

## Water Framework Directive Groundwater Monitoring Programme

### Site Information **Clonbulloge WS**



Clonbulloge PWS is a spring and the abstraction rate is 200m<sup>3</sup>/d with a maximum abstraction of 510 m<sup>3</sup>/d. The GSI produced a source report for this site in 2005.



Offaly

**August 2011**

SITE INFORMATION					
Site Name:	Clonbulloge WS		County:	Offaly	
RBD:	SERBD		EU Reporting Code:	IE_SE_G_116_19_004	
Easting:	260780		GWB Name:	Rhode	
Northing:	223655		GWB Code:	IE_SE_G_116	
Site Use:	Drinking Water (PWS)		Drinking Water Code:	2500PUB1004	
Hydrometric Area:	14		Water Level Monitoring Network:	Level	Flow
Townland:	CLONBULLOGE			N	N
Ownership:	Offaly County Council				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	N		N		Y
Site Comments:	Clonbullogue PWS is a spring situated in Dinantian Impure Lower Limestones. The spring is included in the operational chemical network				

SITE DIRECTIONS	
Location and Access Information:	From Dublin take M7 south and take exit for Rathangan at junction 13. Drive through Rathangan for Clonbulloge. Enter the village and keep straight until arrive at an estate with a green area to the front and enter the estate along Woodlawn drive, keeping left, drive until arrive at track in the back of the estate. Climb over gate and see the pumphouse and well along the river bank across the field.
Additional Comments:	---

WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	200	Ground Elevation (m OD):	68
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):	510	Comments on Monitoring Site:	Spring is located right next to the river, in a concrete chamber outside the pumphouse.		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	Clonbulloge	Number of Abstraction Points in the Scheme:	1	Source Report Available	Y
Source Report Info:	Source report prepared by GSI in 2005.				
Scheme Summary:	The source was commissioned in 1968, and consists of a spring with a large diameter concrete pipe installed around the spring, with a sump 1.55 m deep. A small pumphouse has been built next to the chamber. A flow meter is positioned beneath a second manhole cover beside the pumphouse. The scheme serves approximately 450 people and there are approximately forty farms on the scheme. The water is pumped to a reservoir with a storage capacity of approximately 365 m³.				

HYDROGEOLOGY							
GEOLOGY	Soil:	Alluviums (AlluvMIN)				Subsoil Permeability:	Moderate
	Subsoil:	Alluvium (A)					
	Bedrock:	Dinantian Upper Impure Limestones					
HYDROGEOLOGY	Aquifer Category:	LI	Vulnerability at Monitoring site:	Moderate	Flow Regime:	Poorly productive	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km <sup>2</sup> ):	0.76	ZOC Delineated By:	GSI	Recharge Estimate (mm/yr):	179	
	ZOC Delineation Comments:	The GSI delineated a source area using the maximum discharge of 510 m <sup>3</sup> /d and the topography. See the source report for details.					
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	0	0	85.74	14.26	0	0	0
HYDROCHEMISTRY							
Hydrochemical Signature:	Ca-CO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 13 mg/l NO3 and the maximum nitrate concentration was 22 mg/l NO3. The average ammonium concentration was 0.022 mg/l N and the maximum ammonium concentration was 0.1 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.009 mg/l P and the maximum MRP concentration was 0.023 mg/l P. The average chloride concentration was 16.9 mg/l Cl and the maximum chloride concentration was 20 mg/l Cl.			
Alkalinity (mg/l HCO3):	Average:	Range:					
	266	33-390					
Hardness (mg/l CaCO3):	Average:	Range:					
	337	297-435					
Conductivity (uS/cm):	Average:	Range:					
	611	526-704					
Monitoring Record Period:	From:	To:					
	2007	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:		
	0.00	85.53	14.47	0.00	0.00		
OTHER INFORMATION							
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Pump House



