

Water Framework Directive Groundwater Monitoring Programme

Site Information **Ballyhane PWS**



The Ballyhane borehole source contributes to the Cappaquin part of the greater Lismore-Cappaquin-Ballyduff Water Supply Scheme. The borehole abstracts 345m³/day. A source report has been prepared for the source in 2010.

SITE INFORMATION					
Site Name:	Ballyhane PWS		County:	Waterford	
RBD:	SWRBD		EU Reporting Code:	IE_SW_G_050_24_002	
Easting:	213258		GWB Name:	Lismore	
Northing:	97706		GWB Code:	IE_SW_G_050	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	3100PUB1089	
Hydrometric Area:	18		Water Level Monitoring Network:	Level	Flow
Townland:	BALLYHANE(ED BALLYHANE)			N	N
Ownership:	Waterford County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	N		N		Y
Site Comments:	Ballyhane PWS is a 26.7m deep borehole situated in Dinantian Pure Unbedded Limestones and is used as a public water supply. The abstraction rate is 345m³/day. The borehole is included in the operational chemical network.				
SITE DIRECTIONS					
Location and Access Information:	The source is located in a 10 m by 10 m gated compound with concrete post and rail fencing, adjacent to the N72 from Cappaquin to Dungarvan / Waterford.				
Additional Comments:	---				
WELL INFORMATION					
Monitoring Point Type:	BH	Abstraction Rate (m³/d):	345	Ground Elevation (m OD):	15
Borehole Log Available:	---	Total Drilled Depth (m bgl):	26.7	Depth to Bedrock (m bgl):	unknown
Top of Casing (m agl):	slightly raised	Upper Casing Diameter (mm):	200	Lower Casing Diameter (mm):	---
Final Borehole Depth (m):	26.7	Upper Casing Bottom Depth (m bgl) :	unknown	Lower Casing Bottom Depth (m bgl):	---
Screen Interval (m bgl):	---	Screen Type (PVC,Steel,other):	steel	Screen Slot Size (mm):	unknown
Grout Type (cement,bentonite):	not grouted	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):	1363	Comments on Monitoring Site:	Yield is very high and drawdown is very low; 0.02m for a pumping rate of 1363m³/d during a pumping test in 1991; thus parameters for specific capacity and transmissivity are very high.		
Specific Capacity (m³/d/m):	very high				
Static Water Level (m bgl):	10.6				
Scheme Name:	Ballyhane	Number of Abstraction Points in the Scheme:	1	Source Report Available	Y
Source Report Info:	Source Report by TOBIN 2009.				
Scheme Summary:	The Ballyhane borehole source contributes to the Cappaquin part of the greater Lismore-Cappaquin-Ballyduff Water Supply Scheme.				

HYDROGEOLOGY							
GEOLOGY	Soil:	Deep well drained mineral (AminDW)				Subsoil Permeability:	Moderate
	Subsoil:	Tills (diamictos) (TDSs)					
	Bedrock:	Dinantian Pure Unbedded Limestones					
HYDROGEOLOGY	Aquifer Category:	Rkd	Vulnerability at Monitoring site:	Moderate	Flow Regime:	Karstified	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	1.7	ZOC Delineated By:	TOBIN	Recharge Estimate (mm/yr):	273	
	ZOC Delineation Comments:	ZOC based on a combination of topography and geology. Of note is that the northern boundary includes the LI aquifer as there is evidence of karstification in the vicinity. The boundary does not extend up passed the PI aquifer considered to be a groundwater flow barrier. All of the ZOC is defined as part of the Inner Protection Area. The areal extent accounts for an area greater than 150% of the current abstraction.					
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	0	6.62	0	0	0	93.38	0
HYDROCHEMISTRY							
Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 48 mg/l NO3 and the maximum nitrate concentration was 86 mg/l NO3. The average ammonium concentration was 0.018 mg/l N and the maximum ammonium concentration was 0.15 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.009 mg/l P and the maximum MRP concentration was 0.043 mg/l P. The average chloride concentration was 24.5 mg/l Cl and the maximum chloride concentration was 31 mg/l Cl.			
Alkalinity (mg/l HCO3):	Average:	Range:					
	275	220-400					
Hardness (mg/l CaCO3):	Average:	Range:					
	330	235-369					
Conductivity (uS/cm):	Average:	Range:					
	625	243-731					
Monitoring Record Period:	From:	To:					
	1993	2010					
RISK ASSESSMENT							
Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse		Typical Contaminants:	Nitrate			
Risk Category:	At risk, high confidence		GWB Status:	Good			
Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:		
	3.07	55.91	41.02	0.00	0.00		
OTHER INFORMATION							



