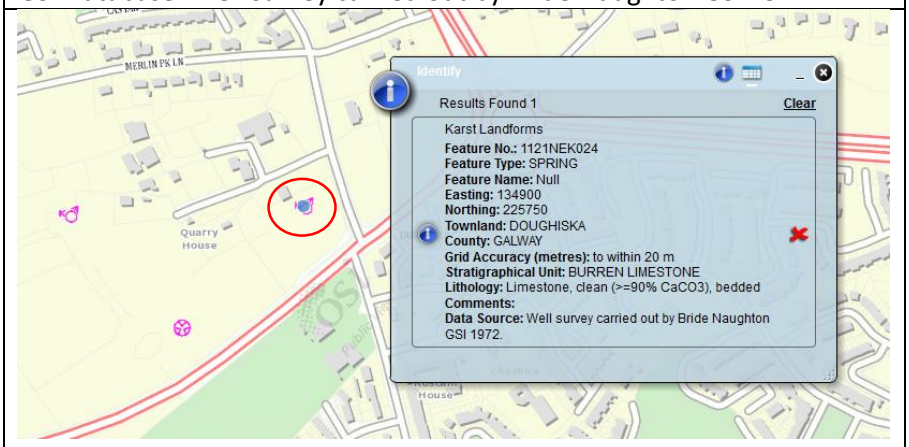
Feature ID	**K168**
Feature type	Enclosed depression
Coordinates	534764, 728234
Source	Lidar
	
	Bing maps
	
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot confirm as vegetation is too dense to access exact location
Site photos	Not available

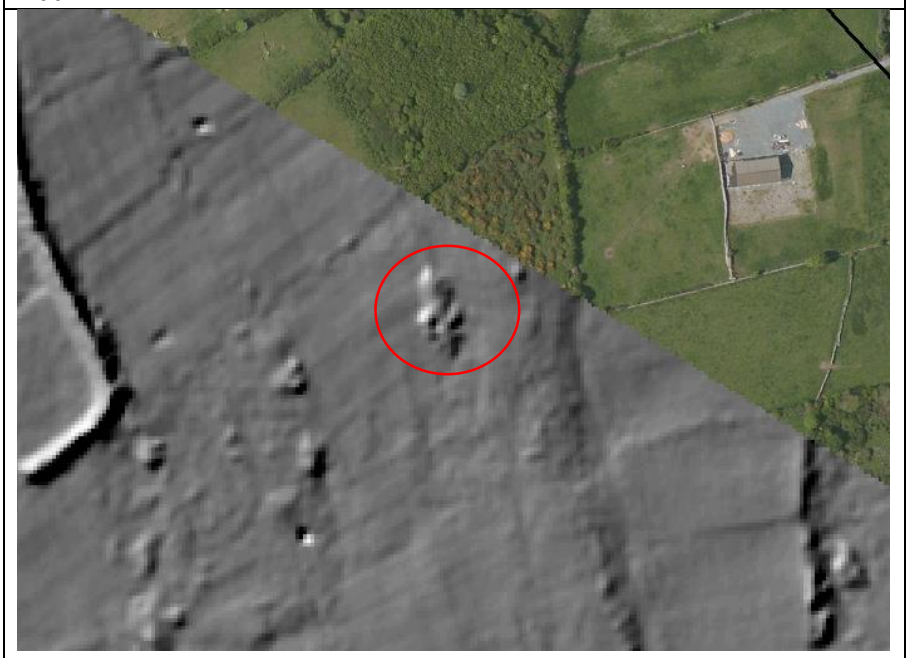
Feature ID	**K169**
Feature type	Enclosed depression
Coordinates	534784, 728290
Source	Lidar: 
	Bing maps 
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot confirm as vegetation is too dense to access exact location
Site photos	Not available

Feature ID	**K170**
Feature type	Well/enclosed depression
Coordinates	534787.19, 728293.49
Source	Field survey
Field survey date	22/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Dug well Approx. 3m diameter and 2m to base Base of well is covered in moss covered rocks
Site photos	

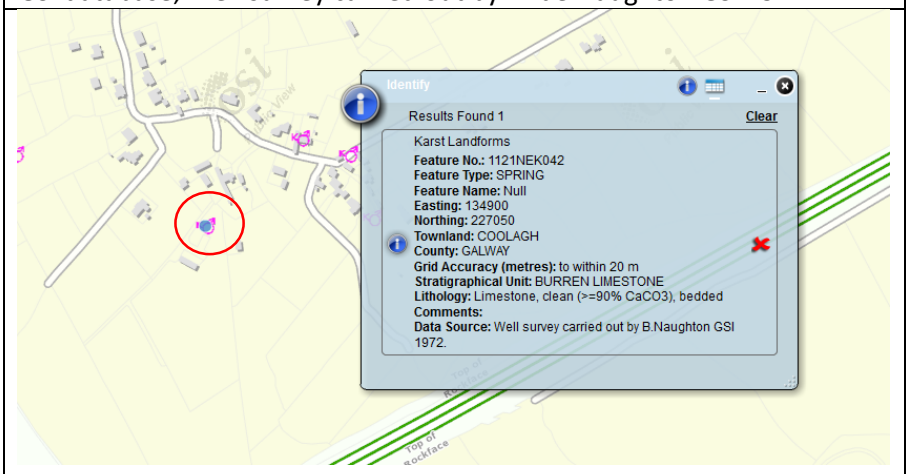
Feature ID	**K172**
Feature type	Enclosed depression
Coordinates	534791, 727078
Source	Lidar: 
	Bing maps 
Field survey date	23/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Very shallow depression

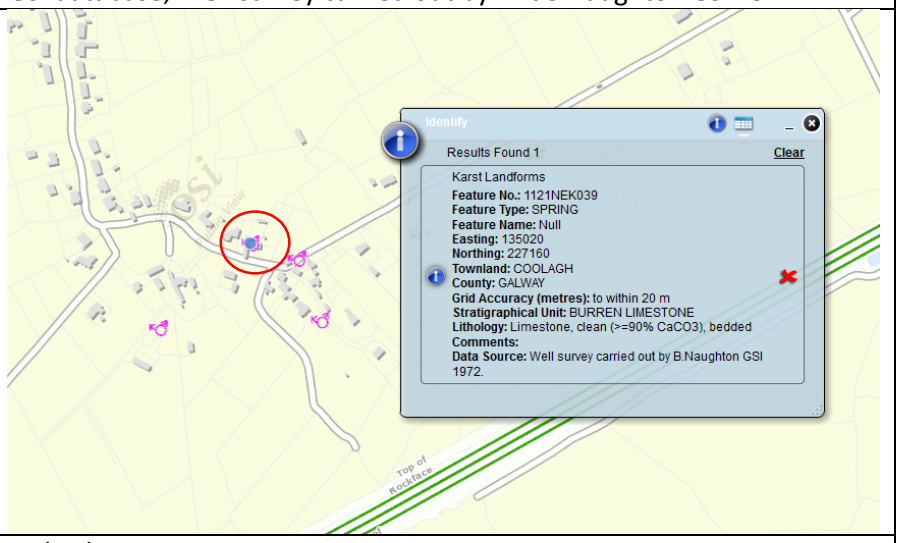
Site photos	

Feature ID	**K173**
Feature type	Spring
Coordinates	534843, 725787
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 510 uS/cm Temperature: 9.7 °C pH: 7.88 Flow: 6.3 l/s
Water level elevation	25.22 mAOD
Additional Information	Spring discharges from under an old building.
Site photos	

