

Water Framework Directive Groundwater Monitoring Programme

Site Information **Gorey WS (Barnadown BH)**



Gorey WS (Barnadown BH) is a borehole used as part of the Gorey public water supply. The abstraction rate of the borehole is 1200 m³/day.



Wexford

August 2011

SITE INFORMATION					
Site Name:	Gorey WS (Barnadown BH)		County:	Wexford	
RBD:	SERBD		EU Reporting Code:	IE_SE_G_071_26_006	
Easting:	313764		GWB Name:	Gorey	
Northing:	155777		GWB Code:	IE_SE_G_071	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	3300PUB1306	
Hydrometric Area:	11		Water Level Monitoring Network:	Level	Flow
Townland:	BARNADOWN UPPER			N	N
Ownership:	Wexford County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	N		N		Y
Site Comments:	Gorey WS (Barnadown BH) is an 84m deep borehole situated in Ordovician Volcanics and is used as a public water supply. The borehole is included in the operational chemical network and it has been monitored by the EPA				

SITE DIRECTIONS	
Location and Access Information:	Loc ated 4.1 km south of Gorey. From Clogh village the site 1.4 km to the west in Barnadown Upper Townland.
Additional Comments:	---

WELL INFORMATION					
Monitoring Point Type:	BH	Abstraction Rate (m³/d):	1200	Ground Elevation (m OD):	60
Borehole Log Available:	---	Total Drilled Depth (m bgl):	84	Depth to Bedrock (m bgl):	---
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	200	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):	---	Comments on Monitoring Site:	---		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Gorey	Number of Abstraction Points in the Scheme:	9	Source Report Available	Y
Source Report Info:	WYG				
Scheme Summary:	Barnadown is one of seven boreholes being used in the Gorey scheme pumping up to 6900 m³/day. It is augmented by two surface water abstraction which provide an additional 2800 m³/day.				

HYDROGEOLOGY								
GEOLOGY	Soil:	Deep well drained mineral (AminDW)					Subsoil Permeability:	Low
	Subsoil:	Tills (diamictos) (TLPS)						
	Bedrock:	Ordovician Volcanics						
HYDROGEOLOGY	Aquifer Category:	Rf	Vulnerability at Monitoring site:	High to Low			Flow Regime:	Productive fissured bedrock
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	2.69	ZOC Delineated By:	OCM (DC)			Recharge Estimate (mm/yr):	255
	ZOC Delineation Comments:	The Barnadown ZOC was delineated using topography, abstraction and recharge. It is based on 150% of the abstraction rate to account for increases in demand and uncertainties in the delineation process. WYG has delineated a ZOC for the three different well fields in Gorey. These should be available in early 2011						
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified	
	18.85	14.69	0	0	0	66.46	0	
HYDROCHEMISTRY								
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 24 mg/l NO3 and the maximum nitrate concentration was 31 mg/l NO3. The average ammonium concentration was 0.015 mg/l N and the maximum ammonium concentration was 0.097 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.009 mg/l P and the maximum MRP concentration was 0.026 mg/l P. The average chloride concentration was 24.9 mg/l Cl and the maximum chloride concentration was 29 mg/l Cl.				
Alkalinity (mg/l HCO3):	Average:	Range:						
	113	93-170						
Hardness (mg/l CaCO3):	Average:	Range:						
	135	111-163						
Conductivity (uS/cm):	Average:	Range:						
	349	298-389						
Monitoring Record Period:	From:	To:						
	1993	2010						
RISK ASSESSMENT								
Pressure (e.g., Nitrates, Phosphates, Abstractions):	---			Typical Contaminants:	---			
Risk Category:	At risk, high confidence			GWB Status:	Good			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:			
	0.00	95.69	3.16	0.14	1.01			
OTHER INFORMATION								



Pump House



Borehole Housing



Sampling Point

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 µS/cm) / Drinking Water Test (1,875 µS/cm)

