

Water Framework Directive Groundwater Monitoring Programme

Site Information **Ballymoe PS**



The Ballymoe spring serves the Ballymoe public water scheme. The average abstraction rate from the spring is 650 m³/d. The extent and geometry of the associated ZOC is uncertain due to the karstic nature of the limestone aquifer.



Galway

August 2011

SITE INFORMATION					
Site Name:	Ballymoe PS		County:	Galway	
RBD:	Shannon IRBD		EU Reporting Code:	---	
Easting:	167889		GWB Name:	Suck South	
Northing:	271511		GWB Code:	IE_SH_G_225	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	1200PUB1007	
Hydrometric Area:	26		Water Level Monitoring Network:	Level	Flow
Townland:	Lisnageeragh (ED Ballymoe)			N	N
Ownership:	Galway Co. Co.				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	N		N		N
Site Comments:	Site is located on flat land surrounded by forest to the north and agricultural land in all other directions (pasture).				

SITE DIRECTIONS	
Location and Access Information:	From the intersection of the N60 and R360 in the centre of Ballymoe, drive SW on the R360. After c. 1 km, turn right. Follow road for c. 400 m. Just prior to the first house on the right, there is an access gate and dirt road into the field on the right. Open and close the access gate, and follow the dirt road for c. 500 m. The pump house is at the end of the dirt road.
Additional Comments:	The covered spring is located c. 50 m west of the pump house.

WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	650	Ground Elevation (m OD):	69
Borehole Log Available:	---	Total Drilled Depth (m bgl):	n/a	Depth to Bedrock (m bgl):	---
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	---	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:	The spring is covered, and the overflow location is equipped with a 90-degree V-notch weir. The abstraction varies according to demand, with records suggesting a range between 550-790 m³/d, and 650 m³/d as a reasonable average. There are two pumps in the pump house, one rated at 10.6 l/s and the other at 11.6 l/s. The later is a back-up pump. Water is treated via a slow sand filter and UV disinfection.		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Ballymoe PWS	Number of Abstraction Points in the Scheme:	1	Source Report Available	N
Source Report Info:	---				
Scheme Summary:	The scheme consists of a single spring which is pumped to two offsite reservoirs. The water is treated in the pump house.				

HYDROGEOLOGY								
GEOLOGY	Soil:	Cutaway/cutover peat (Cut)					Subsoil Permeability:	Low
	Subsoil:	Tills (diamictos) (TDSs)						
	Bedrock:	Dinantian Pure Bedded Limestones						
HYDROGEOLOGY	Aquifer Category:	Rkc	Vulnerability at Monitoring site:	Low	Flow Regime:	Karstified		
ZONE OF CONTRIBUTION	Estimated ZOC Size (km ²):	1.29	ZOC Delineated By:	CDM (HM)	Recharge Estimate (mm/yr):	300		
	ZOC Delineation Comments:	The ZOC is difficult to define due to its apparent karstic nature. There are many karst features (e.g. swallow holes) and smaller springs in the area. A theoretical ZOC has been delineated on the basis of a recharge estimate, topography, and a spring flow of 1,306 m ³ /d, measured on the day of the site visit (full range of spring overflow is not known, but the measured flow represents reasonably wet weather). ZOC encompasses a hilly area south of the spring higher than 80 mOD and of high to extreme vulnerability. The valley that the spring occupies is low vulnerability with peaty and clayey soils, and is excluded. An alternative ZOC would extend southward to some mapped swallow holes at Ballyglass. To improve the ZOC delineation, field study and tracer tests are needed.						
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified	
	7.73	60.51	26.93	4.83	0	0	0	
HYDROCHEMISTRY								
Hydrochemical Signature:	---		Additional Water Chemistry Information:	The average concentration of MRP (0.05 mg/L P) during the period 2008-2010 exceeds the WFD threshold value of 0.035 mg/L-P.				
Alkalinity (mg/l HCO ₃):	Average:	Range:						
	352.5	324-376						
Hardness (mg/l CaCO ₃):	Average:	Range:						
	384	356-424						
Conductivity (uS/cm):	Average:	Range:						
	710.12	683-736						
Monitoring Record Period:	From:	To:						
	2008	2010						
RISK ASSESSMENT								
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:	Phosphates				
Risk Category:	At risk, high confidence		GWB Status:	Poor				
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:			
	0.00	69.44	25.74	4.82	0.00			
OTHER INFORMATION								
<p>At the time of the site visit, the pump was off. The flow through the V-notch weir was measured and calculated at c. 1,036 m³/d (representing relatively wet conditions). When the pump is operating, the caretaker reports that there is usually a small overflow on any given day. The spring yield is usually reliable, but during the very dry summer of 2010, supply from the spring was low. The supply was augmented by pumping from a second much smaller spring about 100 m to the NE of the pump house. Without this additional source, the demand on the water scheme could not have been met. The flow and quantity pumped from the second spring is not known. In all likelihood it was a modest quantity, as the caretaker reported that the second spring was "pumped dry with a 2-inch submersible pump.</p>								



