
Water Framework Directive
Groundwater Monitoring Programme

Site Information
Cavanreagh BH1

Cavanreagh BH-1 a deep borehole used as part of the Clones public water supply. The abstraction rate is 300 m³/day. The GSI have completed a source report for this site.



Monaghan

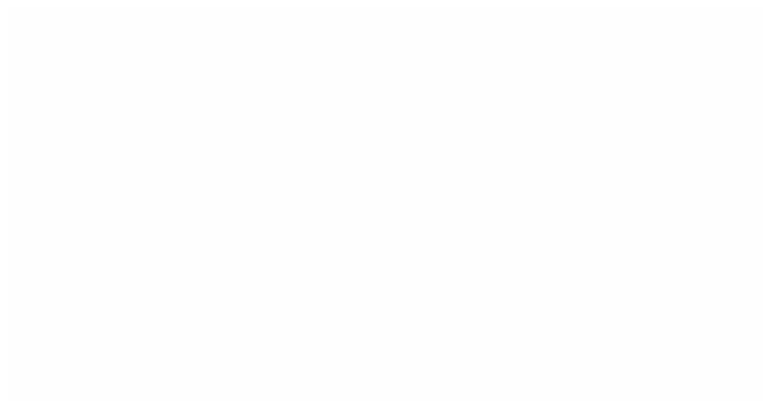
August 2011

SITE INFORMATION					
Site Name:	Cavanreagh BH1		County:	Monaghan	
RBD:	NWIRBD		EU Reporting Code:	IEGBNI_NW_G_063_18_002	
Easting:	248809		GWB Name:	Clones	
Northing:	319819		GWB Code:	IEGBNI_NW_G_063	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	2400PUB1002	
Hydrometric Area:	36		Water Level Monitoring Network:	Level	Flow
Townland:	CAVANREAGH (Dartree By)			N	N
Ownership:	Monaghan County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	Y		N		N
Site Comments:	Cavanreagh, is a 70m deep borehole situated in Dinantian (early) Sandstones, Shales and Limestones and is used as a public water supply.				

SITE DIRECTIONS	
Location and Access Information:	Located 0.4 km northwest of Scotshouse. Access is from the main road that runs from the R212 in the village.
Additional Comments:	---

WELL INFORMATION					
Monitoring Point Type:	BH	Abstraction Rate (m³/d):	300	Ground Elevation (m OD):	56
Borehole Log Available:	---	Total Drilled Depth (m bgl):	70	Depth to Bedrock (m bgl):	9.5
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	300	Lower Casing Diameter (mm):	---
Final Borehole Depth (m):	---	Upper Casing Bottom Depth (m bgl) :	---	Lower Casing Bottom Depth (m bgl):	---
Screen Interval (m bgl):	---	Screen Type (PVC,Steel,other):	---	Screen Slot Size (mm):	---
Grout Type (cement,bentonite):	---	Grouted above (m bgl):	---	Grout Volume Injected (m³):	---
Gravel Pack Interval (m bgl):	---	Gravel Pack Volume (m³):	---	Open Hole Interval (m bgl):	---
Potential Yield (m³/day):	1221	Comments on Monitoring Site:	---		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	55.1				
Scheme Name:	Clones (Scotshouse)	Number of Abstraction Points in the Scheme:	2	Source Report Available	Y
Source Report Info:	Source report prepared by GSI in 2002.				
Scheme Summary:	The scheme comprises two boreholes which are pumped together. Both boreholes are 70 m deep and are located in lay-bys off roads from Scotshouse. There are observation boreholes located with 5 m of each borehole.				