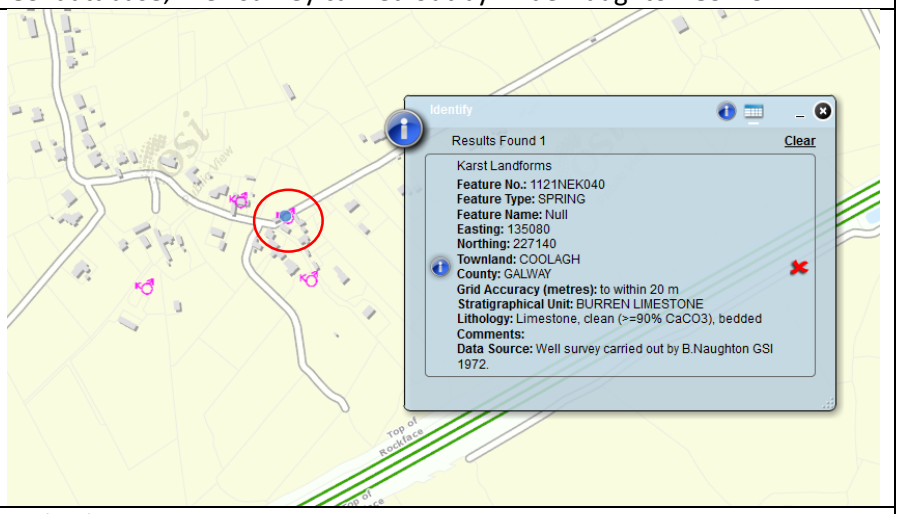
Feature ID	**K174**
Feature type	Enclosed depression
Coordinates	534854, 728406
Source	Lidar: 
	Bing maps 
Field survey date	22/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Appears to be dip in topography but cannot gain access due to dense vegetation
Site photos	Not available

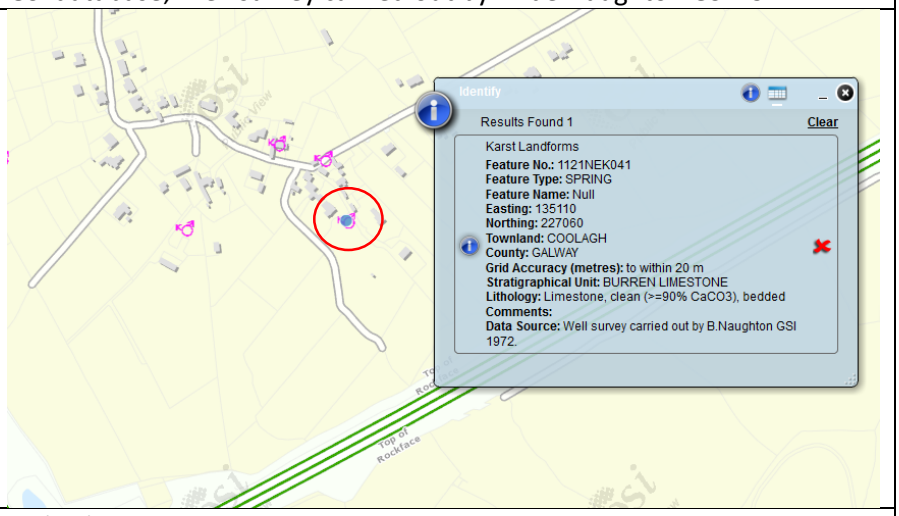
Feature ID	**K175**
Feature type	Enclosed depression
Coordinates	534857, 727168
Source	Field survey
Field survey date	23/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 20m diameter, 2m depth
Site photos	 

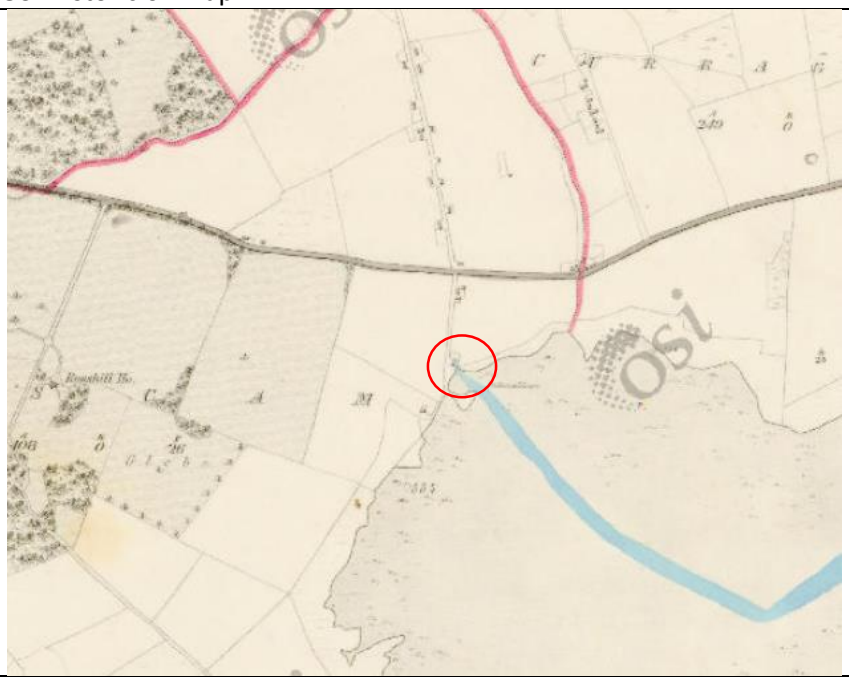
Feature ID	**K176**
Feature type	Spring
Coordinates	534865, 727079
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	23/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	During the field survey locals were asked about springs in the Briarhill area. We were informed that these were old disused wells that were covered up since the area was connected to the mains water supply.
Site photos	Not available

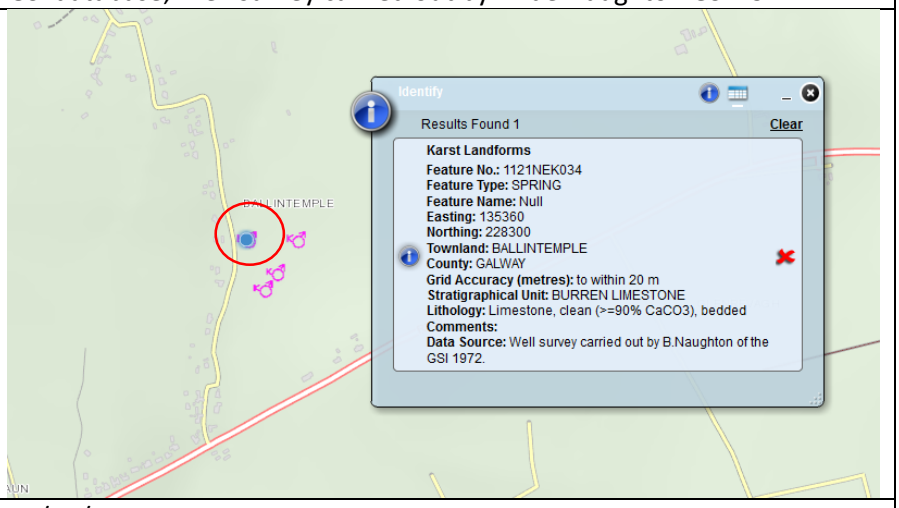
Feature ID	**K178**
Feature type	Spring
Coordinates	534985, 727189
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	23/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	During the field survey locals were asked about springs in the Briarhill area. We were informed that there were a number of springs but that they were not in use any more and were likely covered up since the area was connected to the mains water supply.
Site photos	Not available