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

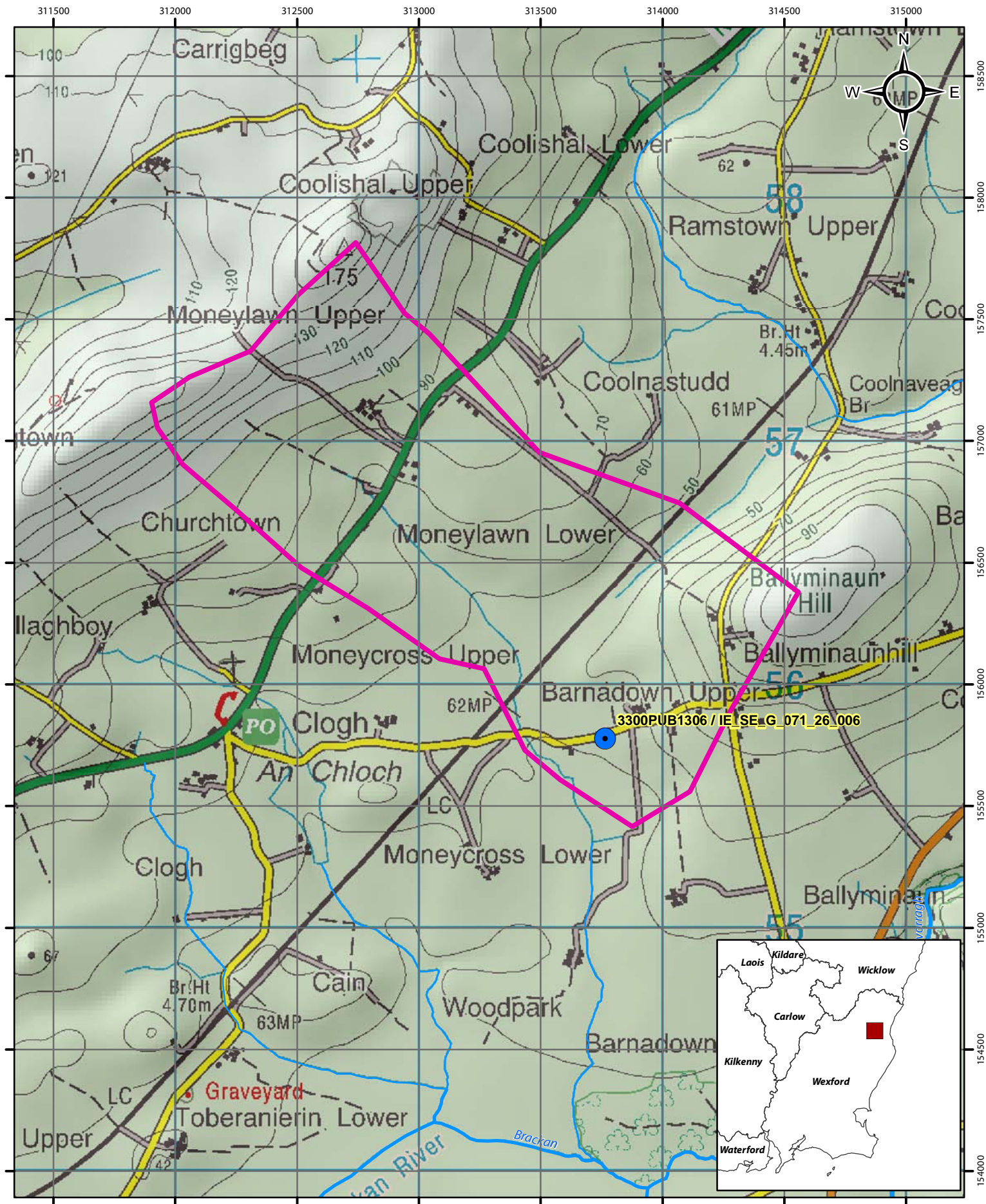
General Downgradient Distances

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		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:	