Site Entrance



Site



Spring Chamber

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 NO₃)

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).

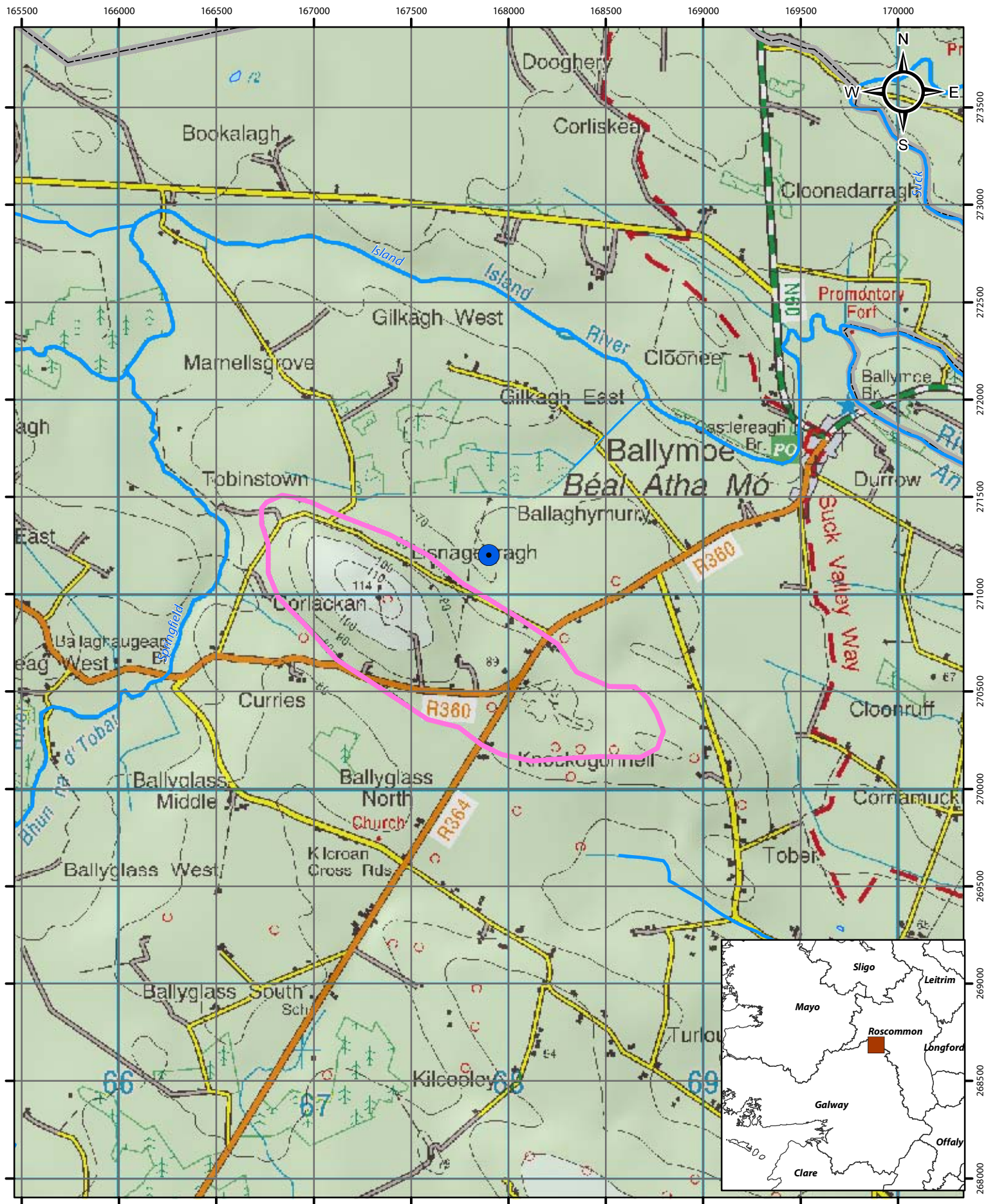
General Downgradient Distances

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
Ll, Pl	60 m

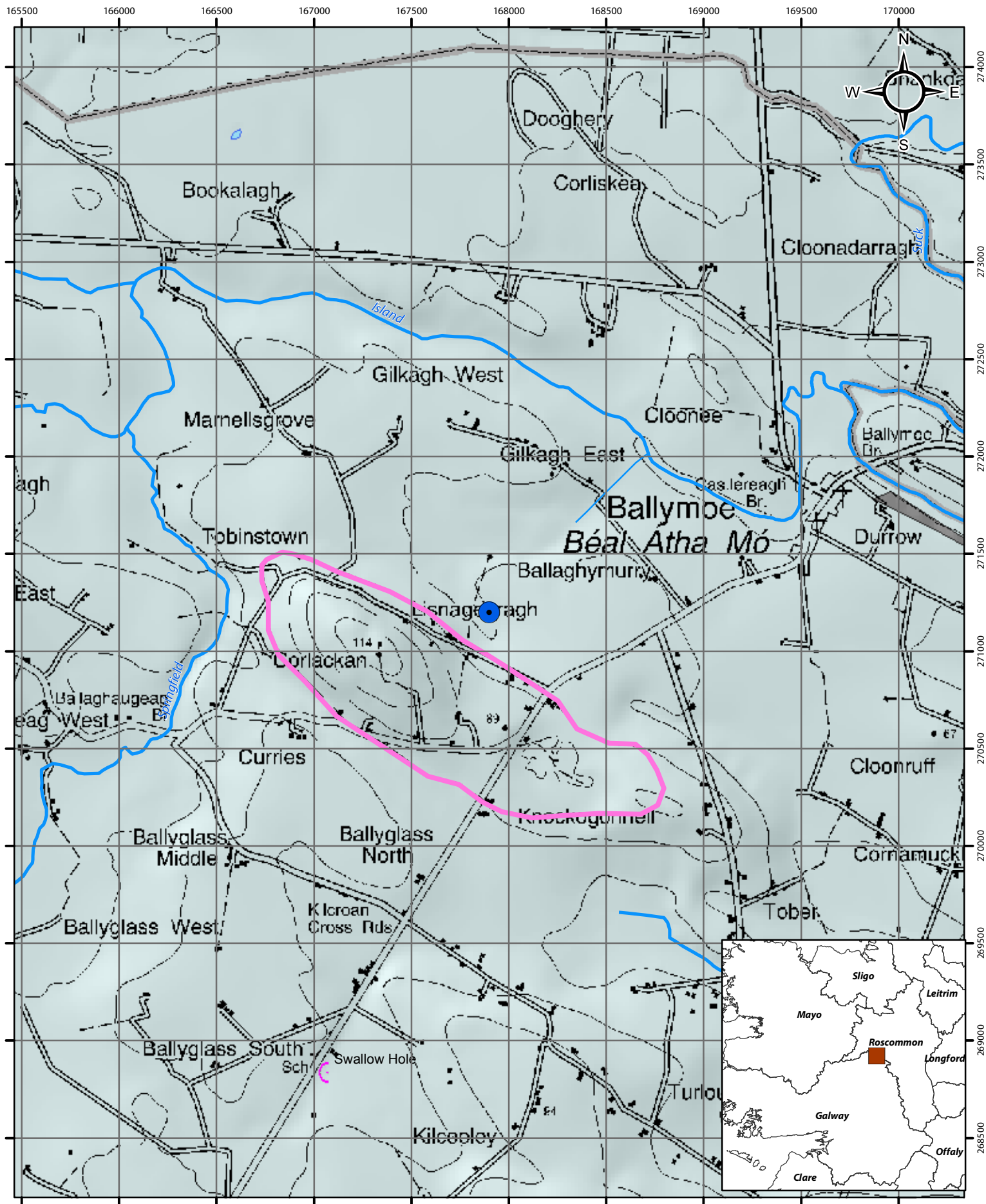
It is assumed that groundwater downgradient of a spring cannot flow back up to the spring, however a precautionary 30m buffer is generally applied which allows for instances where pumping under dry weather periods may induce a drawdown or where the ground may be sloping toward the spring from the downgradient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