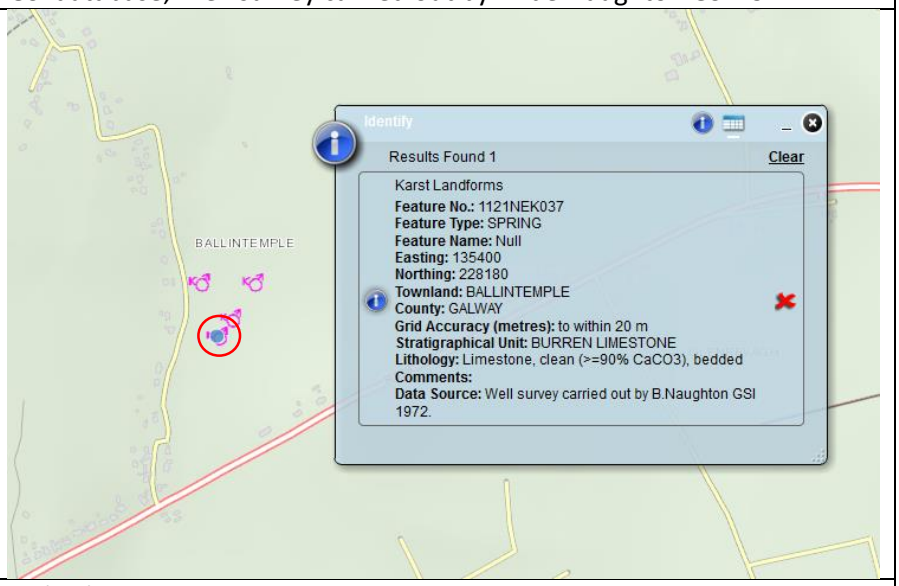
Feature ID	**K179**
Feature type	Enclosed depression
Coordinates	534990, 727121
Source	Field survey
Field survey date	23/10/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 20m diameter semicircle. Shallow
Site photos	 

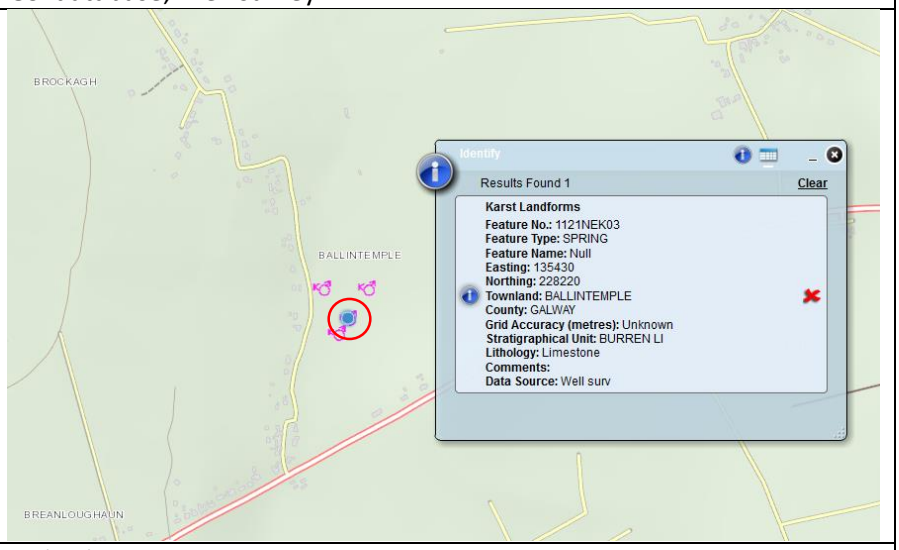
Feature ID	**K180**
Feature type	Spring
Coordinates	535045, 727169
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	23/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	During the field survey locals were asked about springs in the Briarhill area. We were informed that there were a number of springs but that they were not in use any more and were likely covered up since the area was connected to the mains water supply.
Site photos	Not available

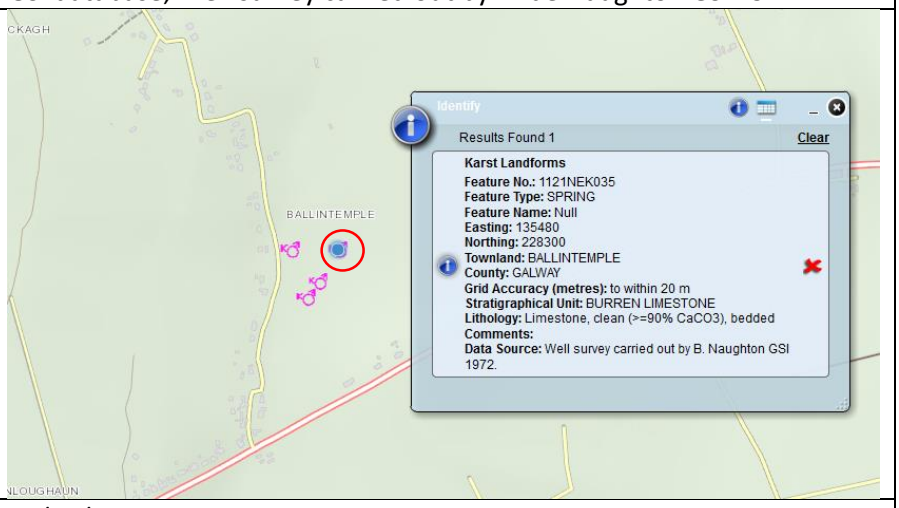
Feature ID	**K181**
Feature type	Spring
Coordinates	535074.86, 727088.79
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	23/10/2014
Field survey status	Not found
Water present	n/a
Additional Information	During the field survey locals were asked about springs in the Briarhill area. We were informed that there were a number of springs but that they were not in use any more and were likely covered up since the area was connected to the mains water supply.
Site photos	Not available

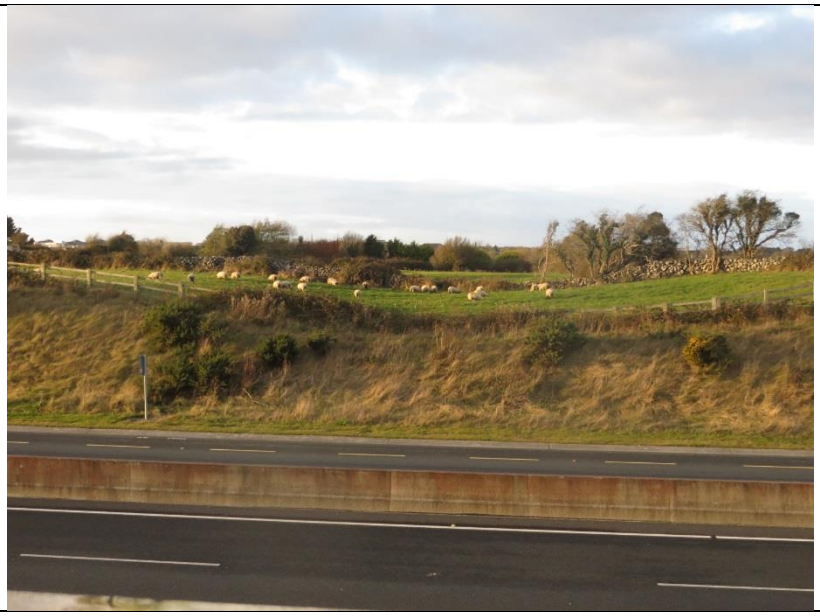
Feature ID	**K182**
Feature type	Spring
Coordinates	535092.48, 724857.76
Source	OSI Historic 6'' Map 
Field survey date	14/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: Outside instrument range Temperature: 11.5 °C pH: 7.34
Additional Information	Flow from spring too wide to measure. Flow discharges directly to sea
Site photos	

Feature ID	**K184**
Feature type	Spring
Coordinates	535325, 728328
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972.
	
