Water Framework Directive

Groundwater Monitoring Programme

Site Information

Boyle-Rockingham

Boyle-Rockingham includes three boreholes that supply the Boyle public water scheme. The average total abstraction rate is 2760 m³/day. The GSI have published a source protection report for the site.

Roscommon

August 2011

SITE INFORMATION

Site Name:	Boyle-Rockingham	County:	Roscommon		
RBD:	Shannon IRBD	EU Reporting Code:	IE_SH_G_048_20_006		
Easting:	184940	GWB Name:	Carrick-on-Shannon		
Northing:	302872	GWB Code:	IE_SH_G_048		
Site Use:	Drinking Water (PWS)	Drinking Water Code:	2600PUB1011 / 2600PUB1023		
Hydrometric Area:	26	Water Level Monitoring Network:	Level	Flow	
Townland:	ROCKINGHAM DEMESNE (ED Rockingham)		N	Y	
Ownership:	Roscommon County Council				

Water Quality Monitoring Network:	Surveillance	Operational (Point)	Operational (Diffuse)
	N	N	Y

Site Comments:	The site is surrounded by agricultural land. The site is fenced off. Wellheads are within concrete chambers.

SITE DIRECTIONS

Location and Access Information:	Rockingham Spring and boreholes are located 5 km east of the town of Boyle. Drive east from Boyle on road R294. This merges onto the N4. From the merger with the N4, drive 1.8 kms along the N4 and take a left turn (north side of N4). Follow this road for approximately 600 m and take a left turn onto a dirt road. The site is located about 120 m straight on.
Additional Comments:	---

WELL INFORMATION

Monitoring Point Type:	Borehole	Abstraction Rate (m^3/d):	2760	Ground Elevation (m OD):	47
Borehole Log Available:	---	Total Drilled Depth (m bgl):	19.2	Depth to Bedrock (m bgl):	2
Top of Casing (m agl):	---	Upper Casing Diameter (mm):	300	Lower Casing Diameter (mm):	300
Final Borehole Depth (m):	---	Upper Casing Bottom Depth (m bgl) :	7	Lower Casing Bottom Depth (m bgl):	19.2
Screen Interval (m bgl):	7 to 13.5	Screen Type (PVC,Steel,other):	Steel	Screen Slot Size (mm):	---
Grout Type (cement,bentonite):	---	Grouted above (m bgl):	---	Grout Volume Injected (m^3):	---
Gravel Pack Interval (m bgl):	---	Gravel Pack Volume (m^3):	---	Open Hole Interval (m bgl):	---
Potential Yield (m^3/day):	---	Comments on Monitoring Site:	Boyle Borehole details for 2 main production wells (19.2m deep).300mm diameter steel casing 7m bgl, 300mm slotted steel casing 7-13.5m bgl and 300mm steel casing 13.5-19.2m. PW3 is deeper - to 32m.		
Specific Capacity (m^3/d/m):	---				
Static Water Level (m bgl):	2				
Scheme Name:	Boyle/ Boyle-Ardcarn	Number of Abstraction Points in the Scheme:	3	Source Report Available	Y
Source Report Info:	Source report prepared by GSI.				
Scheme Summary:	Three production boreholes (PW-1, PW-2, PW-3). Two of the wells work all the time and one is on standby. The water is pumped to two reservoirs Carrickmore (2600PUB1023) and Ardcarne (2600PUB1011).				

HYDROGEOLOGY

GEOLOGY	Soil:	Deep poorly drained mineral (AminPD)			Subsoil Permeability:	n/a
	Subsoil:	Tills (diamictons) (TDSs)				
	Bedrock:	Dinantian Pure Bedded Limestones				
HYDROGEOLOGY	Aquifer Category:	Rkc	Vulnerability at Monitoring site:	Extreme	Flow Regime:	Karstified
ZONE OF CONTRIBUTION	Estimated ZOC Size (km²):	15.11	ZOC Delineated By:	GSI	Recharge Estimate (mm/yr):	394
	ZOC Delineation Comments:	ZOC delineated by the GSI for spring and production boreholes. ZOC based on water tracing and geology. Inner Protection Areas were defined. See GSI Boyle-Rockingham Groundwater Source Protection Zones 2003. Available from the groundwater section at GSI.				

Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	16.1	70.36	9.02	3.19	1.34	0	0

HYDROCHEMISTRY

Hydrochemical Signature:	Ca-HCO3		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 6 mg/l NO3 and the maximum nitrate concentration was 11 mg/l NO3. The average ammonium concentration was 0.016 mg/l N and the maximum ammonium concentration was 0.053 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.031 mg/l P and the maximum MRP concentration was 0.071 mg/l P. The average chloride concentration was 46.8 mg/l Cl and the maximum chloride concentration was 1152 mg/l Cl.
Alkalinity (mg/l HCO3):	Average:	Range:		
	304	176-400		
Hardness (mg/l CaCO3):	Average:	Range:		
	323	204-428		
Conductivity (uS/cm):	Average:	Range:		
	605	437-729		
Monitoring Record Period:	From:	To:		
	1995	2010		

RISK ASSESSMENT

Pressure (e.g., Nitrates, Phosphates, Abstractions):	Diffuse	Typical Contaminants:	Phosphate
Risk Category:	At risk, high confidence	GWB Status:	Poor

Impact Potential within ZOC (% area):	Extreme:	High:	Moderate:	Low:	Negligible:
	0.00	50.79	27.83	9.30	12.08

OTHER INFORMATION

The site includes a disused spring sump. The spring overflows via two channels to meet the Ballykeevican stream, which then flows to Lough Key. The spring is completely covered over.

Site Location

Borehole Chamber

Well Head

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).