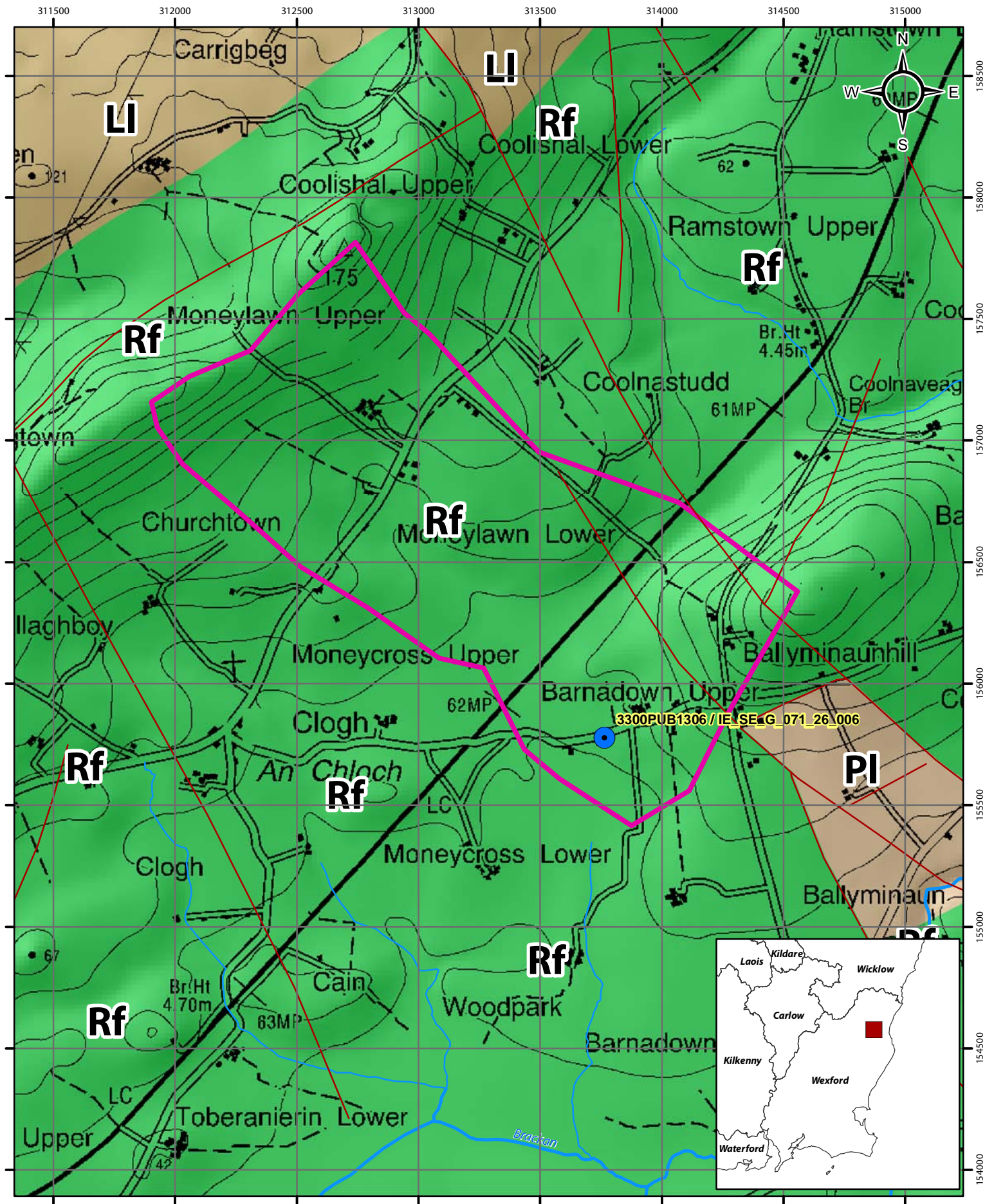


Location Map for Gorey WS (Barnadown BH)