Field survey date	12/11/2014
Field survey status	Not found
Water present	n/a
Additional Information	Could not locate spring
Site photos	Not available

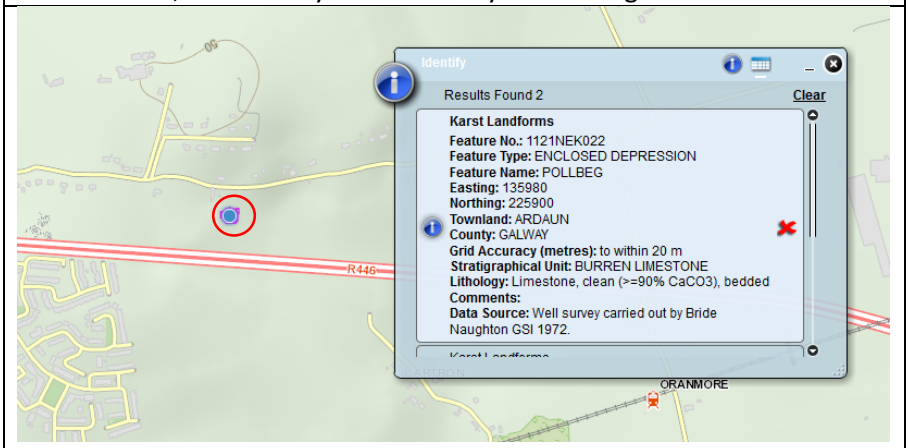
Feature ID	**K189**
Feature type	Spring
Coordinates	535443, 728233
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972.
	
Field survey date	12/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 662 uS/cm Temperature: 8.9 °C pH: 7.52
Water level elevation	26.84 mAOD (approx.) Elevation taken at ground level beside the spring (27.34 mAOD). Spring water level approx. 0.5 m below ground level.
Additional Information	Approx. 3m diameter Fenced area with briars and vegetation.
Site photos	Not available

Feature ID	**K190**
Feature type	Spring
Coordinates	535445, 728328
Source	GSI database; Well survey
	
Field survey date	12/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Cannot access field
Site photos	Not available

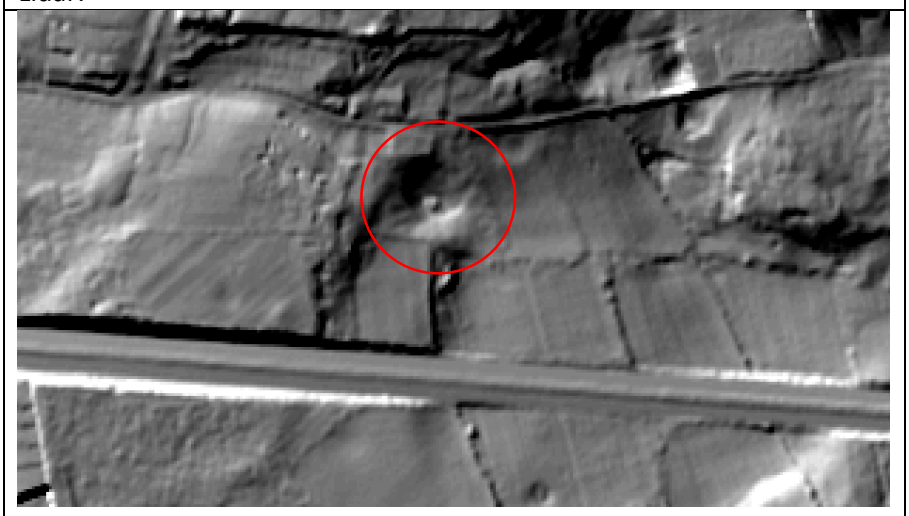
Feature ID	**K192**
Feature type	Spring
Coordinates	535471, 728311
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972. 
Field survey date	12/11/2014
Field survey status	Not found
Water present	n/a
Additional Information	Cannot locate
Site photos	Not available

Feature ID	**K193**
Feature type	Enclosed depression
Coordinates	535482, 727051
Source	Field survey
Field survey date	17/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. 30m diameter depression cut in half by M6 motorway
Site photos	

Feature ID	**K198**
Feature type	Enclosed depression
Coordinates	535953, 725945
Source	GSI database; Well survey carried out by Bride Naughton GSI 1972.

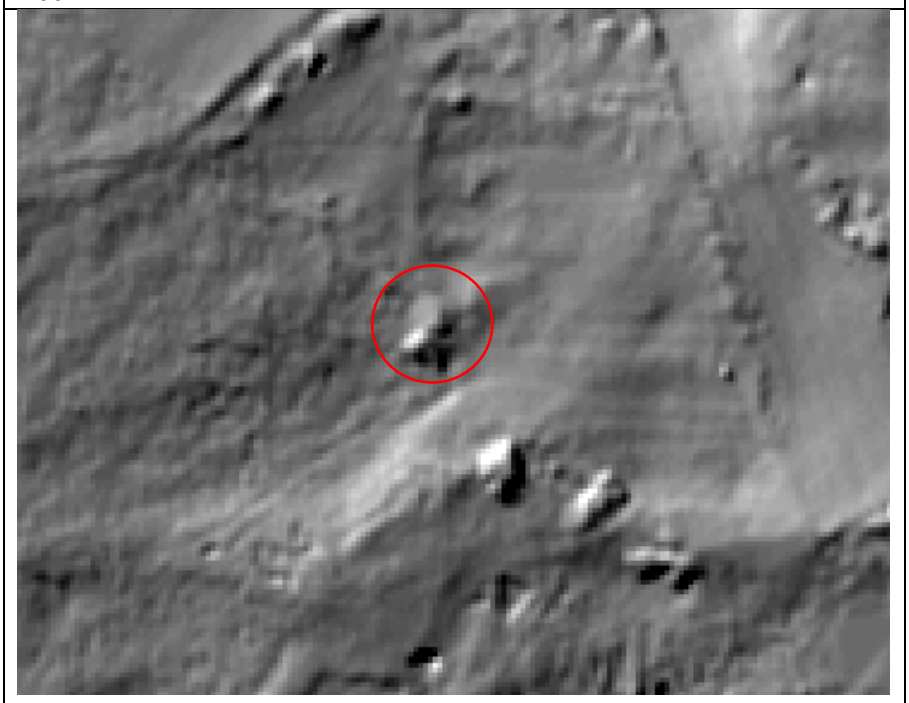


Lidar:



Bing maps:

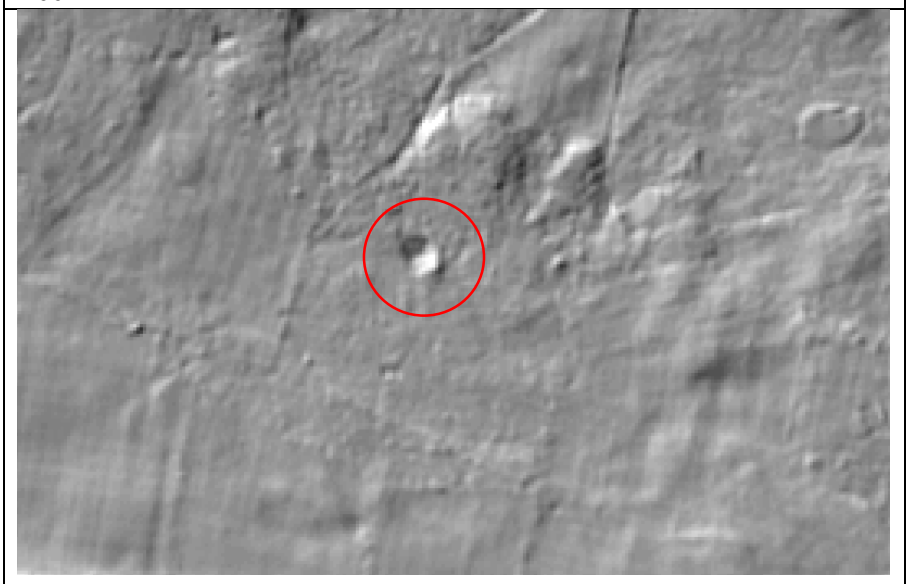
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	Yes No water quality analysis recorded
Additional Information	Farmer noted that the depression fills with water
Site photos	