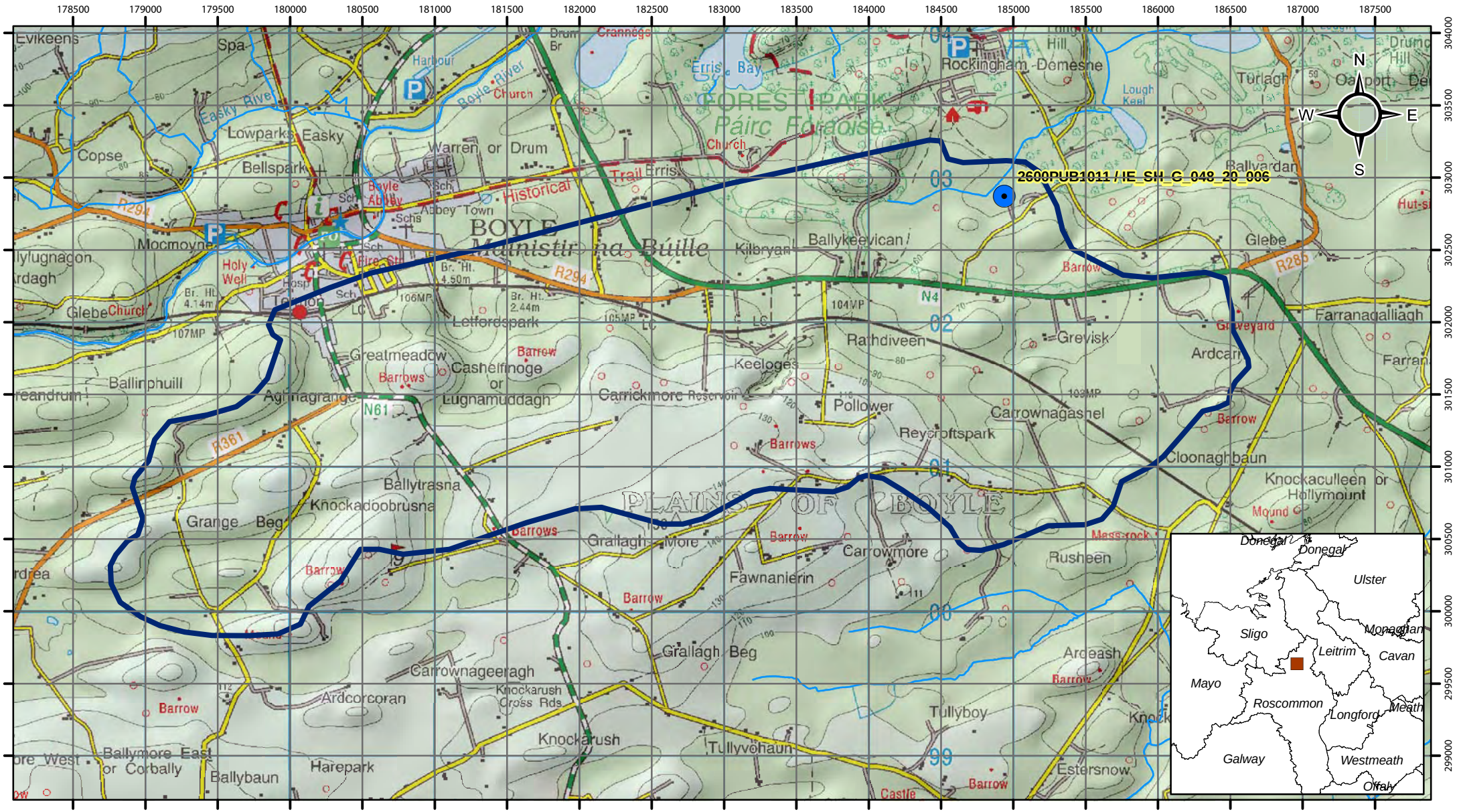
General Downgradient Distances

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
Ll, Pl	60 m

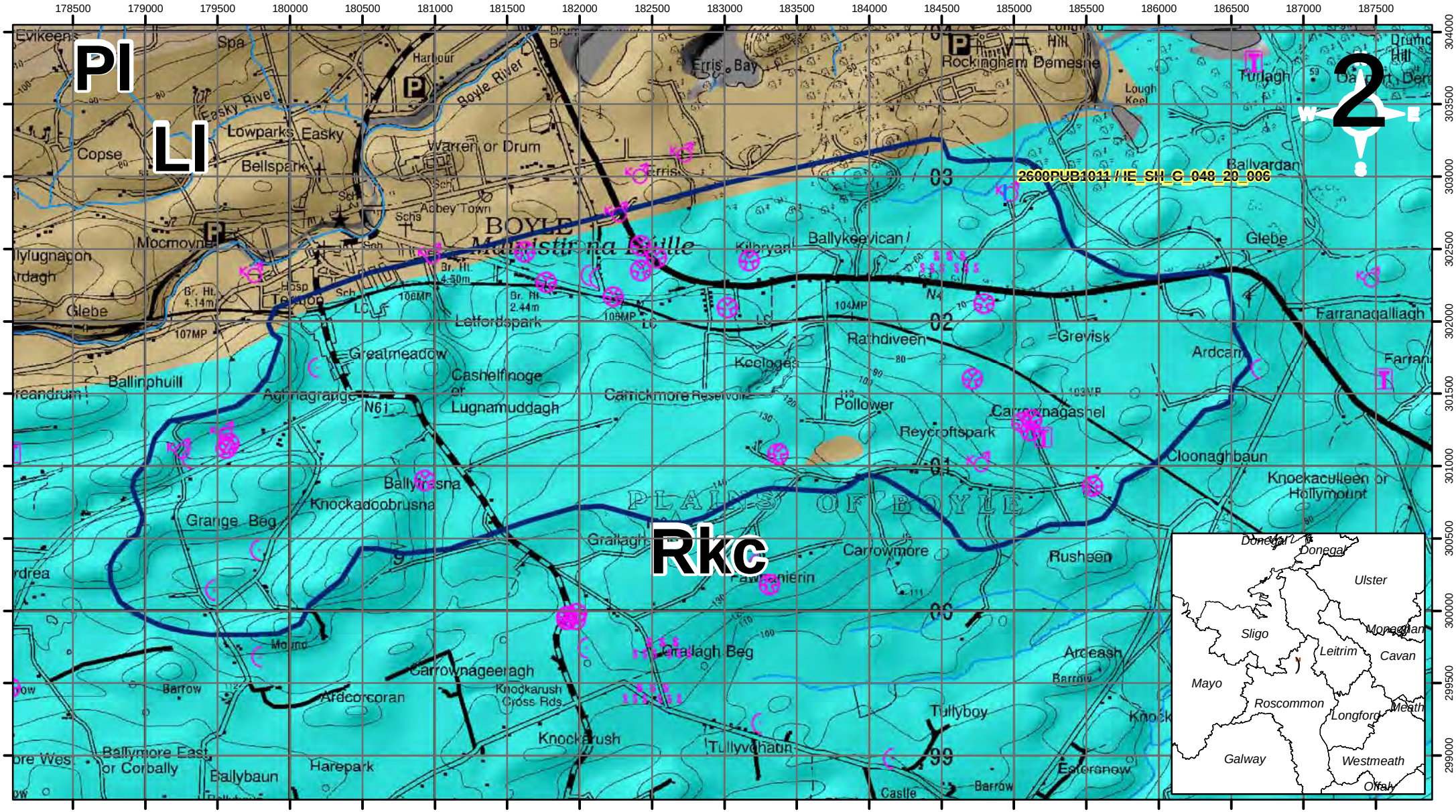
It is assumed that groundwater downgradient of a spring cannot flow back up to the spring, however a precautionary 30m buffer is generally applied which allows for instances where pumping under dry weather periods may induce a drawdown or where the ground may be sloping toward the spring from the downgradient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