- Abstractions
- River
- Zone of Contribution

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0 0.25 0.5 1 km

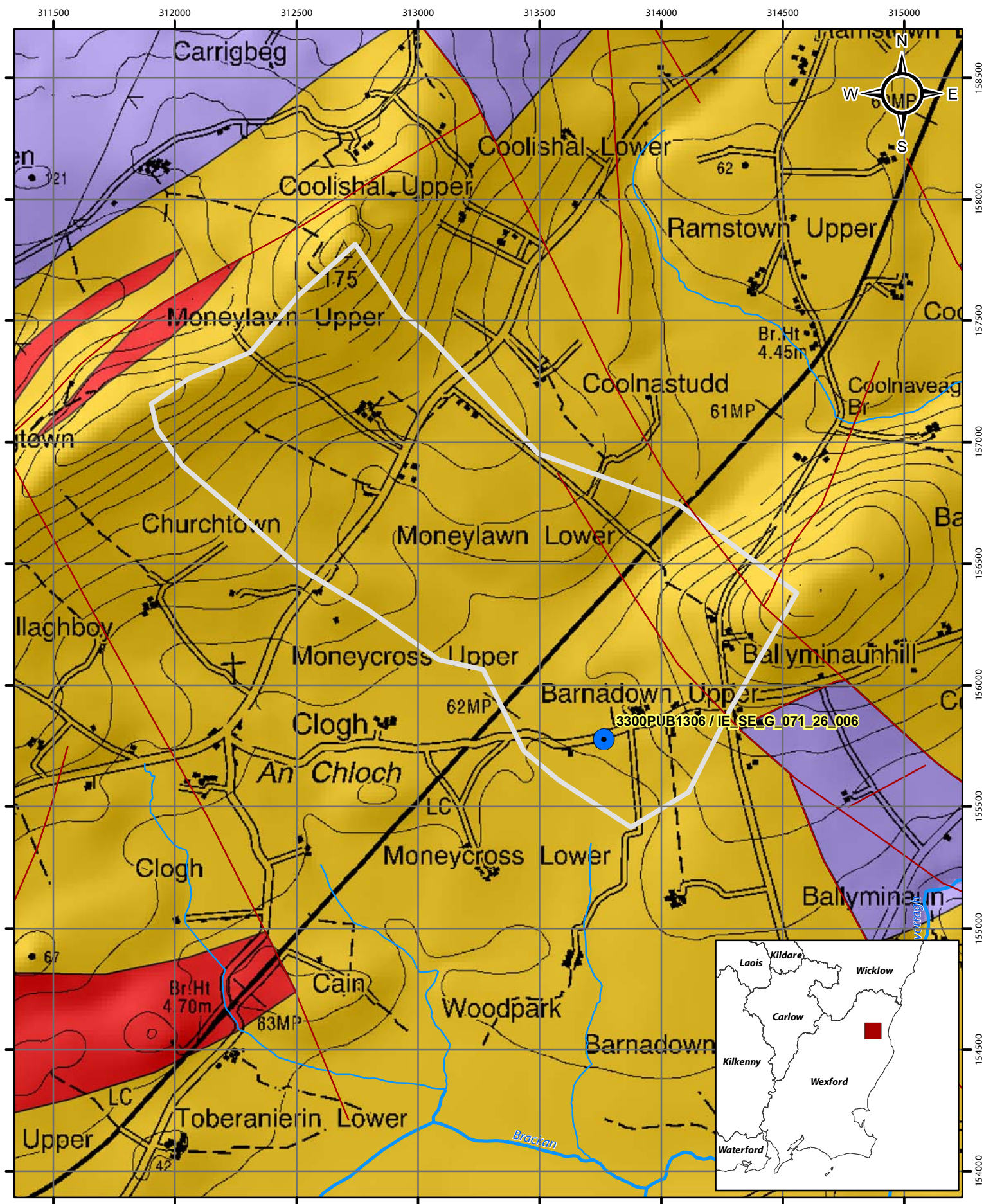


Aquifer Category Map for Gorey WS (Barnadown BH)