Sampling Point



Inside Pumphouse

## 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  $\mu$ S/cm) / Drinking Water Test (1,875  $\mu$ S/cm)

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

### General Downgradient Distances

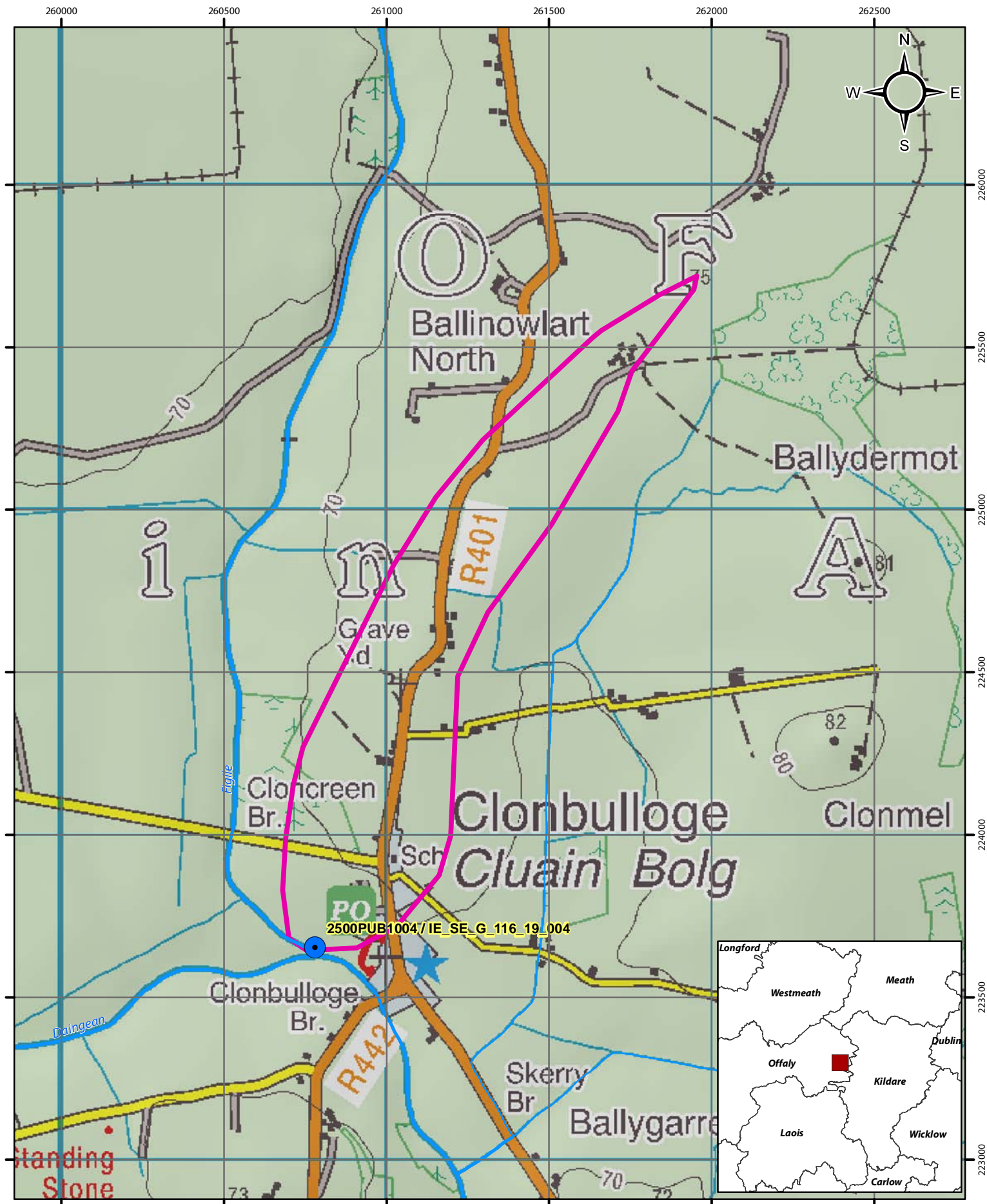
General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

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	Tobin (CK)	Date:	Mar 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	