Version 0:	Prepared by		Date:	
Version 1:	Prepared by	CDM (HM)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	



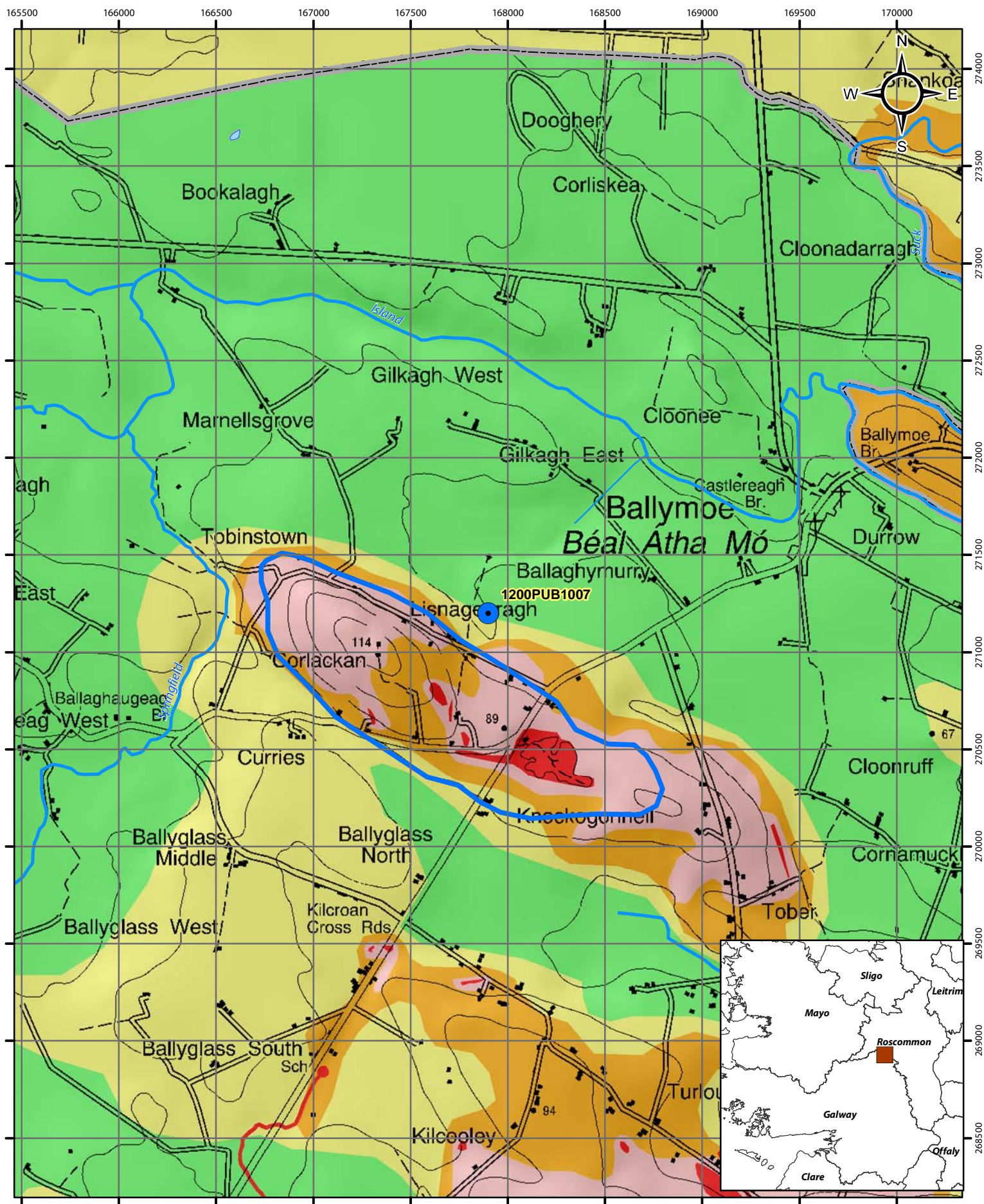
Location Map for Ballymoe P.S.