- Abstractions
- River
- Zone of Contribution
- LI
- PI
- Rf
- Fault

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0 0.25 0.5 1 km

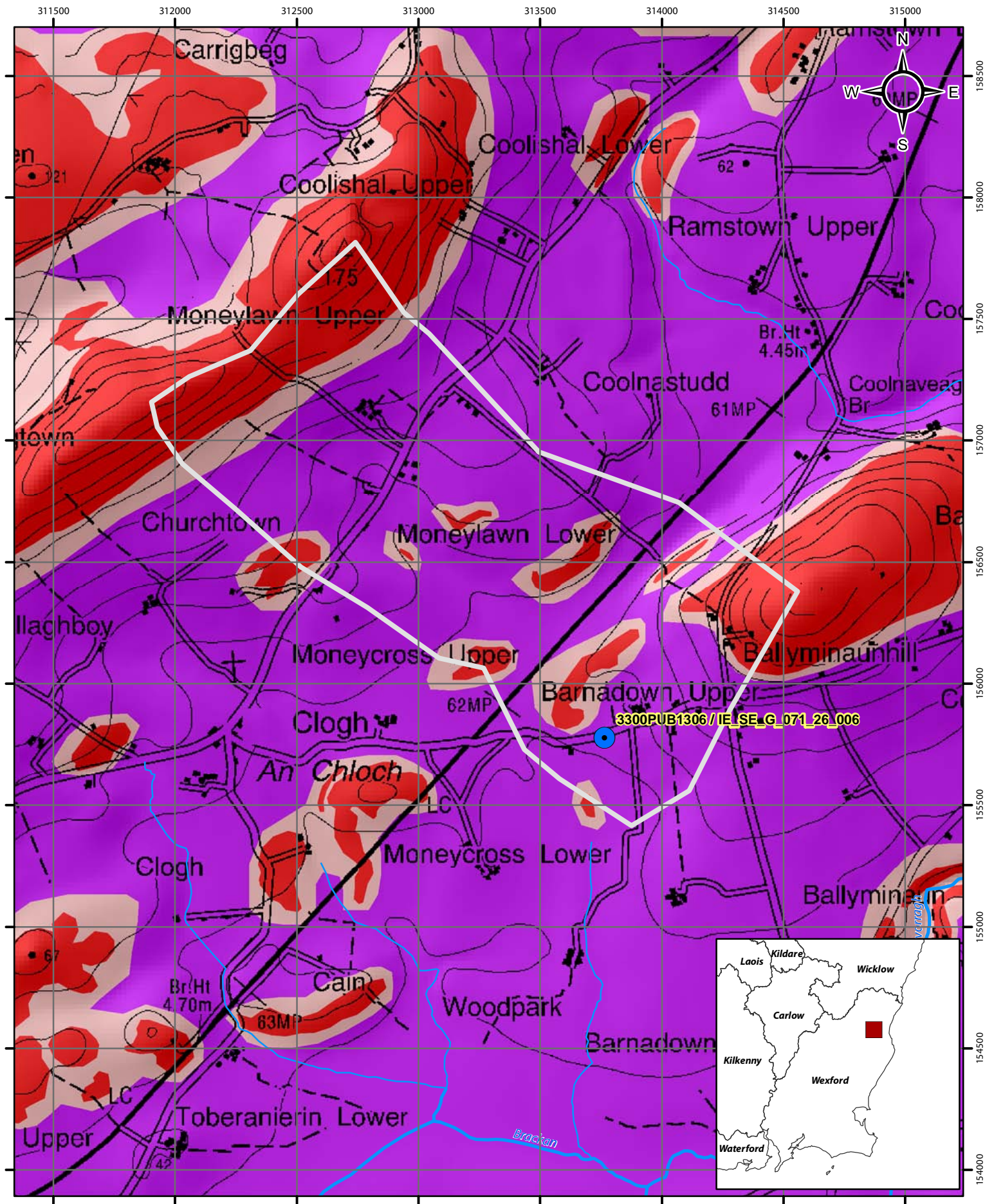


Bedrock Map for Gorey WS (Barnadown BH)

- Abstractions
- River
- Zone of Contribution
- Fault
- Granites & other Igneous Intrusive rocks
- Ordovician Metasediments
- Ordovician Volcanics