HYDROGEOLOGY							
GEOLOGY	Soil:	Deep poorly drained mineral (AminPD)				Subsoil Permeability:	Low
	Subsoil:	Tills (diamictons) (TLPSsS)					
	Bedrock:	Dinantian (early) Sandstones, Shales and Limestones					
HYDROGEOLOGY	Aquifer Category:	Rf	Vulnerability at Monitoring site:	Low		Flow Regime:	Productive fissured bedrock
ZONE OF CONTRIBUTION	Estimated ZOC Size (km ²):	2.26	ZOC Delineated By:	GSI		Recharge Estimate (mm/yr):	143
	ZOC Delineation Comments:	The GSI delineated a ZOC based on an area obtained by using the average abstraction and recharge rates. The shape of this are was derived from numerical modelling and hydrdogeological mapping.					
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	0.57	0.65	39.6	22.54	35.21	0	1.43
HYDROCHEMISTRY							
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was <1 mg/l NO3 and the maximum nitrate concentration was 1 mg/l NO3. The average ammonium concentration was 0.127 mg/l N and the maximum ammonium concentration was 0.428 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.008 mg/l P and the maximum MRP concentration was 0.024 mg/l P. The average chloride concentration was 12.7 mg/l Cl and the maximum chloride concentration was 15 mg/l Cl.			
Alkalinity (mg/l HCO3):	Average:	Range:					
	344	290-381					
Hardness (mg/l CaCO3):	Average:	Range:					
	450	290-560					
Conductivity (uS/cm):	Average:	Range:					
	830	620-1000					
Monitoring Record Period:	From:	To:					
	2007	2010					
RISK ASSESSMENT							
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:	Nitrate			
Risk Category:	Not at risk, low confidence		GWB Status:	Good			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:		
	0.00	1.02	28.80	44.47	25.71		
OTHER INFORMATION							



Data Summary Sheet - July 2011

Disclaimer: The data in this document are based on the best available information and understanding at time of writing. Neither the Environmental Protection Agency, nor the individual bodies supplying data for this document and accompanying maps will be responsible for any loss or damage from the use or interpretation of these data.

Rock Unit Geology Map: GSI, 2009

Aquifer Type Map: GSI, 2009

Groundwater Vulnerability Map: GSI, 2009

Soils & Subsoils Type: Teagasc, 2007

Recharge Map: GSI, 2009

Impact Potential Map: EPA, 2009

Risk Assessment Map: EPA WFD Risk Assessment, 2006

Groundwater Body Status: EPA WFD Status Assessment, 2008

Water Quality Data: EPA WFD Monitoring, 2008

Groundwater Threshold Values

Groundwater threshold values for selected parameters:

Nitrate - General Chemical Test/ Drinking Water Test (37.5 mg/l N03)

Ammonium - Drinking Water Test (0.175 mg/l N) / Surface Water Test (0.065 mg/l N)

Molybdate Reactive Phosphorus (MRP) - Surface Water Test (0.035 mg/l P)

Chloride -Saline/Intrusive Test (24 mg/l) / Drinking Water Test (175 mg/l Cl)

Electrical Conductivity -Saline/Intrusive Test (800 μ S/cm) / Drinking Water Test (1,875 μ S/cm)

Further information on groundwater threshold values is contained in the Groundwater Regulations (S.I. No.9 of 2010).