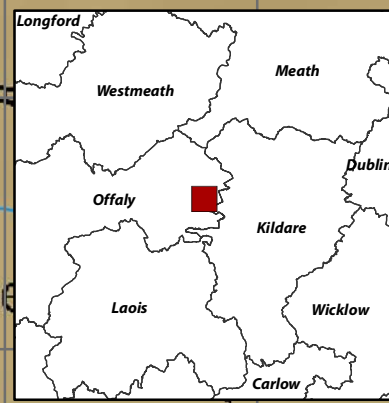
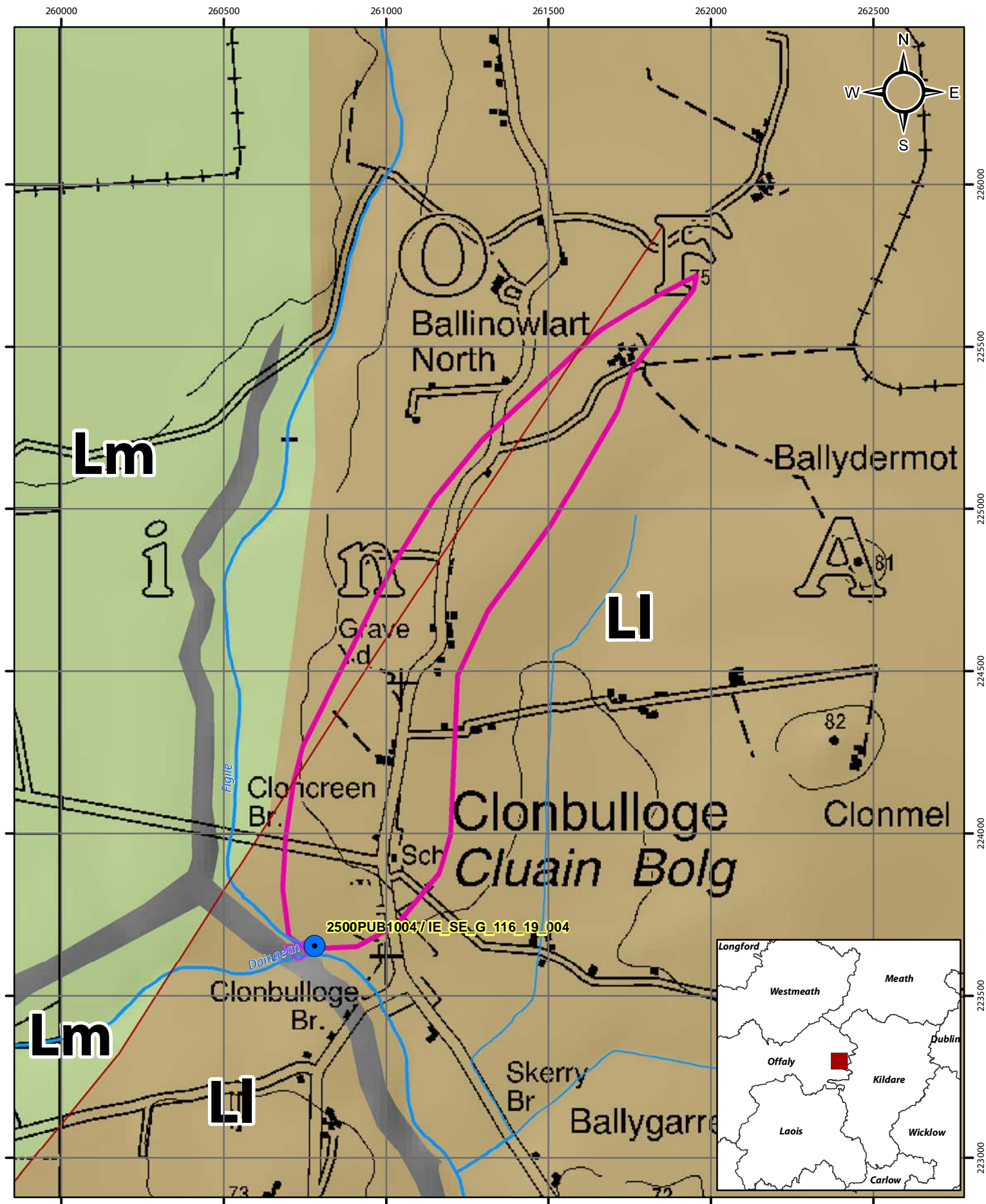