Site



Sampling Location



Sampling Tap

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).

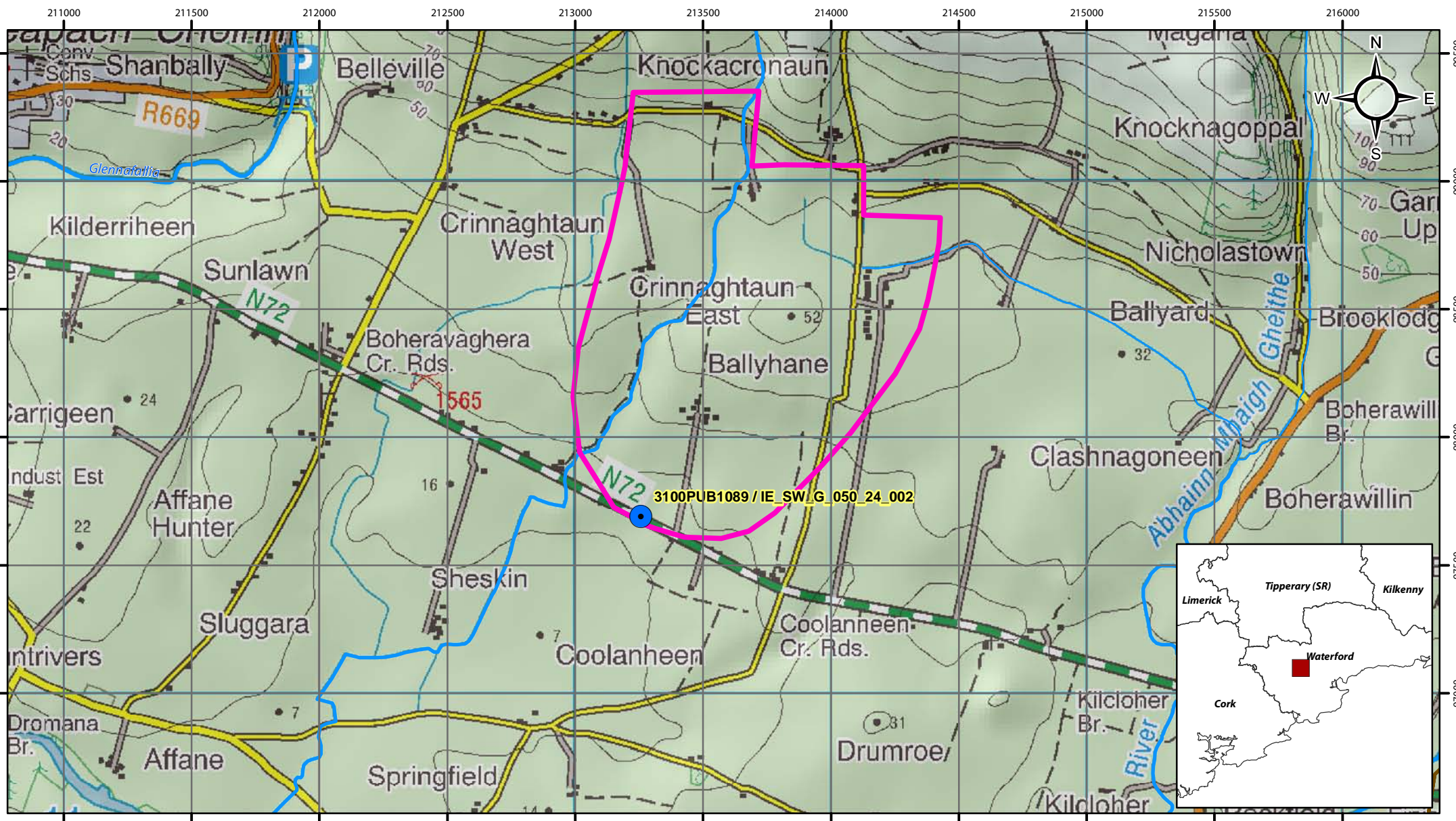
General Downgradient Distances

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
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	Tobin (PC/CK)	Date:	24/10/10
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	