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0 0.25 0.5 1 km

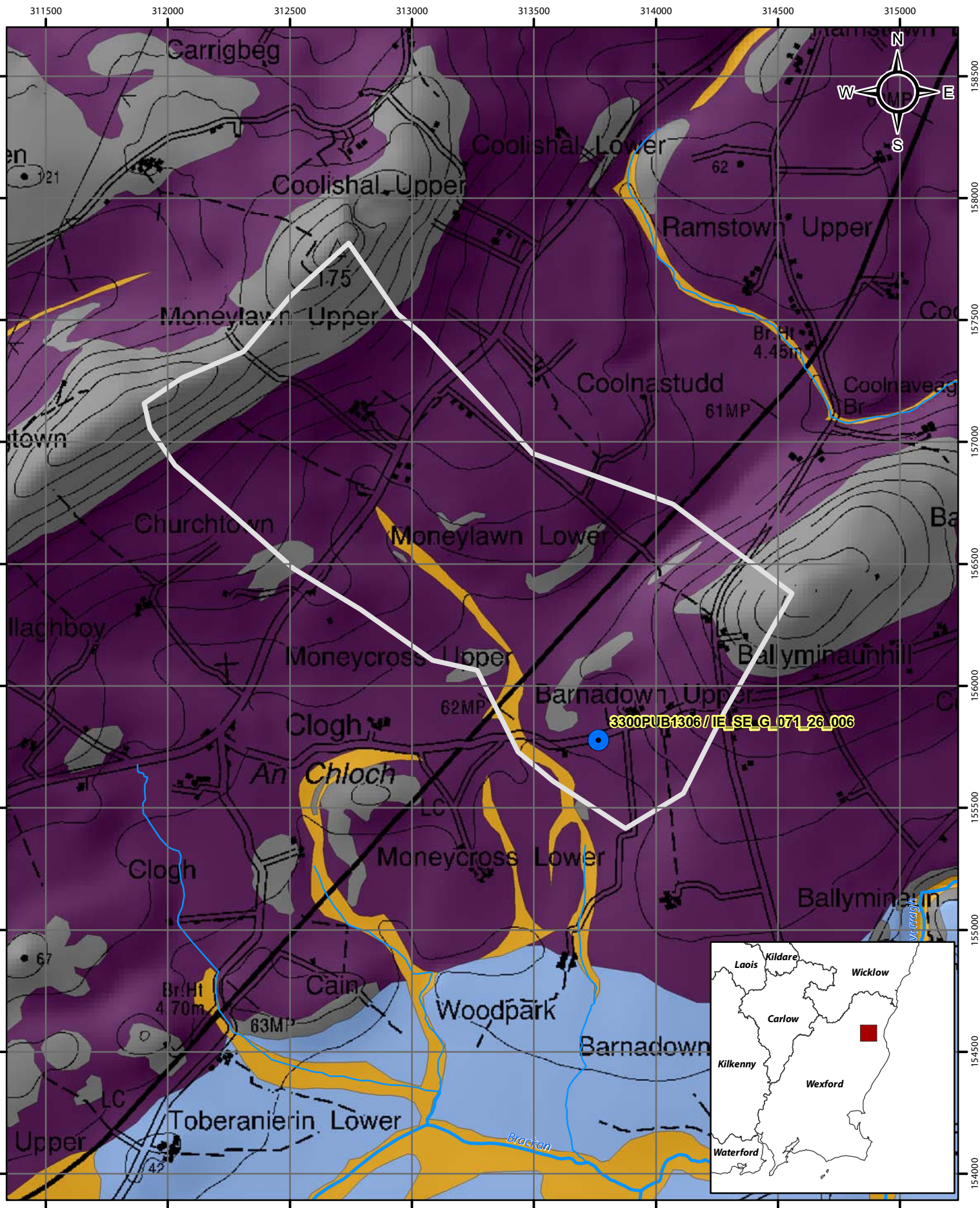


Groundwater Vulnerability Map for Gorey WS (Barnadown BH)