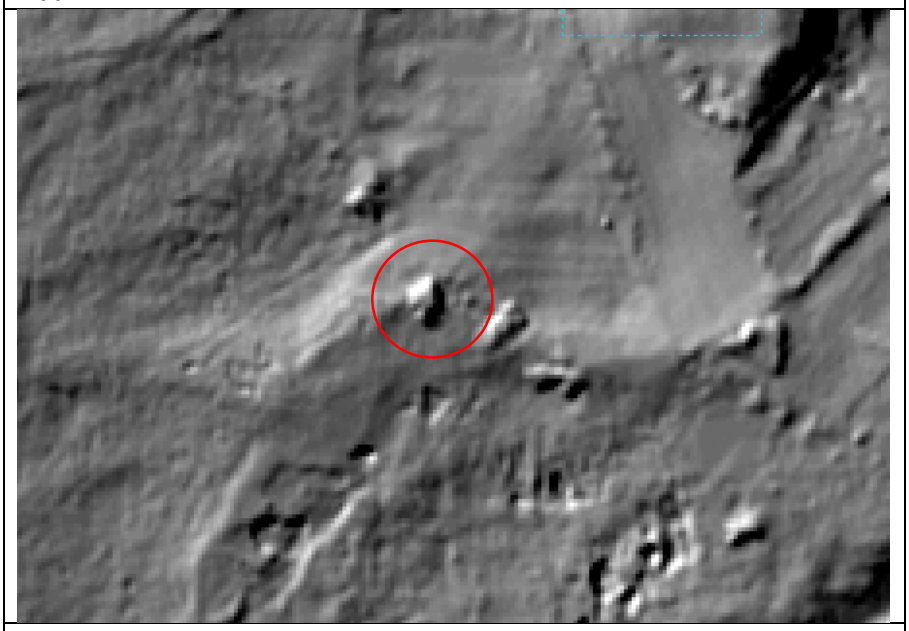
Feature ID	**K199**
Feature type	Enclosed depression
Coordinates	536026, 725583
Source	Lidar:  Bing maps: 
Field survey date	18/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access inhibited due to thick vegetation
Site photos	Not available

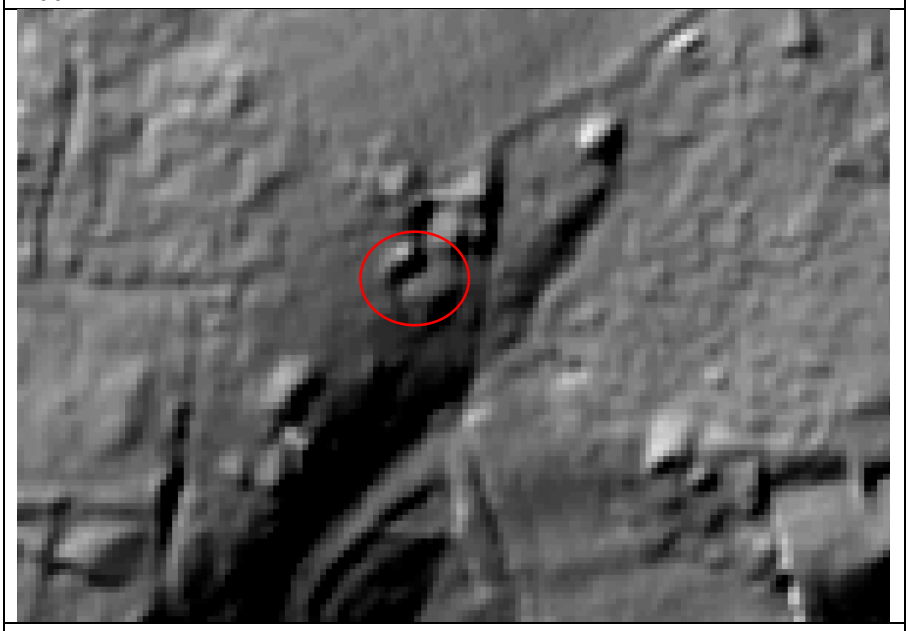
Feature ID	**K201**
Feature type	Enclosed depression
Coordinates	536027, 725739
Source	Field survey
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	29.92 mAOD at base of enclosed depression
Additional Information	Approximate dimensions: 2 m diameter less than 1 m depth
Site photos	 

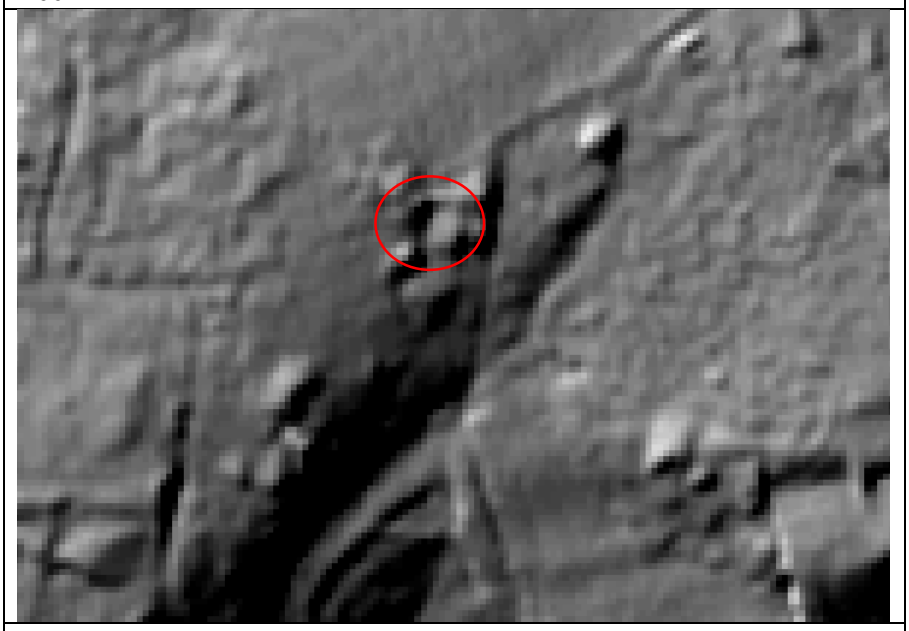
Feature ID	**K202**
Feature type	Enclosed depression
Coordinates	536033, 726313
Source	Field survey
Field survey date	23/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Very shallow enclosed depression Approx. 20m diameter
Site photos	

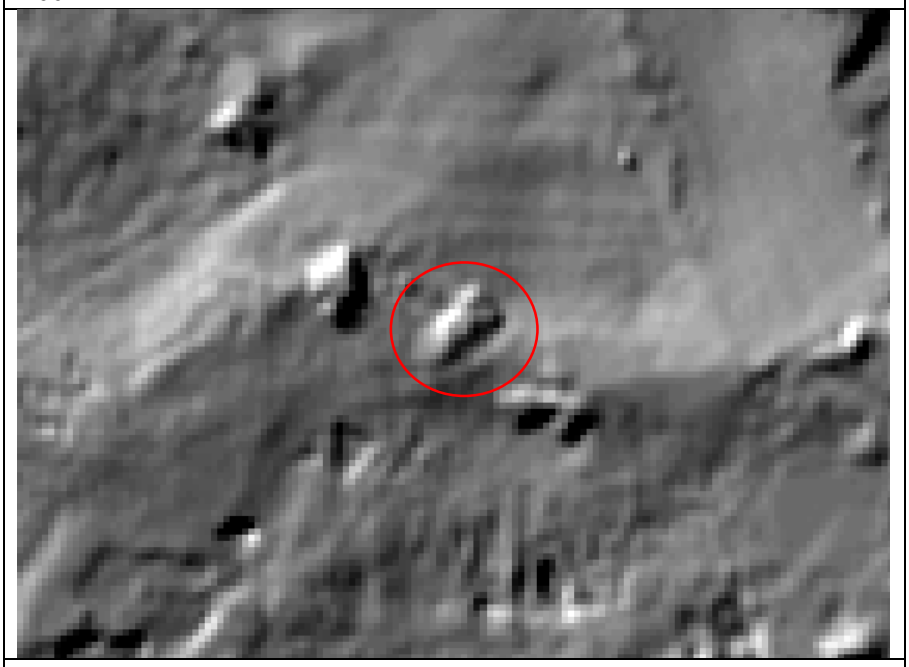
Feature ID	**K203**
Feature type	Enclosed depression
Coordinates	536033, 725740
Source	Field survey
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	29.44 mAOD
Additional Information	Small enclosed depression Approximate dimensions: 5m x 2 m less than 1 m deep
Site photos	 