- Abstractions 2010
- Zone of Contribution
- River



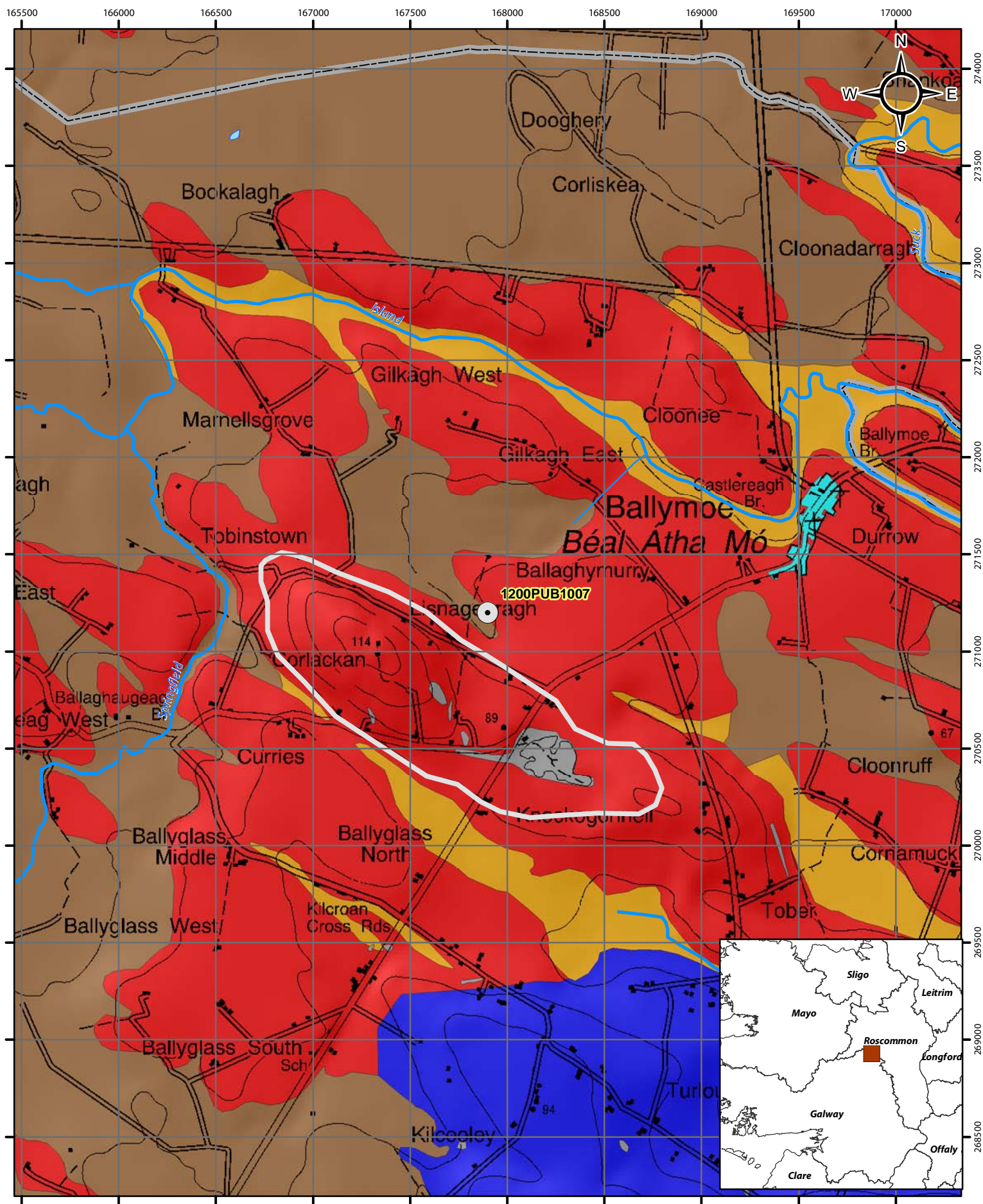
Bedrock Map for Ballymoe P.S.