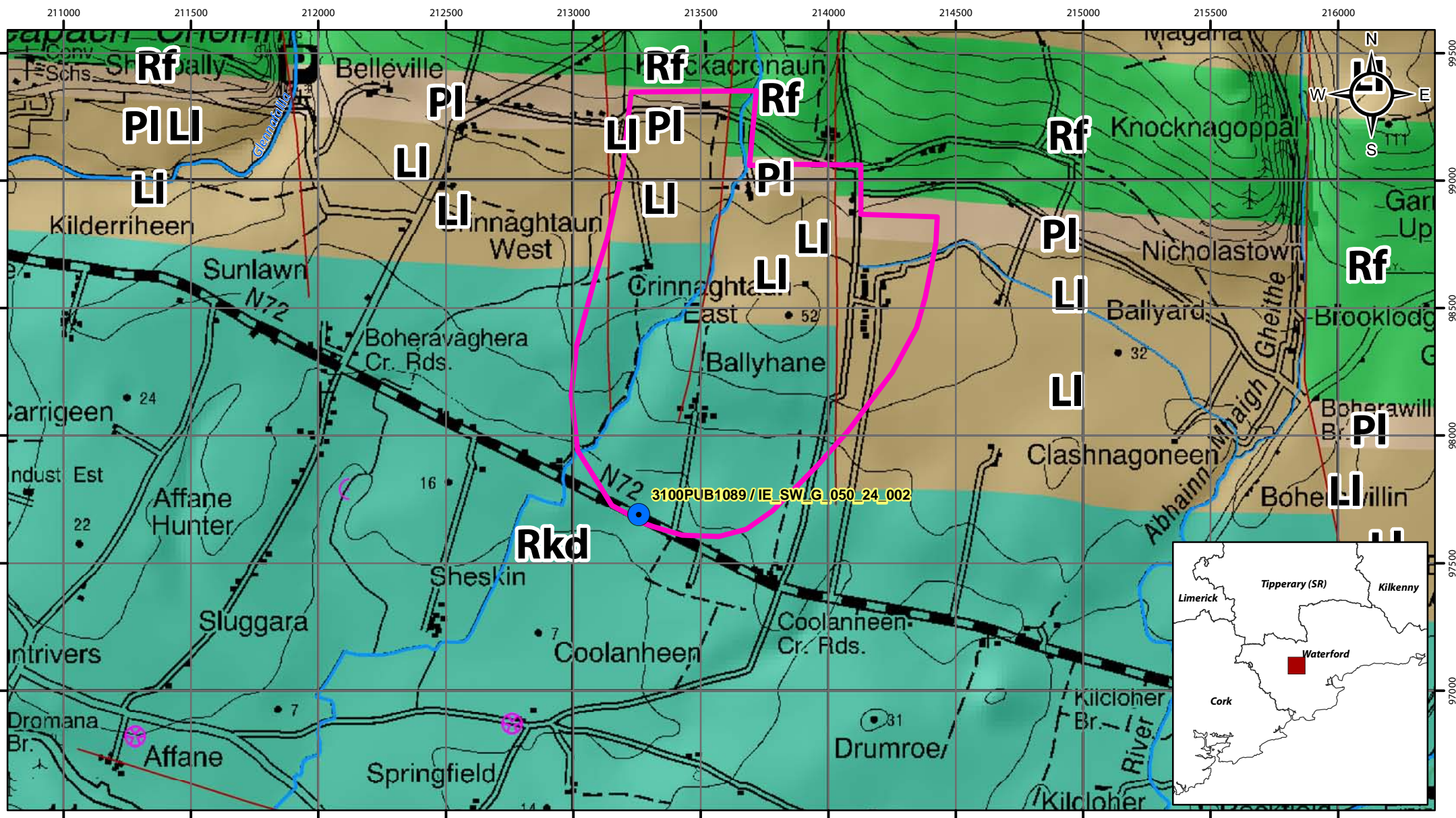


Location Map for Ballyhane PWS

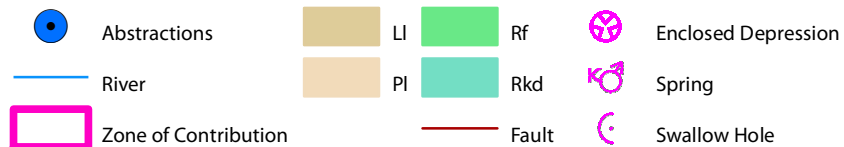
- Abstractions
- River