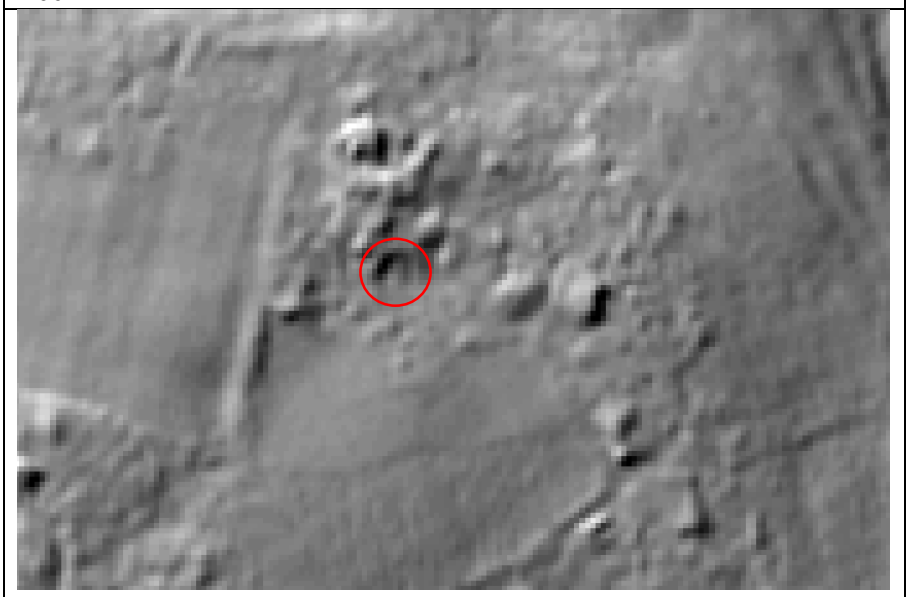
Feature ID	**K204**
Feature type	Enclosed depression
Coordinates	536046, 726864
Source	Lidar: 
	Bing maps: 
Field survey date	17/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Covered by vegetation.
Site photos	Not available

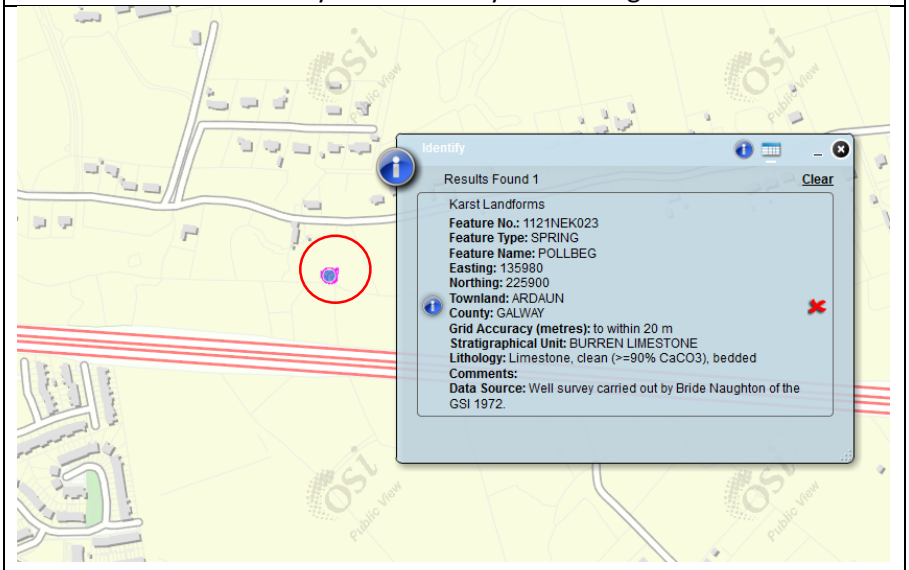
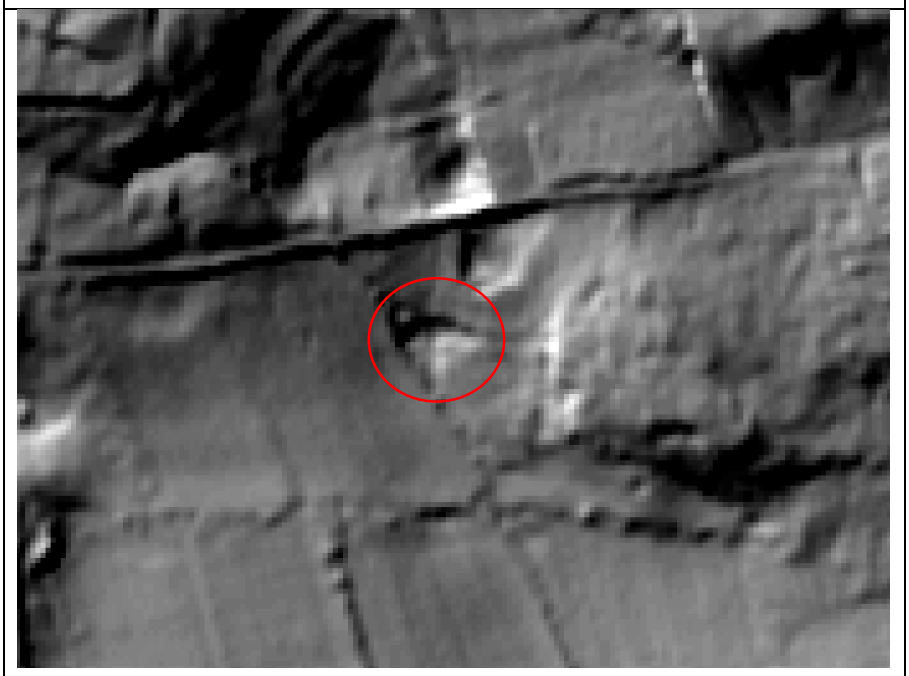
Feature ID	**K205**
Feature type	Enclosed depression
Coordinates	536055, 725532
Source	Lidar:  Bing maps: 
Field survey date	18/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to thick vegetation
Site photos	Not available

Feature ID	**K206**
Feature type	Enclosed depression
Coordinates	536087, 726186
Source	Lidar:  Bing maps: 
Field survey date	23/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to thick vegetation
Site photos	Not available