## Location Map for Clonbulloge WS

- Abstractions
- River
- Zone of Contribution

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0 0.25 0.5 1 km



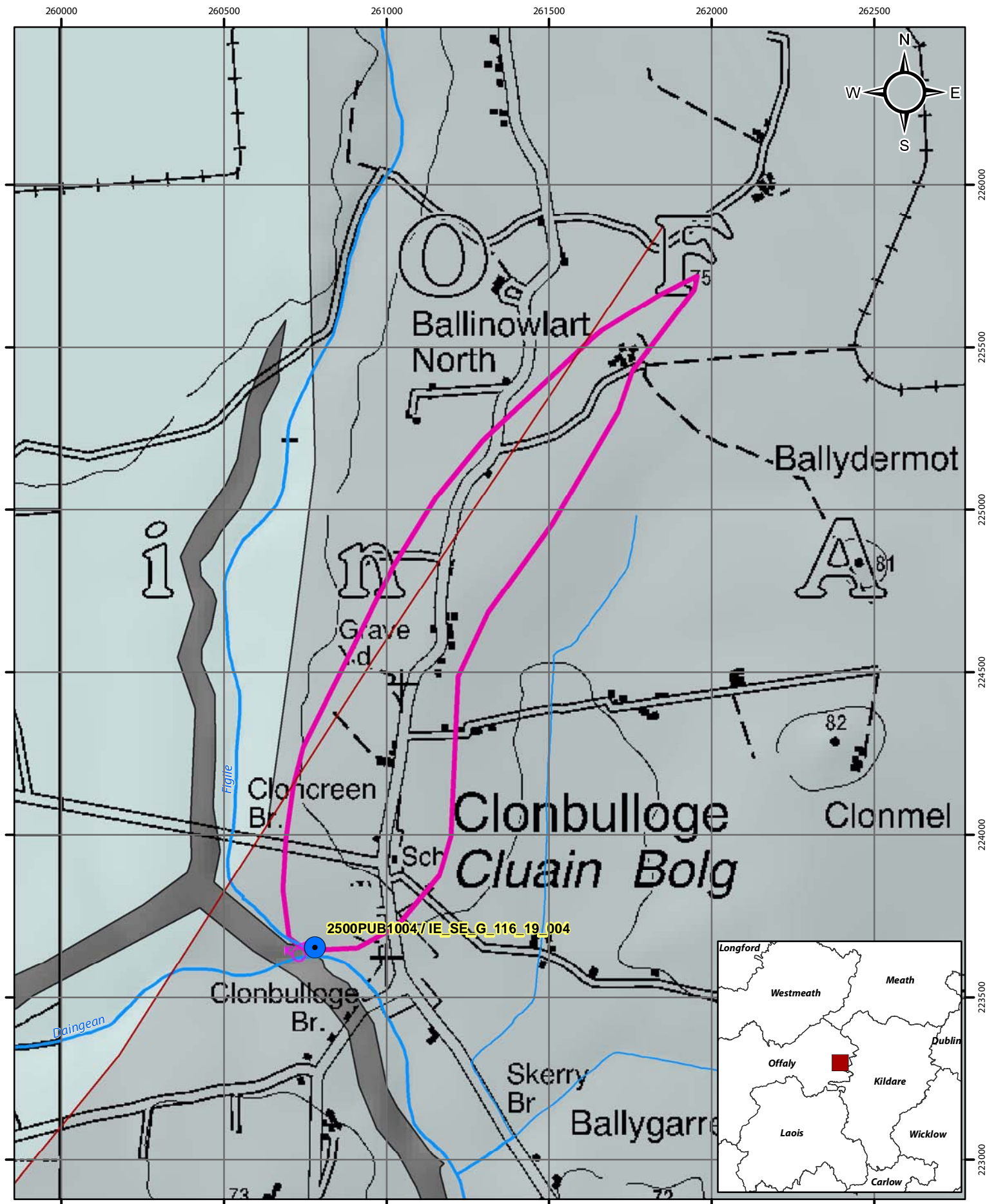
## Aquifer Category Map for Clonbulloge WS