General Downgradient Distances

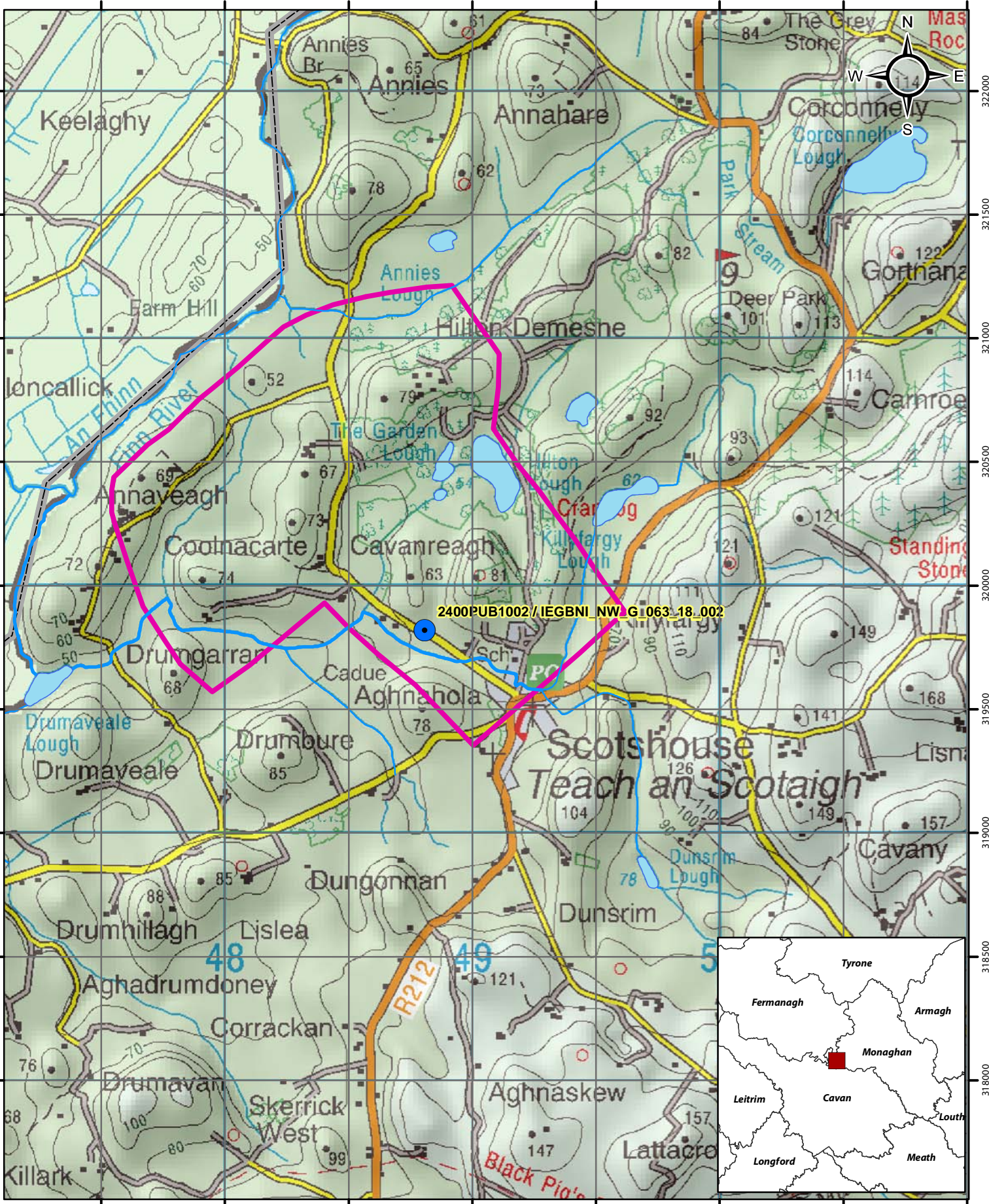
General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

Rk, Rkd, Lk	225 m
Lm	150 m
LI, PI	60 m





It is assumed that groundwater downgradient of a spring cannot flow back up to the spring, however a precautionary 30m buffer is generally applied which allows for instances where pumping under dry weather periods may induce a drawdown or where the ground may be sloping toward the spring from the downgradient side.