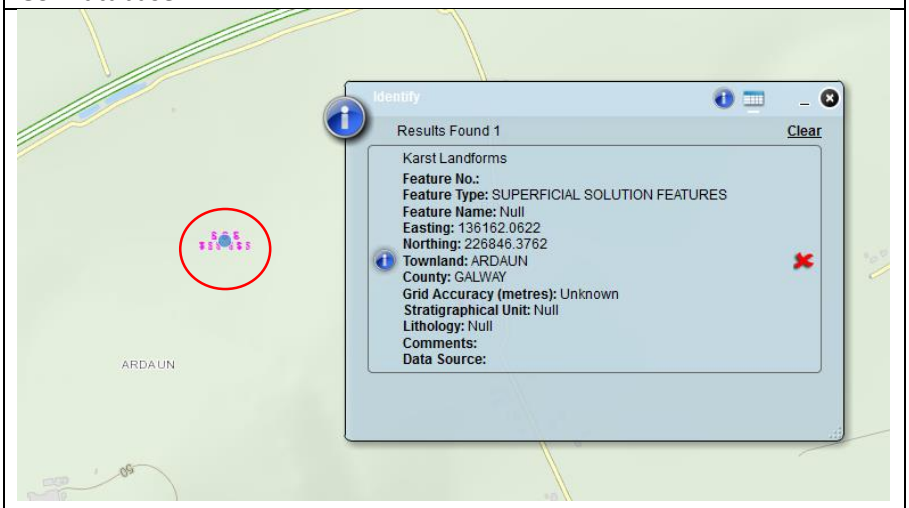
Feature ID	**K207**
Feature type	Enclosed depression
Coordinates	536095, 726205
Source	Lidar:  Bing maps: 
Field survey date	23/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to thick vegetation
Site photos	Not available

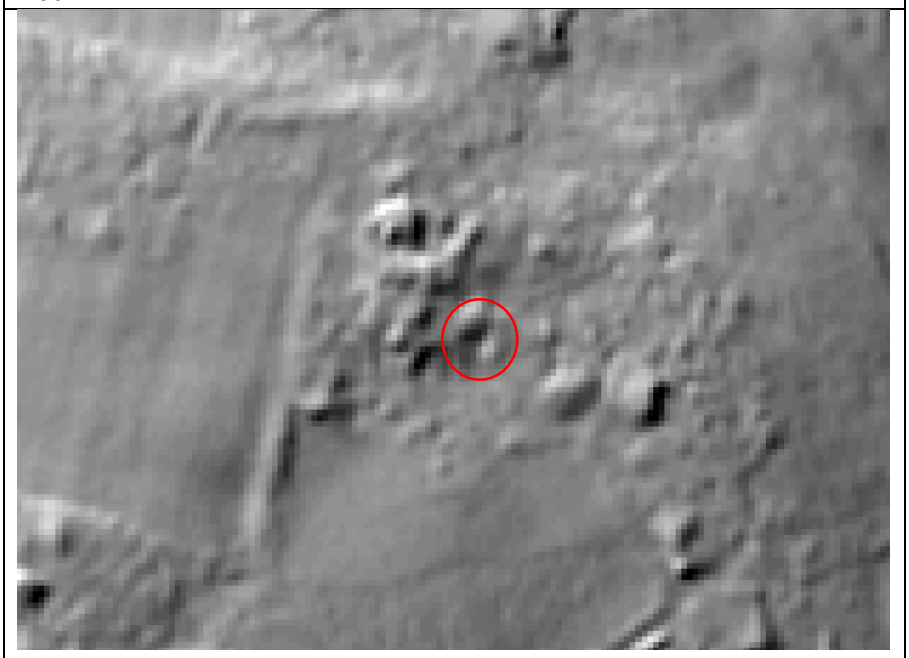
Feature ID	**K208**
Feature type	Enclosed depression
Coordinates	536099, 725516
Source	Lidar:
	
	Bing maps:
	
Field survey date	18/11/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to thick vegetation
Site photos	Not available

Feature ID	**K209**
Feature type	Enclosed depression
Coordinates	536101, 726363
Source	Lidar: 
	Bing maps: 
Field survey date	23/10/2014
Field survey status	Confirmation/identification problem
Water present	n/a
Additional Information	Access issue due to thick vegetation
Site photos	Not available

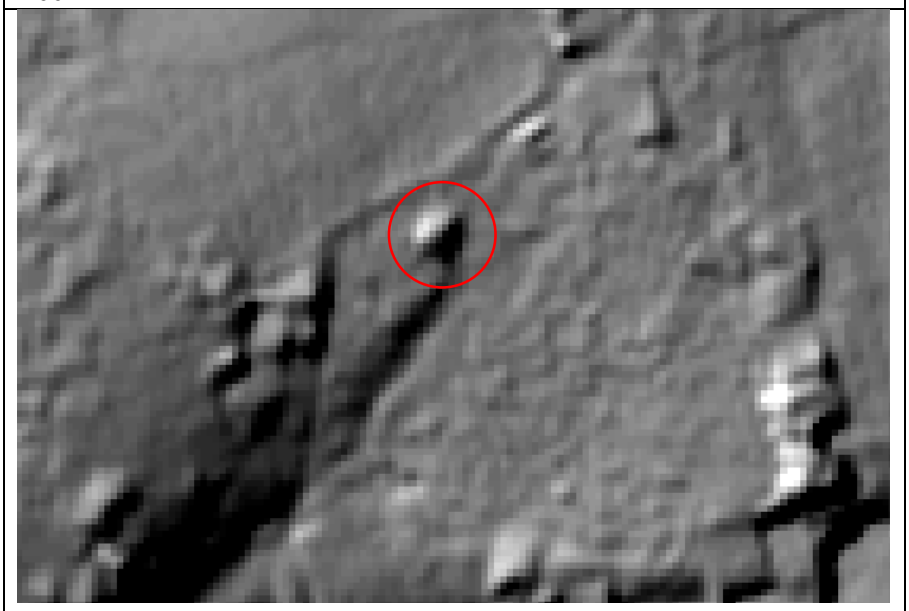
Feature ID	**K210**
Feature type	Spring
Coordinates	536114, 725968
Source	GSI Database: Well survey carried out by Bride Naughton GSI 1972.:  Lidar: 
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	Yes Electrical conductivity: 704 uS/cm Temperature: 9.8 °C pH: 7.88
Water level elevation	26.37 mAOD
Additional Information	The spring is at the base of a depression. The ground is very soft and covered in vegetation. Water is present, however due to the low water

	levels and vegetation flow not measurable. The spring discharge area is approx. 20 m diameter. The landowner lives in the house across the road and informed us that the spring has been used in the past as the drinking water supply but is currently not in use.
Site photos	 

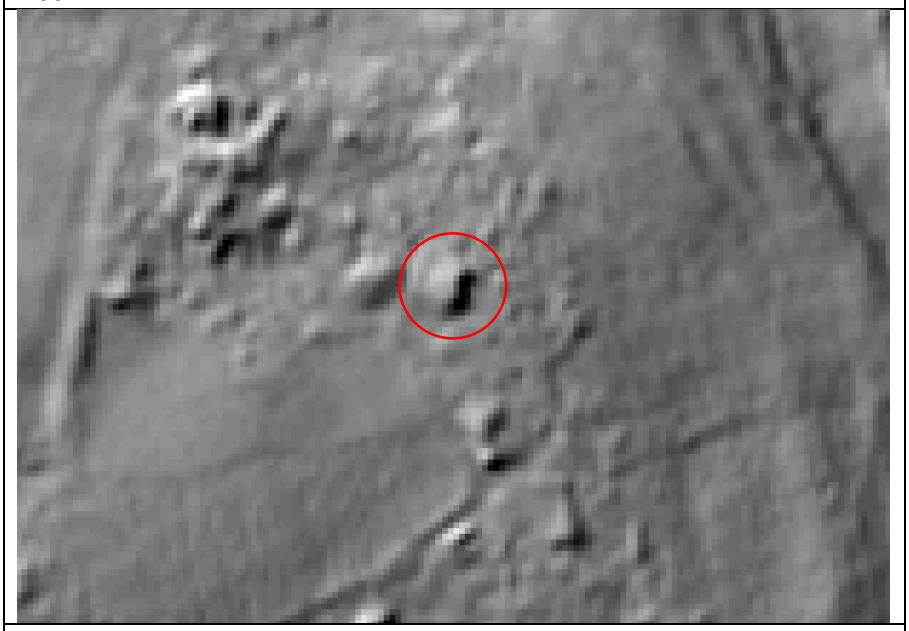
Feature ID	**K211**
Feature type	Superficial solution features
Coordinates	536119, 726817
Source	GSI Database: 
Field survey date	17/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Superficial solution features. Not very obvious. Some bumps etc in ground surface and exposed rock
Site photos	Not available