- Abstractions 2010
- Zone of Contribution
- River
- Fault
- Swallow Hole
- Dinantian Pure Bedded Limestones



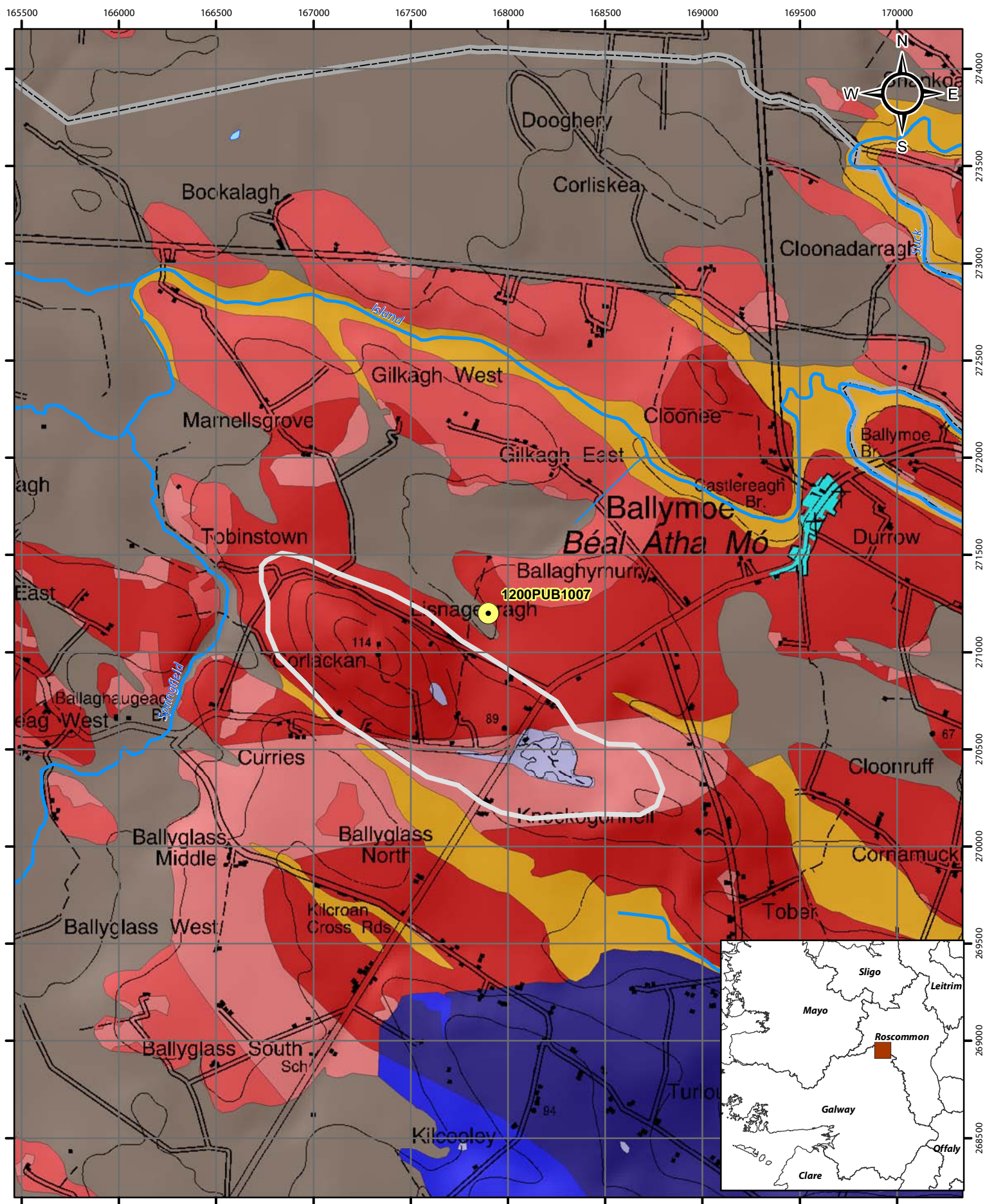
Groundwater Vulnerability Map for Ballymoe P.S.

- Abstractions
- E (Rock near surface or Karst)
- M (Moderate)
- E (Extreme)
- L (Low)
- HL (unmapped - High to Low)
- Zone of Contribution
- River
- Water



Subsoils Map for Ballymoe P.S.

- Abstractions
- Zone of Contribution
- River
- Alluvium
- Cutover raised peat
- Karstified bedrock outcrop or subcrop
- Lacustrine sediments
- Made ground
- Till derived from Devonian sandstones
- Till derived from limestones
- Water



Soils Map for Ballymoe P.S.



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