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

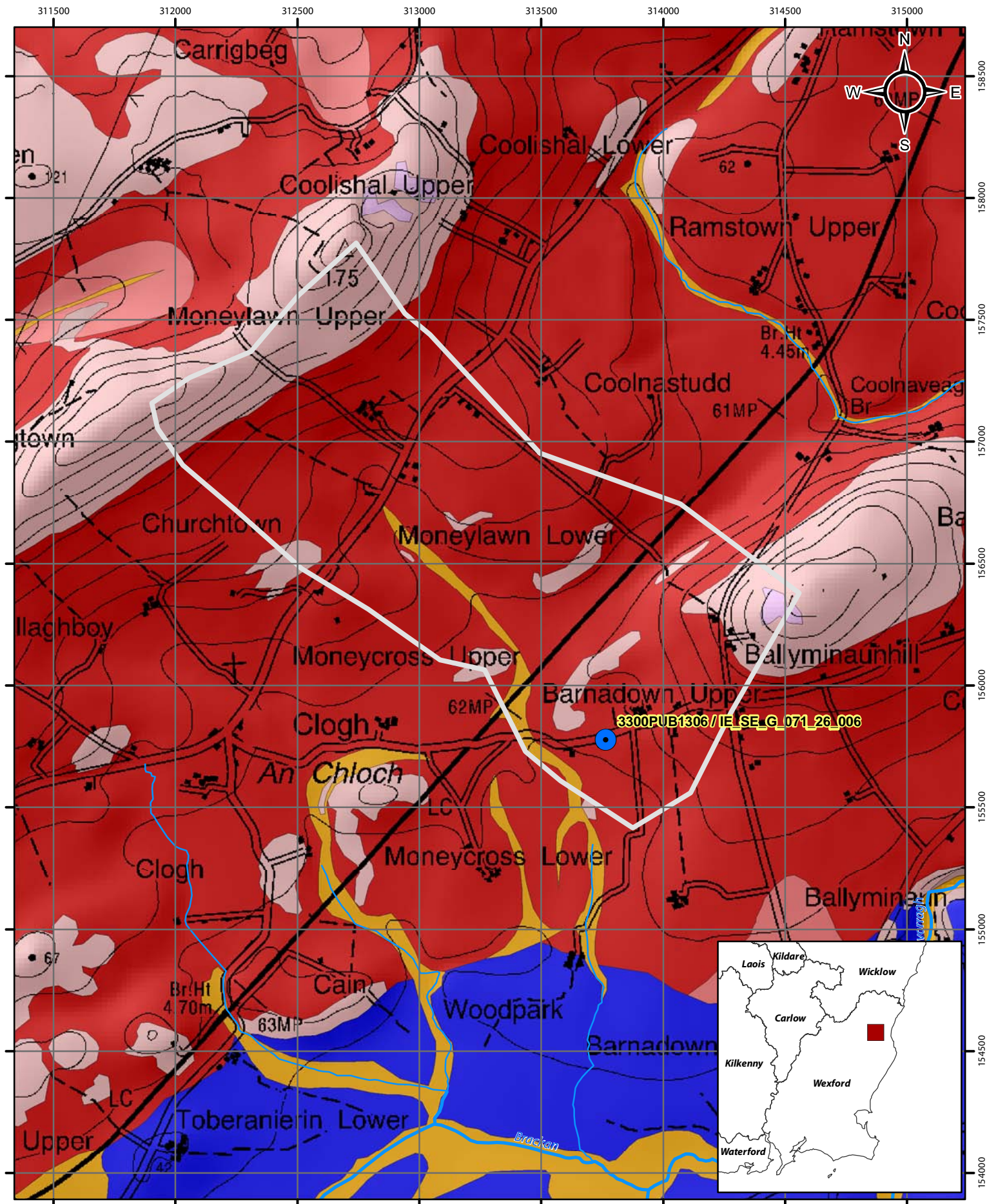
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0 0.25 0.5 1 km



Subsoils Map for Gorey WS (Barnadown BH)

- Abstractions
- Alluvium
- Irish Sea Till derived from limestones
- Bedrock outcrop or subcrop
- Till derived from Lower Palaeozoic shales
- River
- Zone of Contribution



Soils Map for Gorey WS (Barnadown BH)

- Abstractions
- River
- Zone of Contribution
- Acid Deep Well Drained Mineral
- Acid Deep Poorly Drained Mineral
- Acid Shallow Well Drained Mineral
- Acid Shallow Poorly Drained Mineral
- Acid Shallow/Rocky/Peaty Mineral
- Basic Deep Poorly Drained Mineral
- Mineral Alluvium

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0 0.25 0.5 1
km