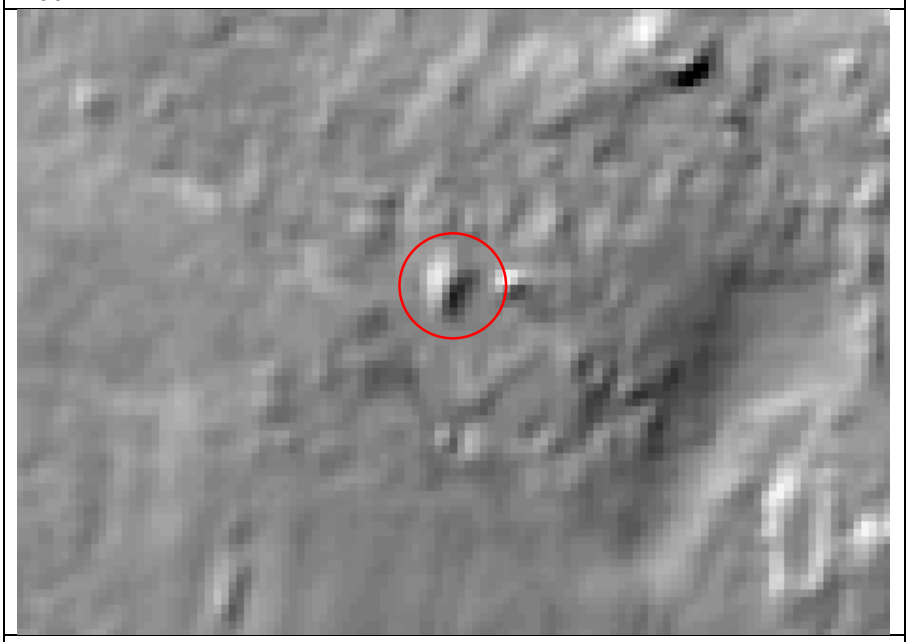
Feature ID	**K212**
Feature type	Enclosed Depression
Coordinates	536121, 726370
Source	Lidar: 
Field survey date	23/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Could not locate due to dense vegetation cover in the area
Site photos	Not available

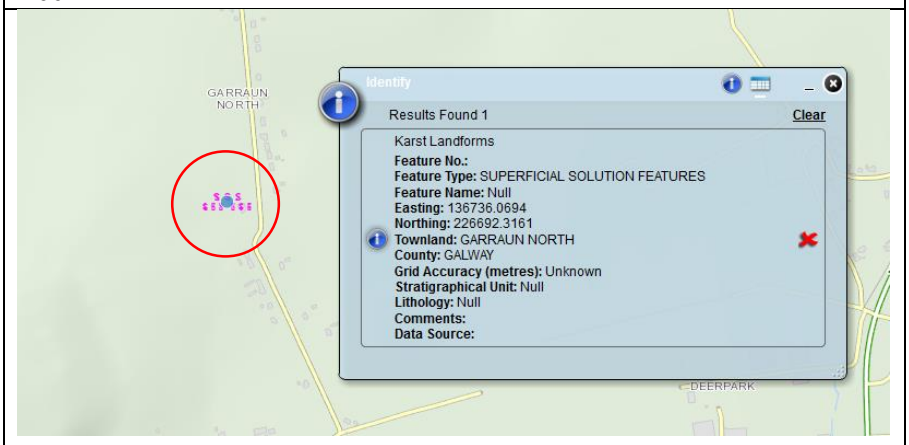
Feature ID	**K213**
Feature type	Enclosed Depression
Coordinates	536132, 726003
Source	Field survey
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Approx. dimensions: 20 m diameter. The depression may contain some fill or modification
Site photos	

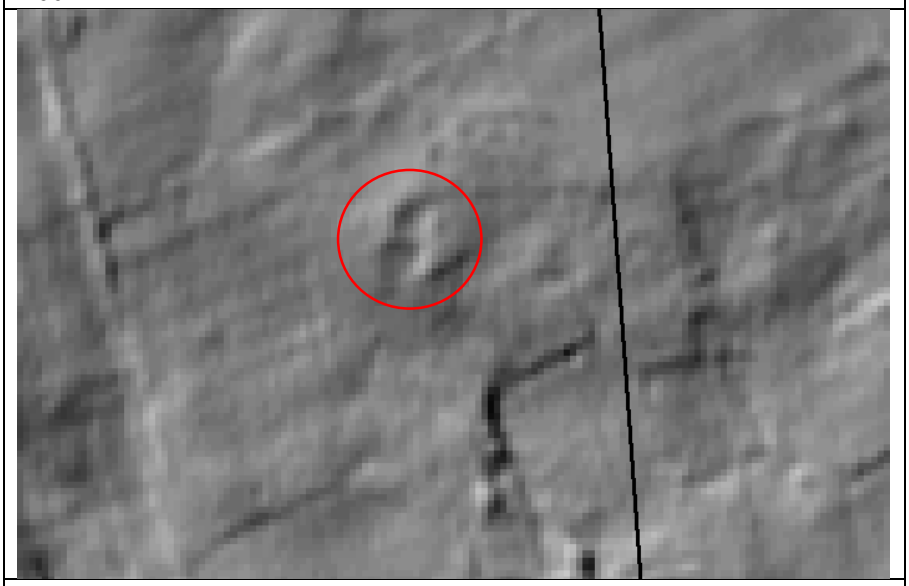
Feature ID	**K214**
Feature type	Enclosed Depression
Coordinates	536149, 726234
Source	Lidar: 
	Bing maps 
Field survey date	23/10/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Could not locate due to dense vegetation cover in the area
Site photos	Not available

Feature ID	**K215**
Feature type	Enclosed Depression
Coordinates	536157, 725528
Source	Field survey
Field survey date	18/11/2014
Field survey status	Confirmed
Water present	No
Ground level elevation	25.14 mAOD
Additional Information	Very shallow depression Approx. dimensions: 5 m diameter and less than 0.5 m depth
Site photos	Not available

Feature ID	**K216**
Feature type	Enclosed Depression
Coordinates	536177, 726351
Source	Lidar: 
	Bing maps 
Field survey date	18/11/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Could not locate due to heavily vegetated area
Site photos	Not available

Feature ID	**K218**
Feature type	Enclosed Depression
Coordinates	536381, 726690
Source	Lidar: 
	Bing maps 
Field survey date	17/11/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Access issue due to dense vegetation
Site photos	Not available

Feature ID	**K222**
Feature type	Superficial solution features
Coordinates	536701, 726721
Source	Lidar: 
Field survey date	17/11/2014
Field survey status	Confirmed
Water present	No
Additional Information	Superficial solution features. Small shallow dips and small patches of outcrop.
Site photos	

Feature ID	**K223**
Feature type	Enclosed Depression
Coordinates	536722,726303
Source	Lidar: 
	Bing maps 
Field survey date	17/11/2014
Field survey status	Confirmation/identification problem
Water present	No
Additional Information	Access issue, bull in field.
Site photos	Not available

Feature ID	**K328**
Feature type	Enclosed Depression
Coordinates	533456,727562
Source	Bing maps
	
Field survey date	
Field survey status	Identified by Galway Racecourse
Water present	No
Additional Information	Feature not visited
Site photos	Not available