Version 0:	Prepared by	GSI	Date:	
Version 1:	Prepared by	OCM (DC)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	

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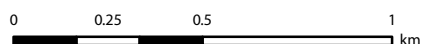
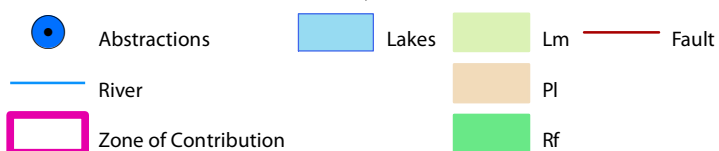
Location Map for Cavanreagh BH1

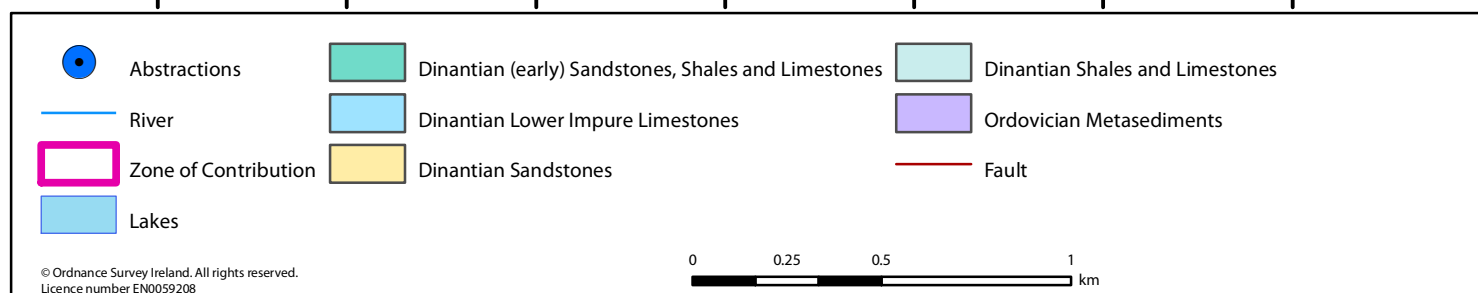
-  Abstractions
-  River
-  Zone of Contribution
-  Lakes

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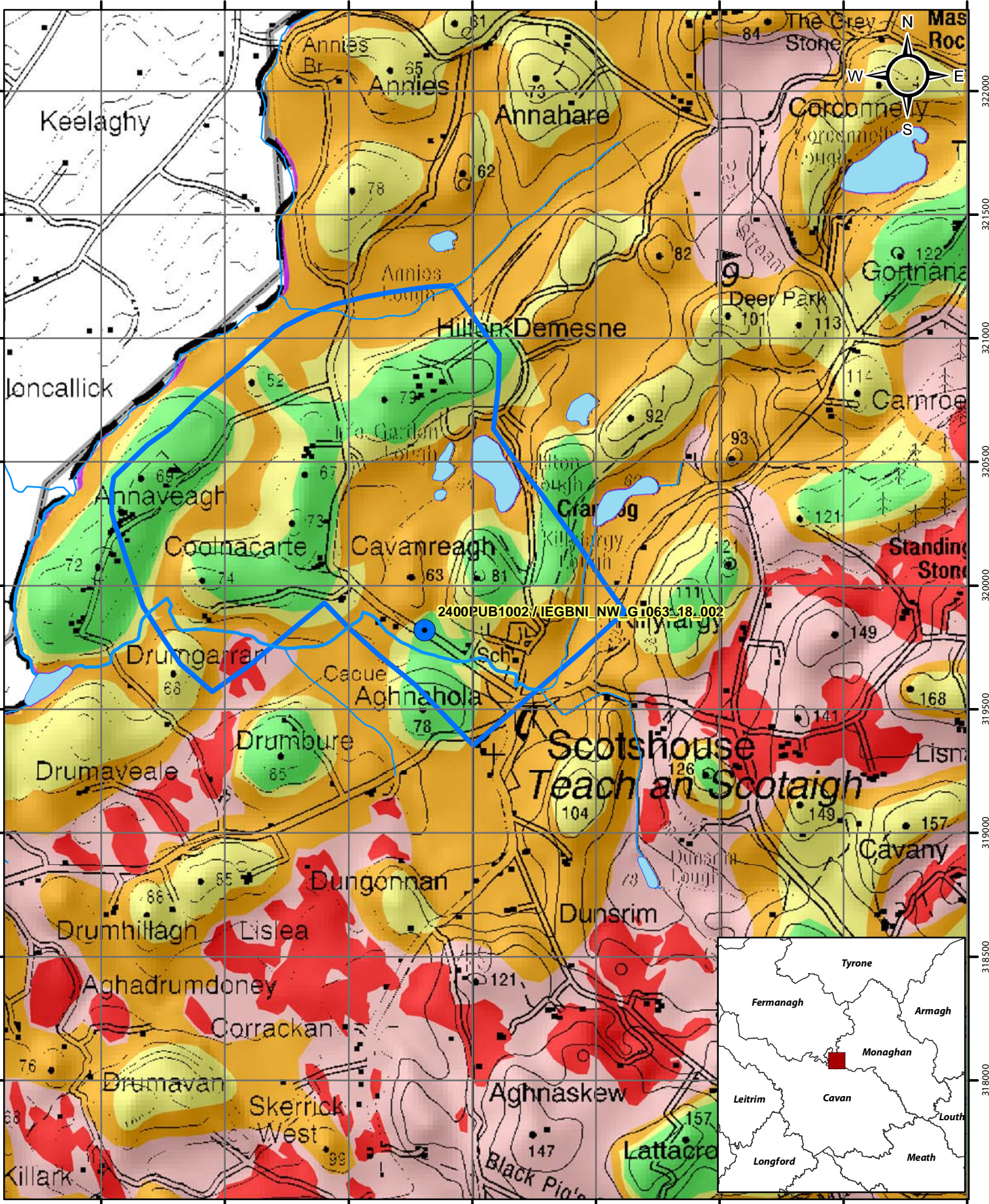
0 0.25 0.5 1 km