- Abstractions
- River
- Zone of Contribution
- ✿ Spring
- Fault
- LI
- Lm

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0 0.25 0.5 1 km





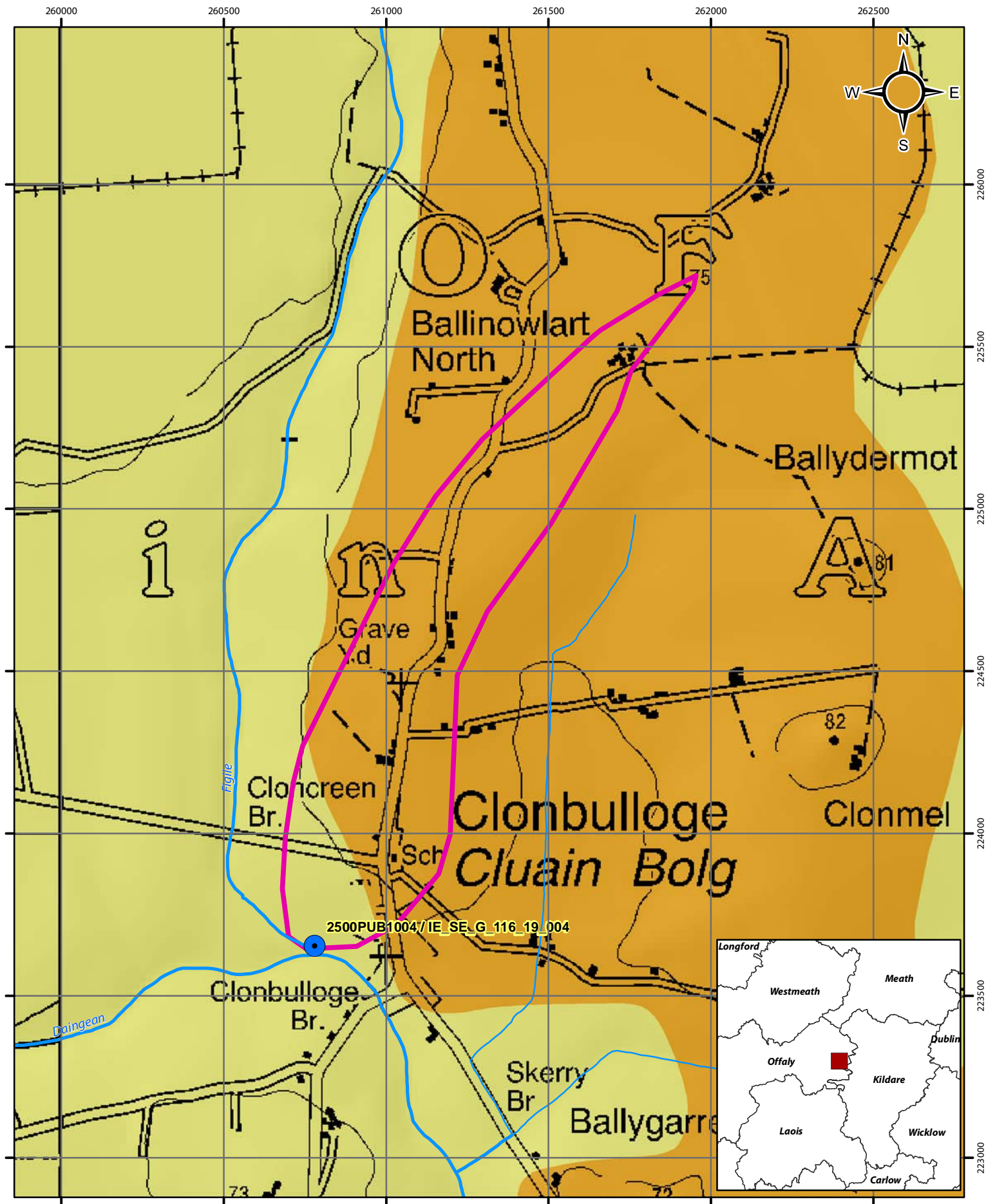
## Bedrock Map for Clonbulloge WS

- Abstractions
- ✿ Spring
- River
- Fault
- Zone of Contribution
- Dinantian Pure Bedded Limestones
- Dinantian Upper Impure Limestones

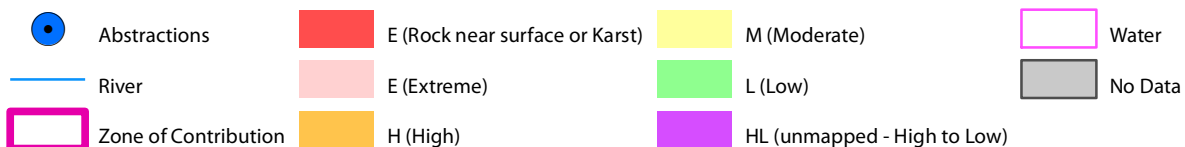
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0 0.25 0.5 1 km