- Zone of Contribution

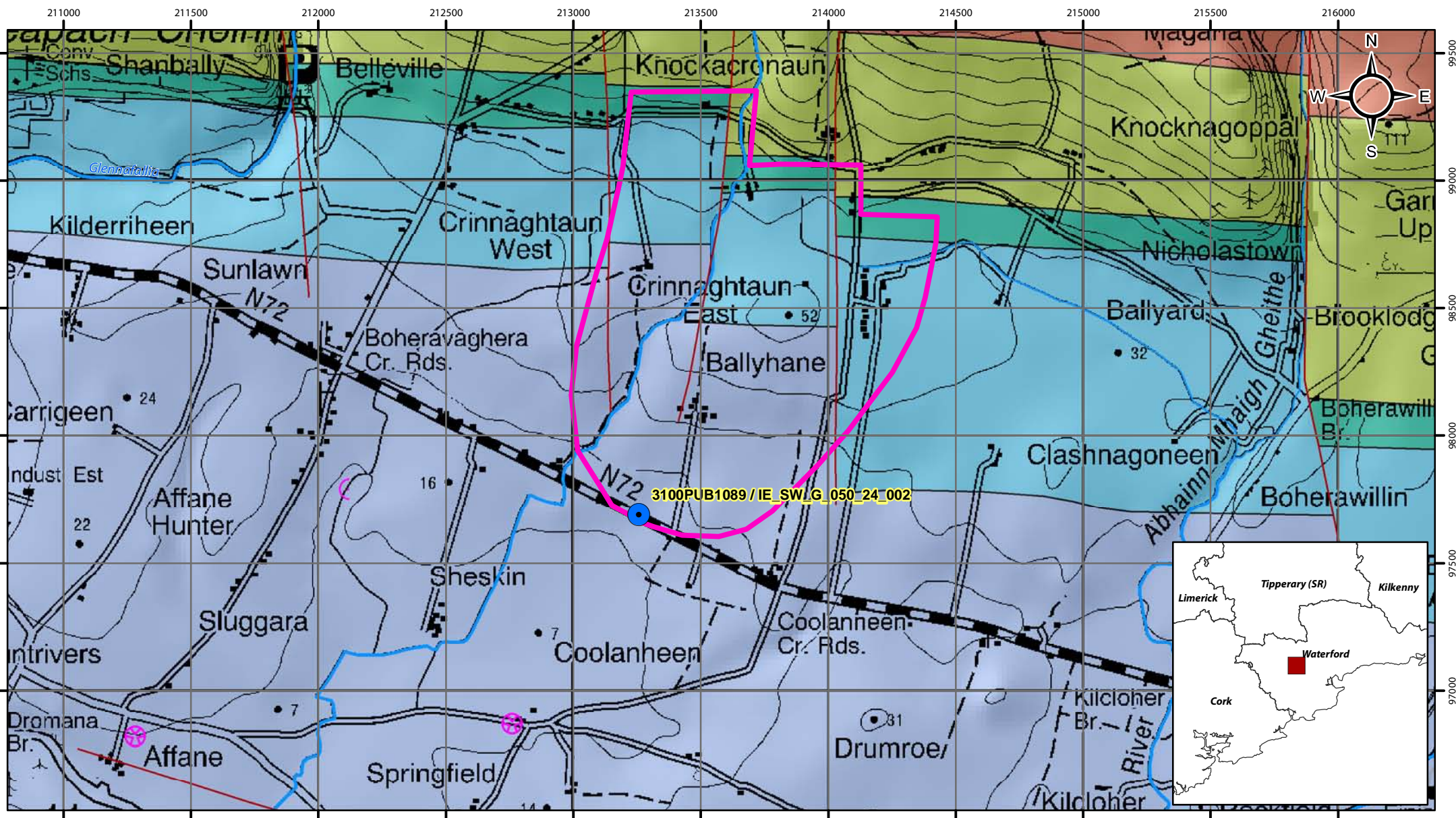
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0 0.25 0.5 1 km