Aquifer Category Map for Cavanreagh BH1





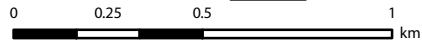
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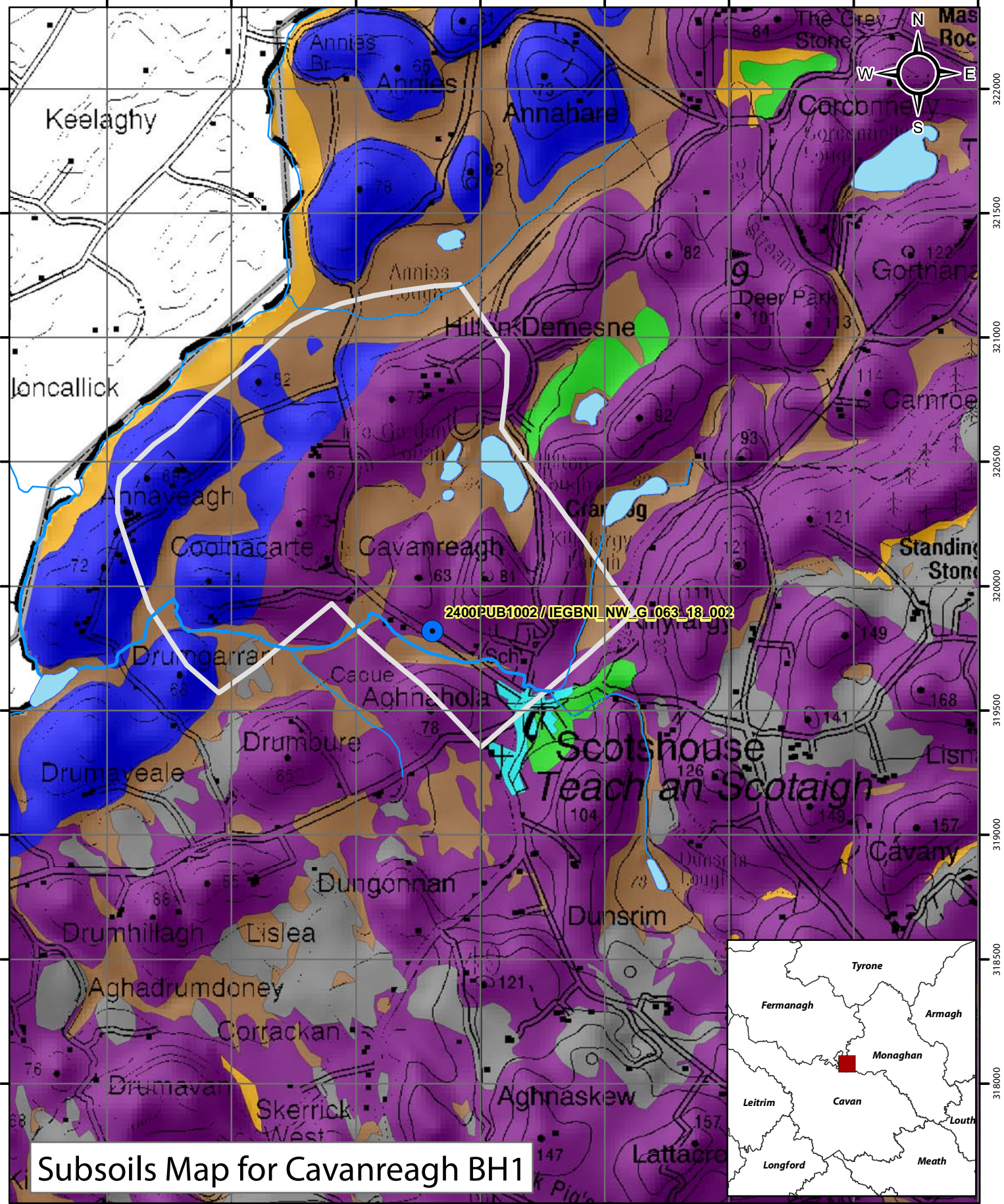
Groundwater Vulnerability Map for Cavanreagh BH1