Version 0:	Prepared by	GSI	Date:	
Version 1:	Prepared by	TOBIN (CK)	Date:	28/02/2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	



Location Map for Boyle-Rockingham

- Abstractions
- River
- Zone of Contribution



Aquifer Category for Boyle-Rockingham

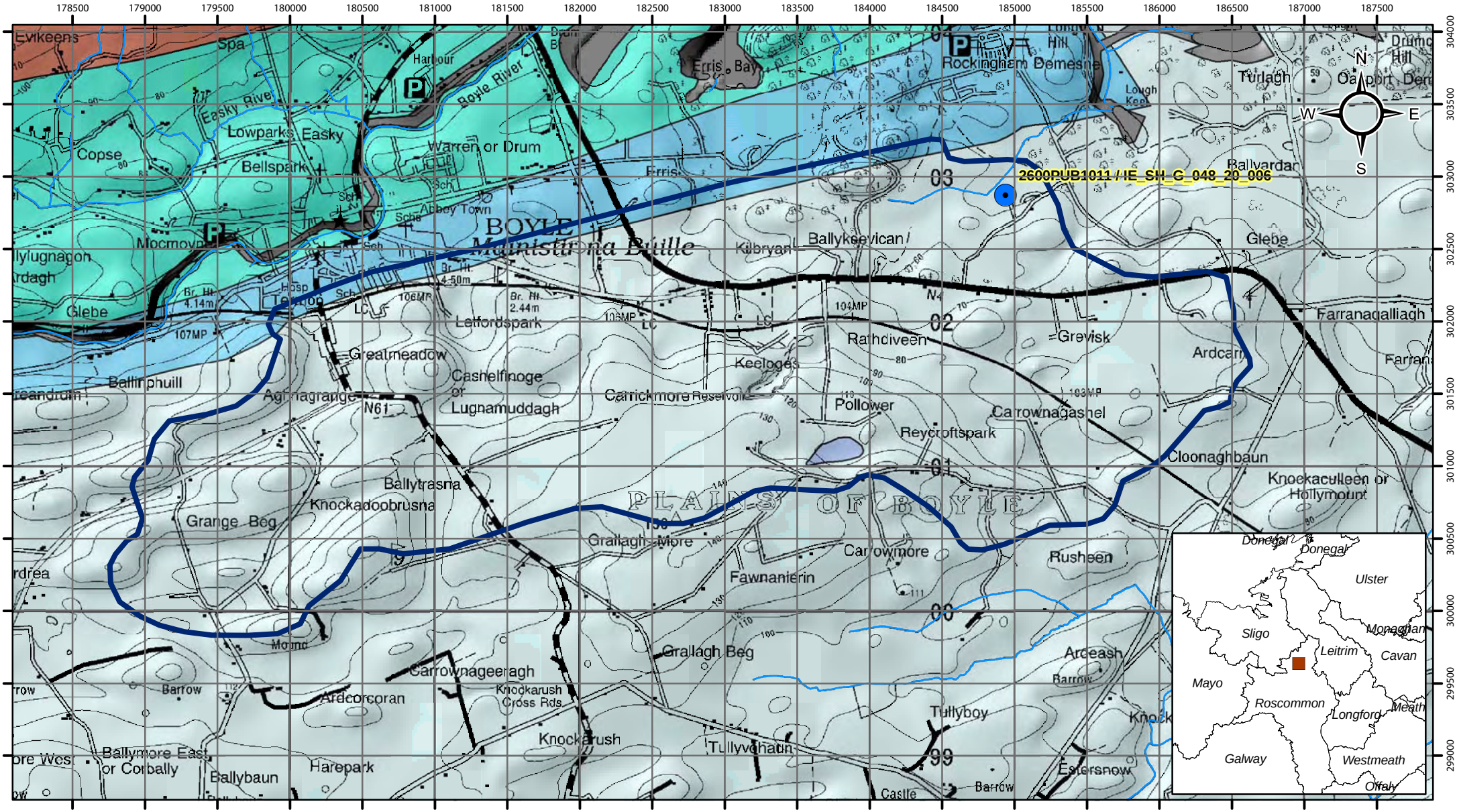
- Abstractions
- River
- Zone of Contribution