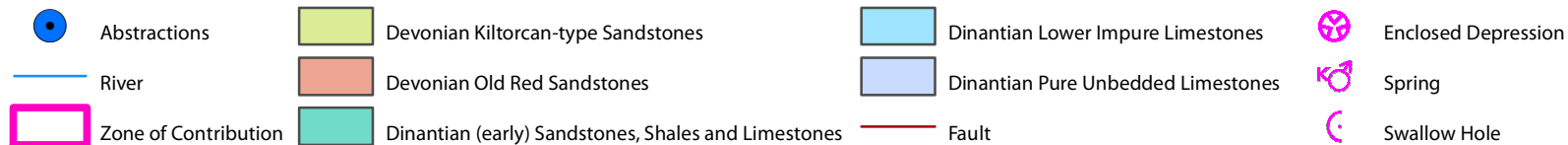


Aquifer Category Map for Ballyhane PWS

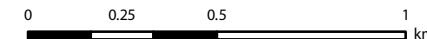


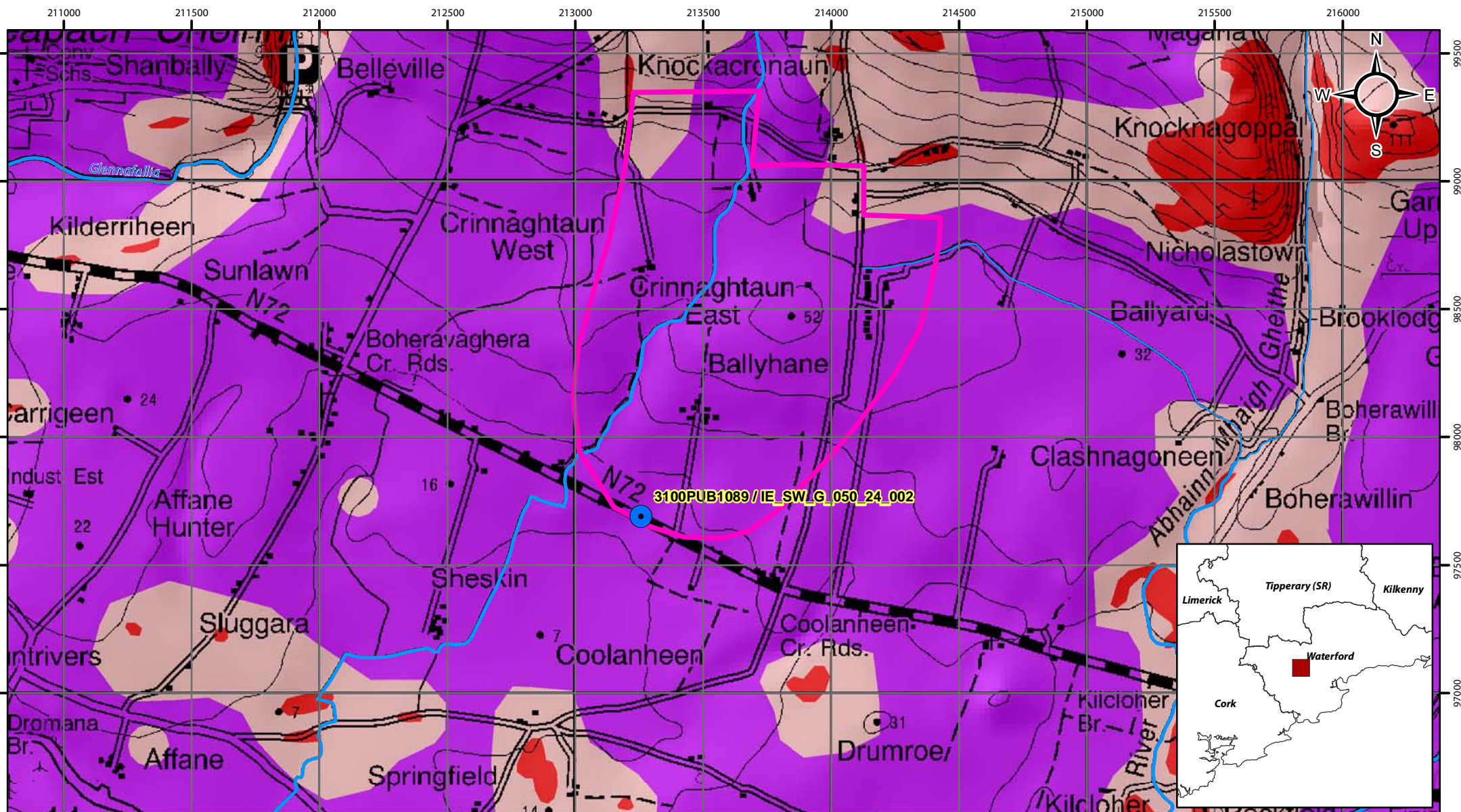


Bedrock Map for Ballyhane PWS

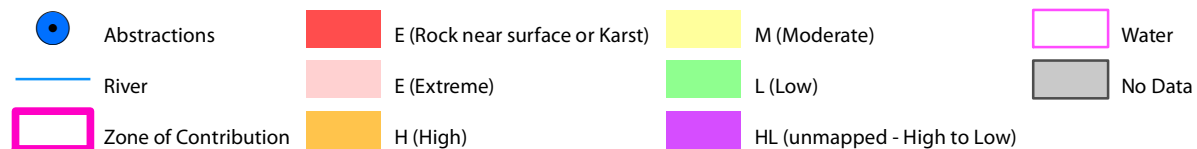