- Abstractions
- River
- Zone of Contribution
- Lakes
- E (Rock near surface or Karst)
- E (Extreme)
- H (High)
- M (Moderate)
- L (Low)
- HL (unmapped - High to Low)
- Water
- No Data

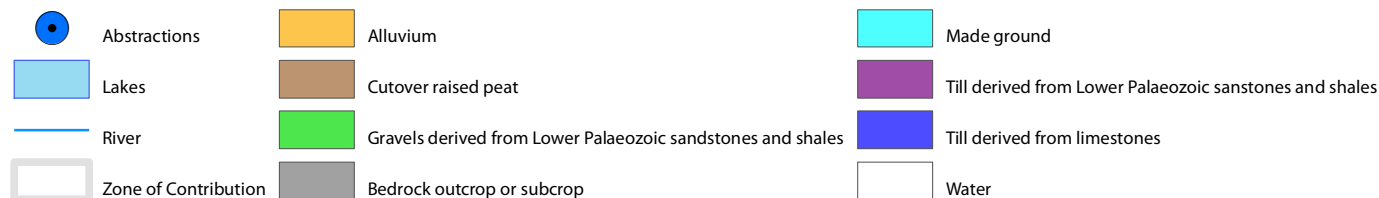
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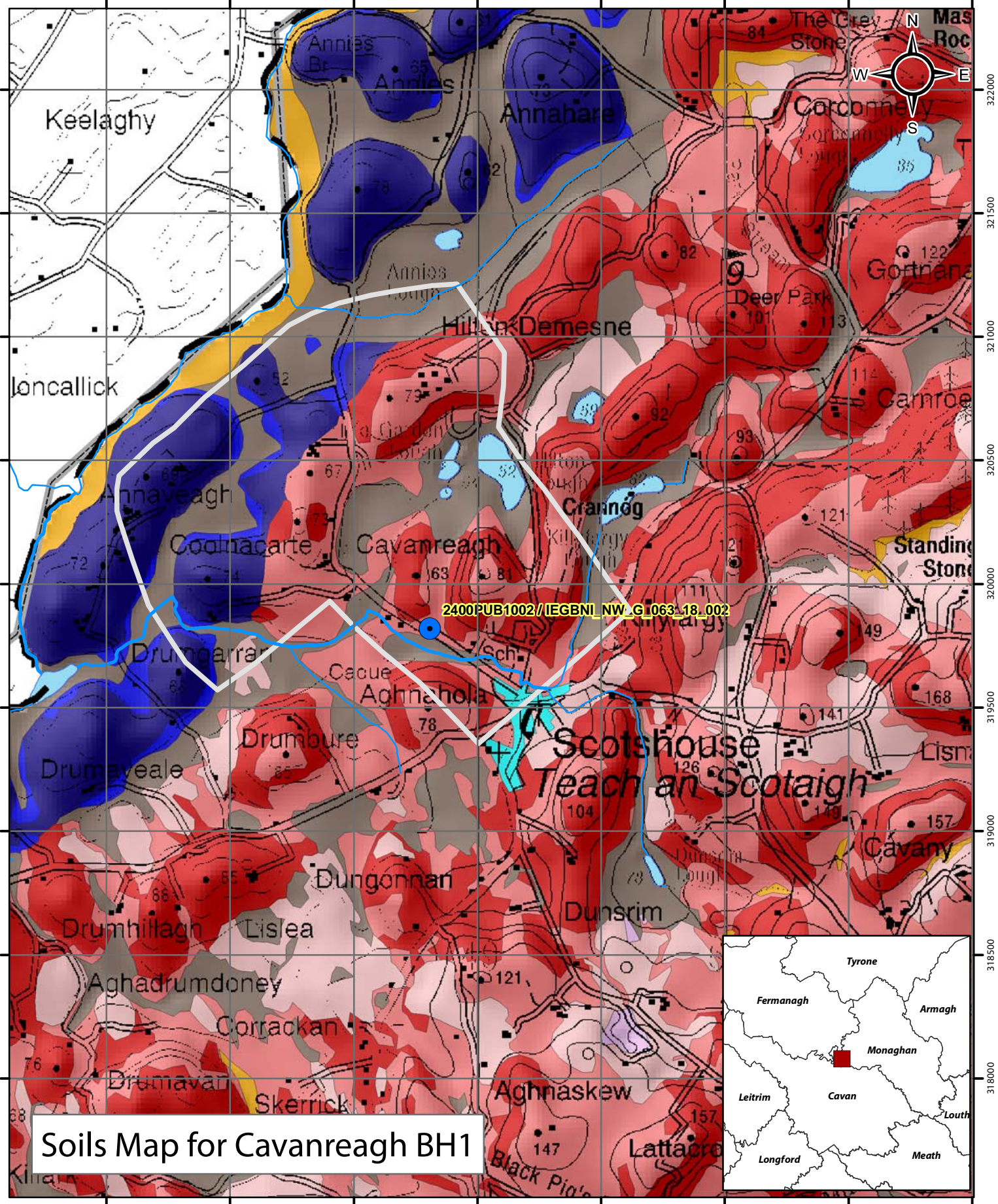
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Subsoils Map for Cavanreagh BH1



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Soils Map for Cavanreagh BH1

- | | | | |
|----------------------|-----------------------------------|-------------------------------------|----------------------|
| Abstractions | Lakes | Acid Shallow Poorly Drained Mineral | Cutover/Cutaway Peat |
| River | Acid Deep Well Drained Mineral | Acid Shallow/Rocky/Peaty Mineral | Mineral Alluvium |
| Zone of Contribution | Acid Deep Poorly Drained Mineral | Basic Deep Well Drained Mineral | Made |
| | Acid Shallow Well Drained Mineral | Basic Deep Poorly Drained Mineral | Water |