FTYPE

- Borehole
- Cave
- Dry Valley
- ES
- Enclosed Depression
- Spring
- Superficial Solution Features
- Swallow Hole
- Turlough

- Ll
- Pl
- Rkc

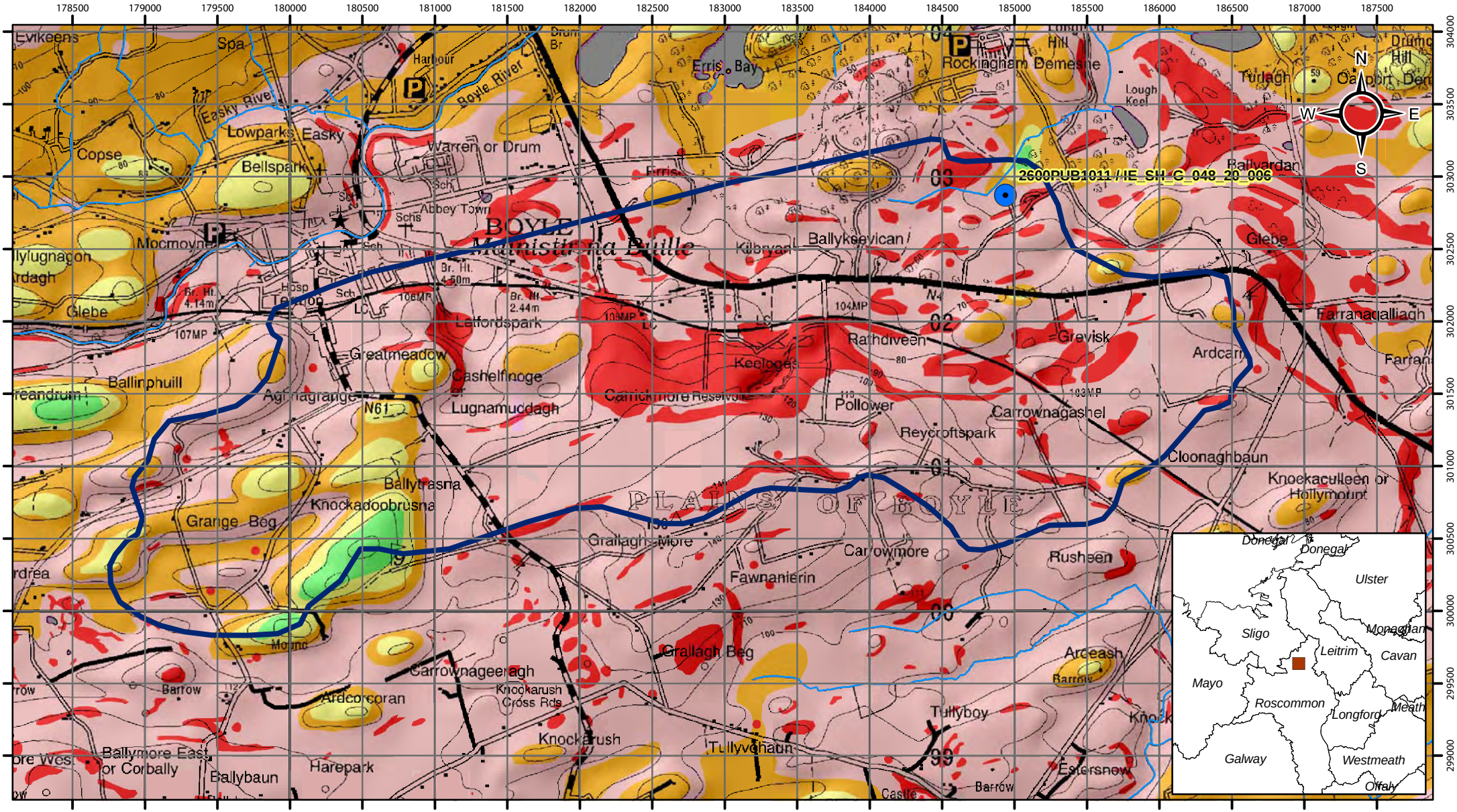
0 0.25 0.5 1 km



Bedrock Map for Boyle-Rockingham

- Abstractions
- River
- Zone of Contribution
- Devonian Old Red Sandstones
- Dinantian Lower Impure Limestones
- Dinantian Mixed Sandstones, Shales and Limestones
- Dinantian Pure Bedded Limestones
- Dinantian Pure Unbedded Limestones