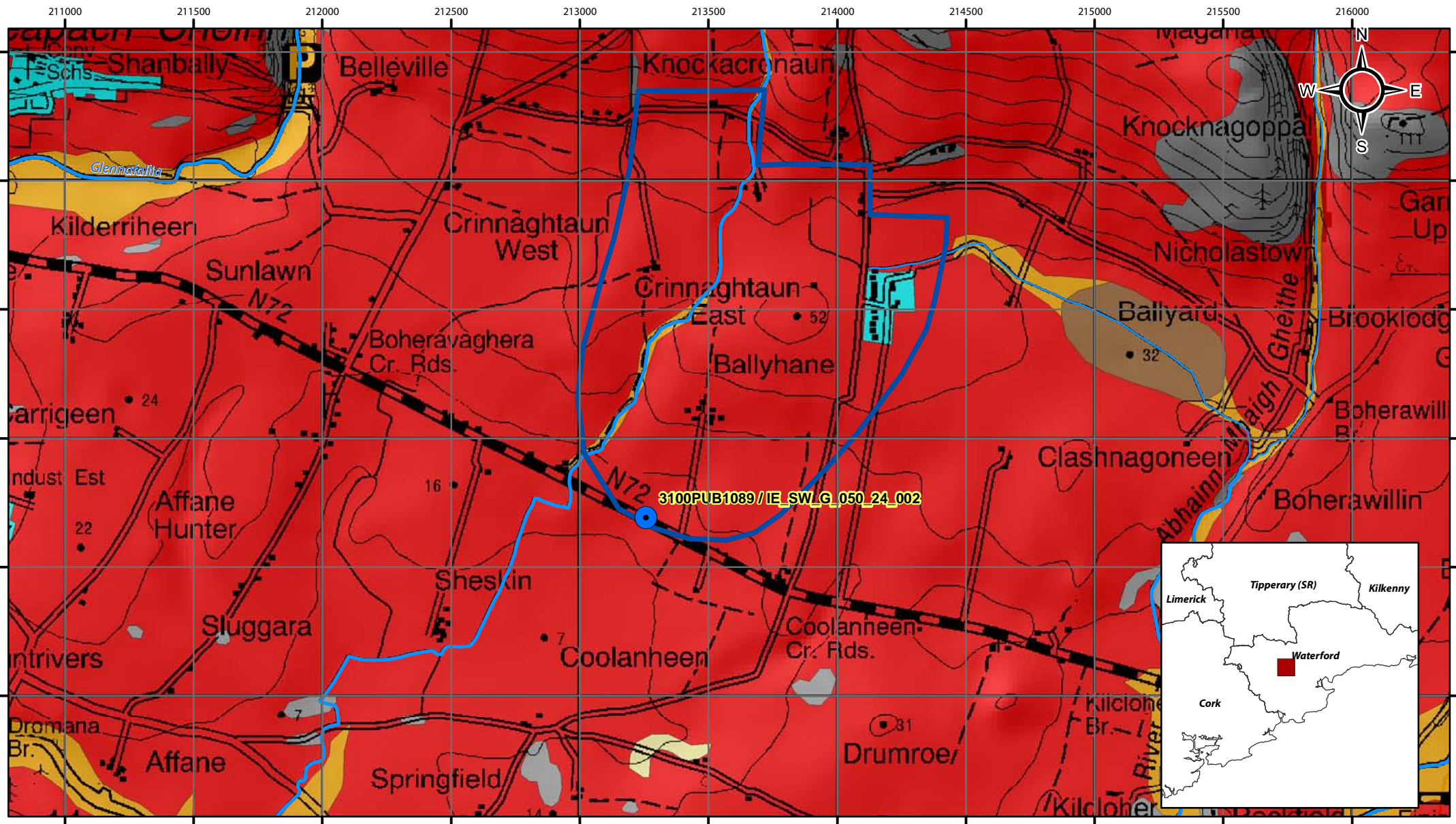
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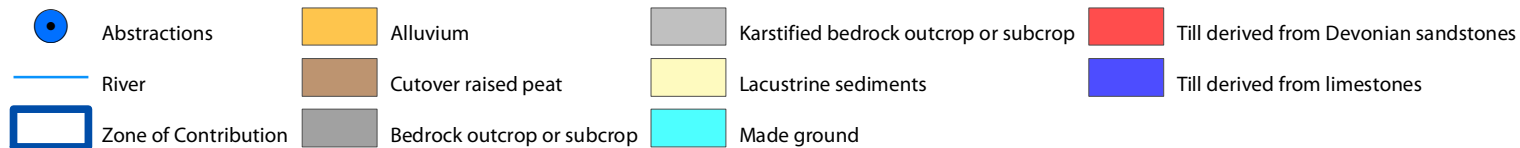