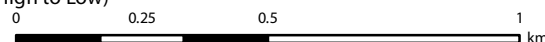


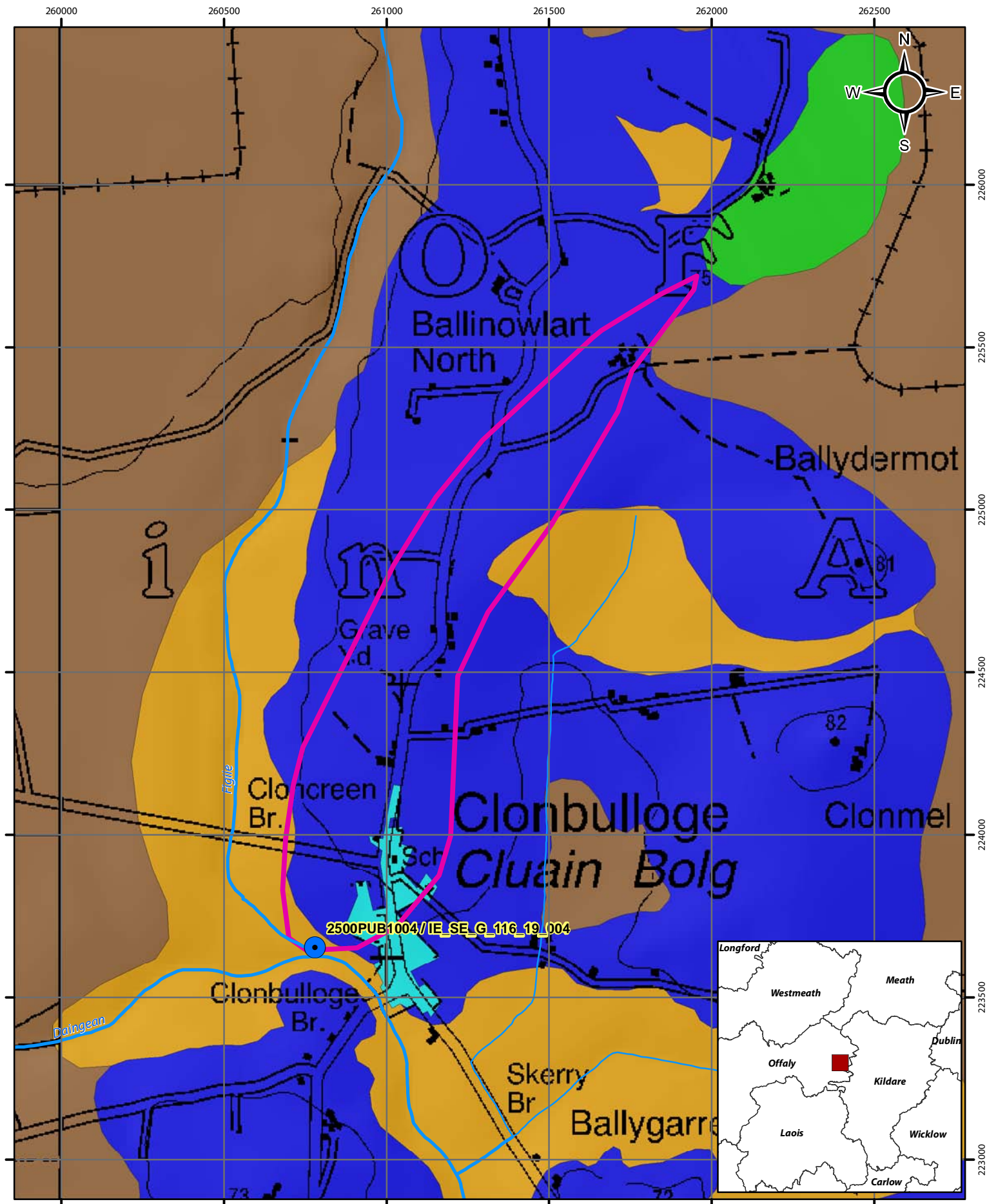


## Groundwater Vulnerability Map for Clonbulloge WS











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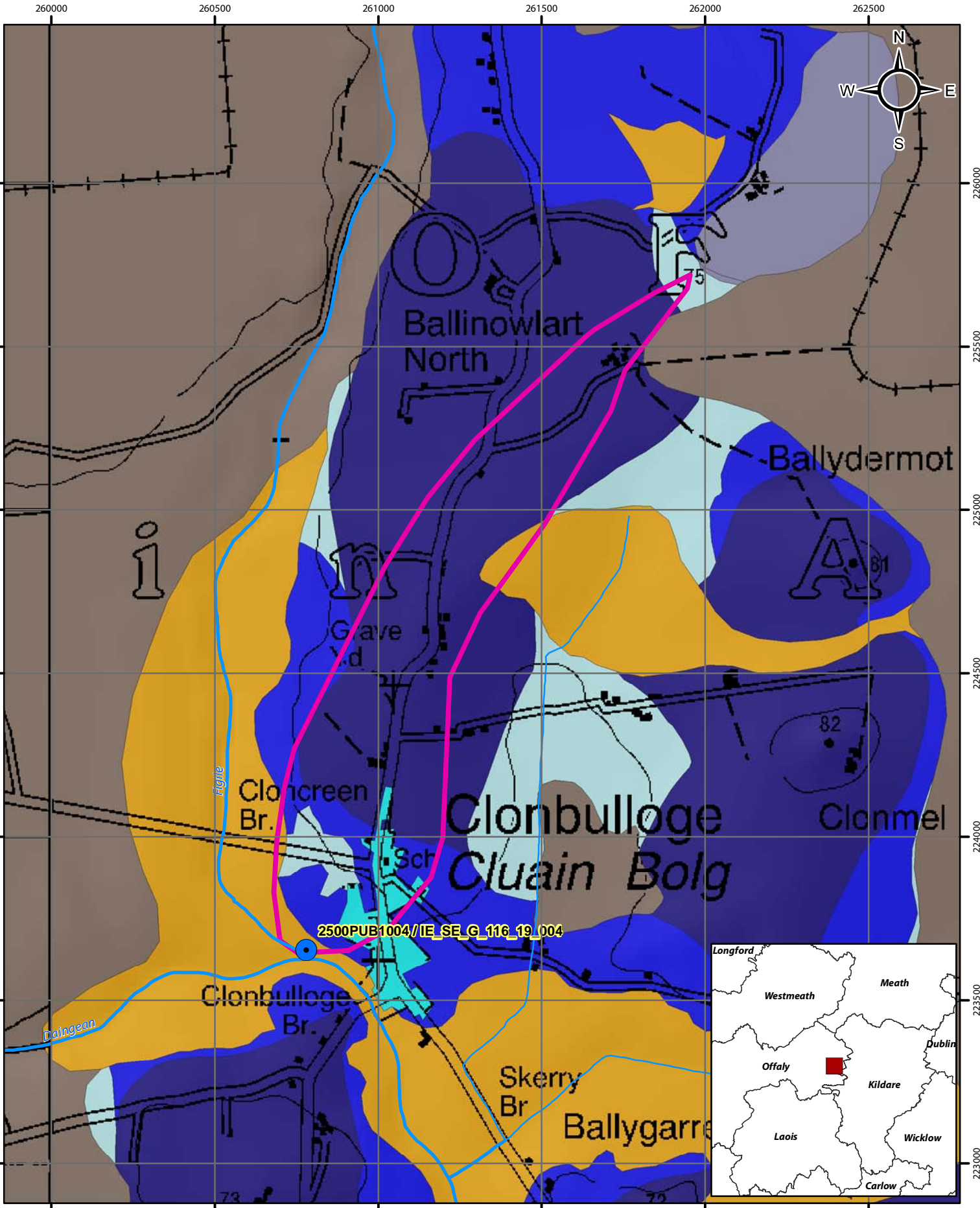
## Subsoils Map for Clonbulloge WS

- |  |                      |   |                                 |   |                              |
|--|----------------------|---|---------------------------------|---|------------------------------|
|  | Abstractions         |  | Alluvium                        |  | Made ground                  |
|  | River                |  | Cutover raised peat             |  | Till derived from limestones |
|  | Zone of Contribution |  | Gravels derived from limestones |   |                              |

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0 0.25 0.5 1 km





# Soils Map for Clonbulloge WS

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