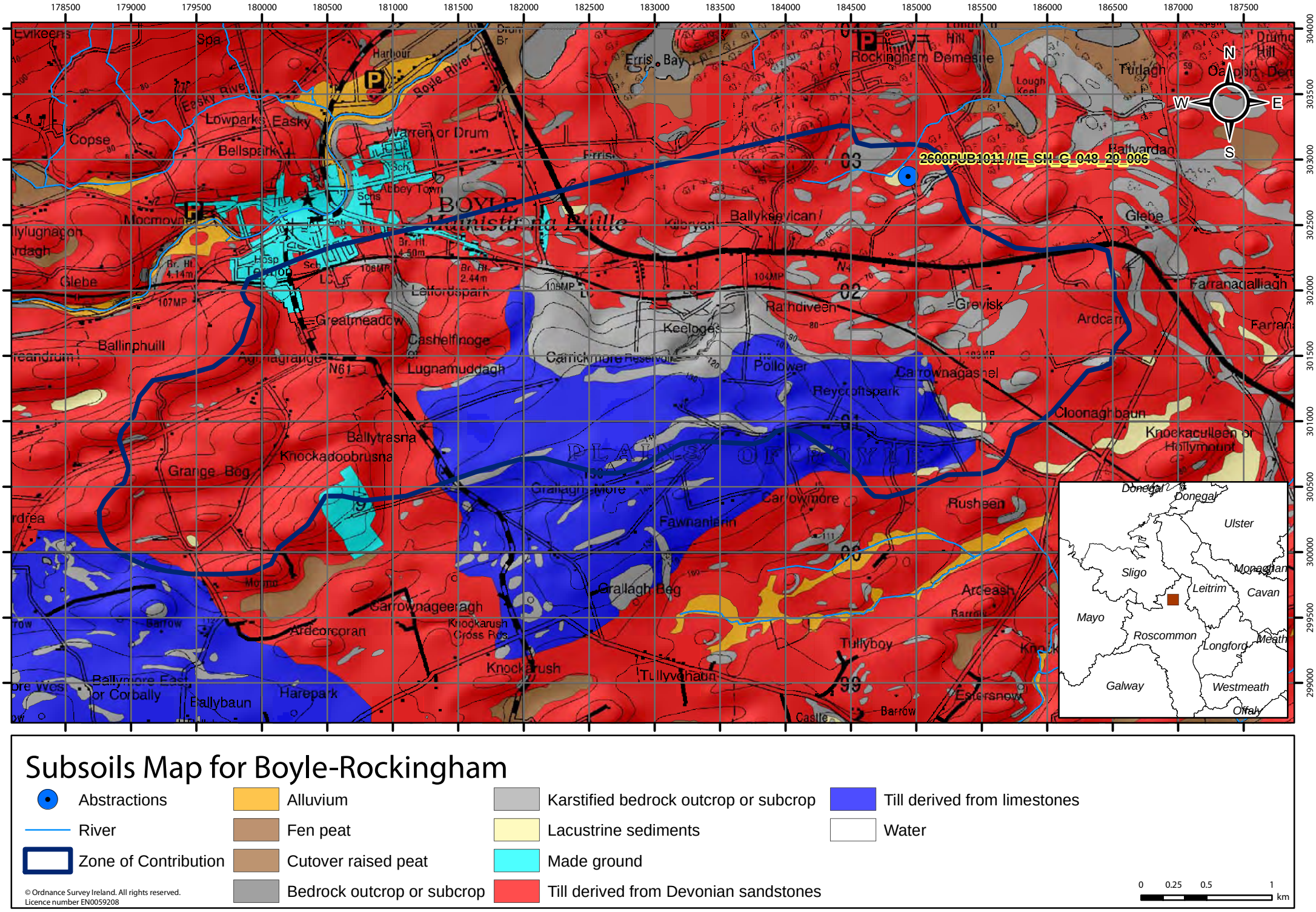
0 0.25 0.5 1 km



Groundwater Vulnerability for Boyle-Rockingham

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

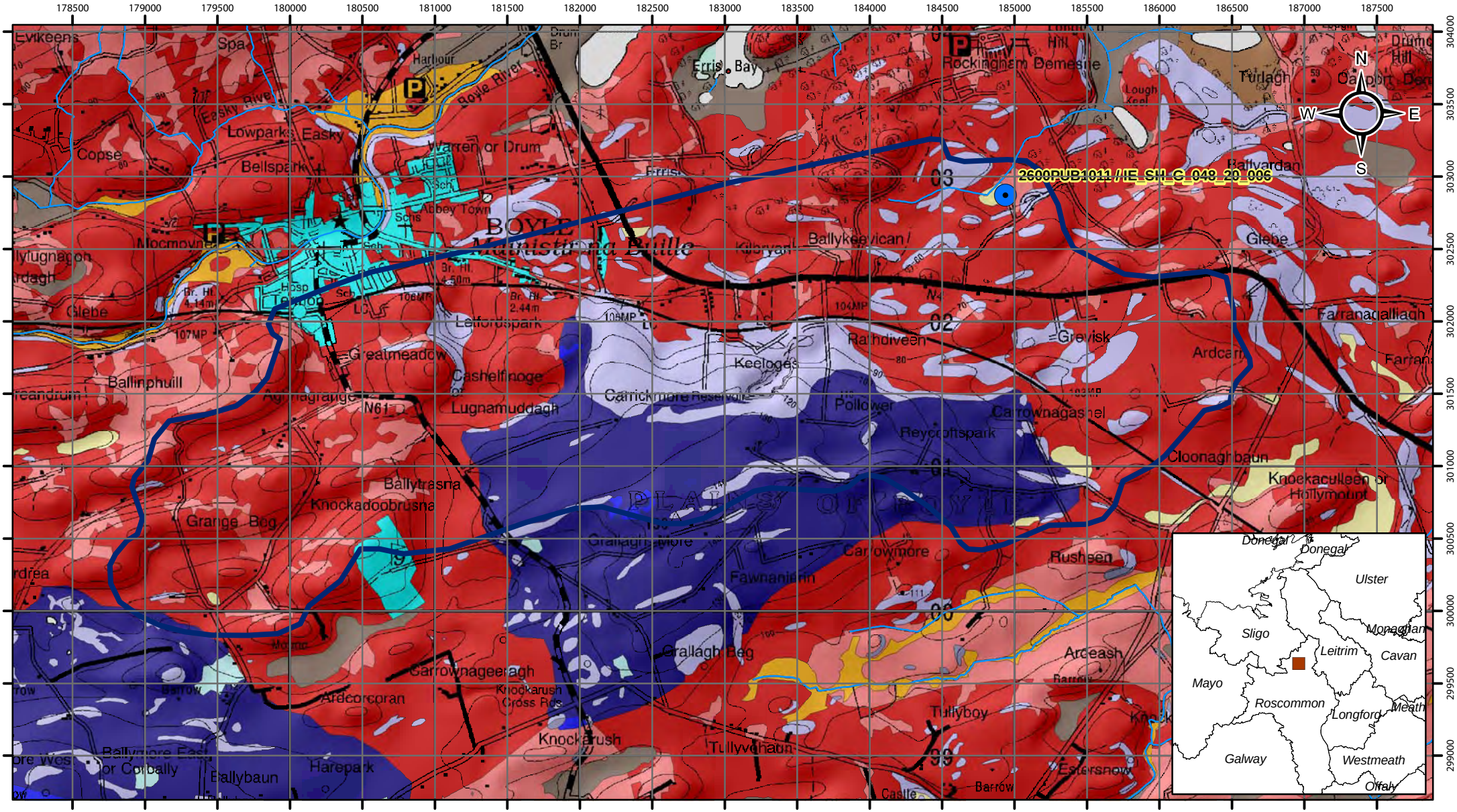
0 0.25 0.5 1 km



Subsoils Map for Boyle-Rockingham

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

0 0.25 0.5 1 km



Soils Map for Boyle-Rockingham

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