Groundwater Vulnerability Map for Ballyhane PWS

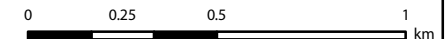


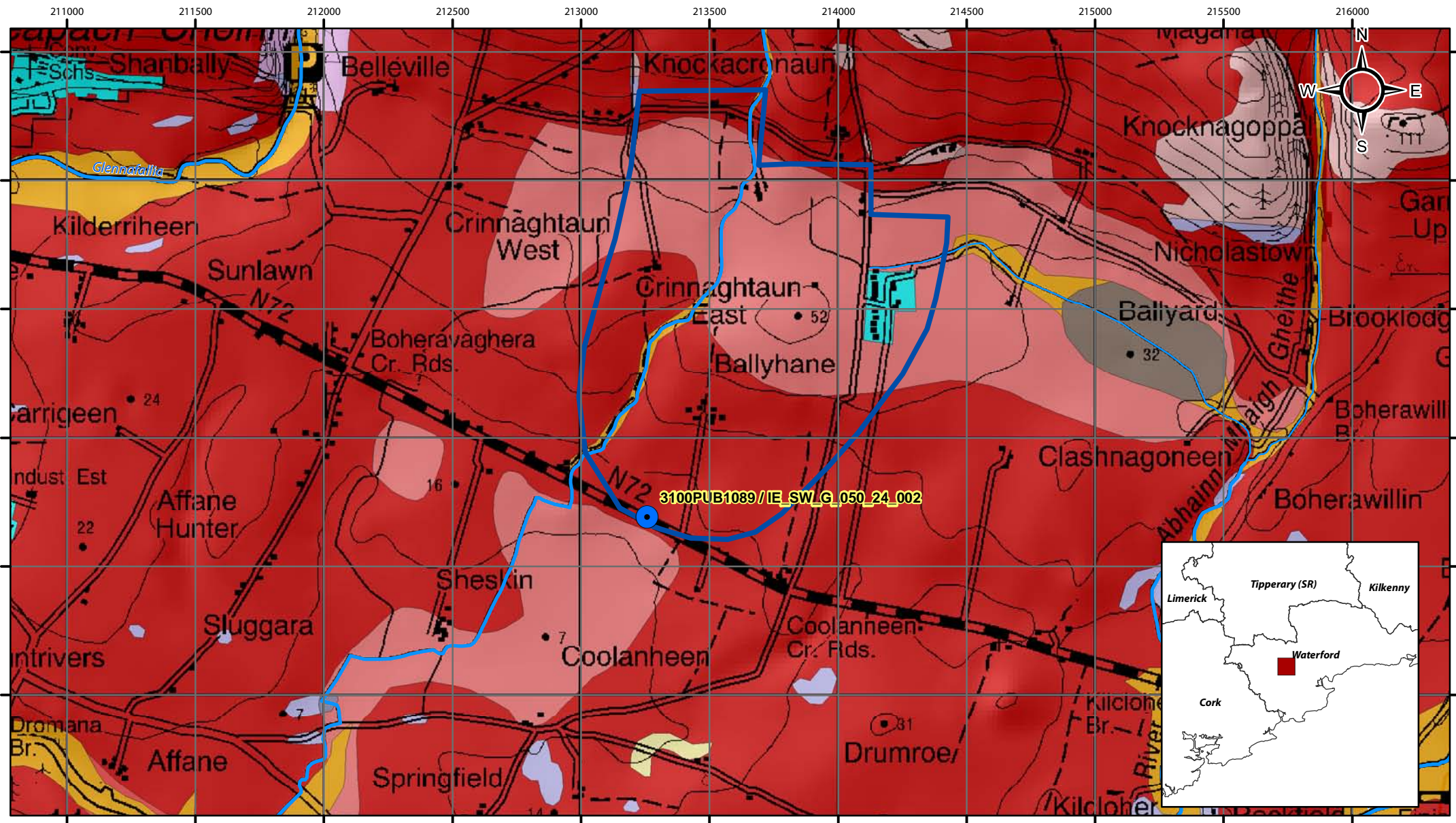


Subsoils Map for Ballyhane PWS



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Soils Category Map for Ballyhane PWS

