

## Water Framework Directive Groundwater Monitoring Programme

### Site Information **Cappog Bridge (PW-3)**



Cappog Bridge PW-3 is one of 8 boreholes used for the Monaghan public water supply. The abstraction rate for this borehole is 1161 m<sup>3</sup>/day. The GSI have completed a source report for the Monaghan Town scheme.

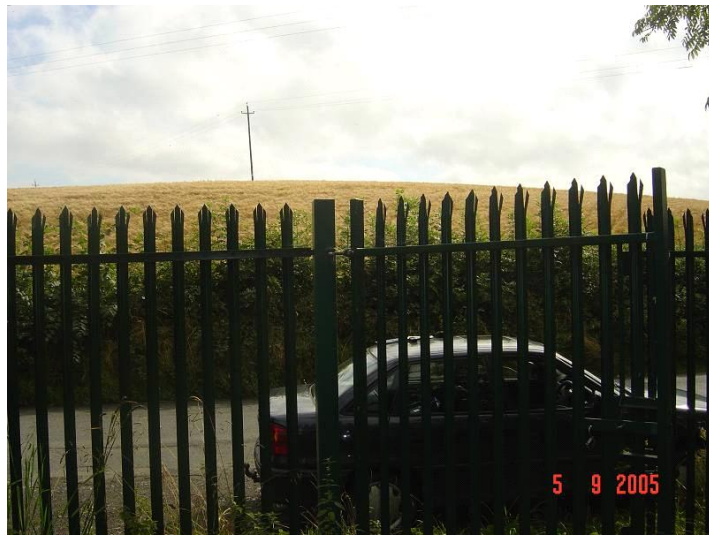


Monaghan

**August 2011**

| SITE INFORMATION                  |   |   |  |                                    |                       |
|-----------------------------------|---|---|--|------------------------------------|-----------------------|
| Site Name:                        | Cappog Bridge (PW-3)  |   | County:  | Monaghan                           |                       |
| RBD:                              | NBIRBD  |   | EU Reporting Code:   | IEGBNI_NB_G_012_18_001             |                       |
| Easting:                          | 263814  |   | GWB Name:  | Monaghan Town                      |                       |
| Northing:                         | 335583  |   | GWB Code:  | IEGBNI_NB_G_012                    |                       |
| Site Use:                         | Drinking Water (PWS)  |   | Drinking Water Code:   | 2400PUB1024                        |                       |
| Hydrometric Area:                 | 3   |   | Water Level Monitoring Network:  | Level                              | Flow                  |
| Townland:                         | TERRYTOLE   |   |  | N                                  | N                     |
| Ownership:                        | Monaghan County Council   |   |  |                                    |                       |
| Water Quality Monitoring Network: | Surveillance  |   | Operational (Point)  |                                    | Operational (Diffuse) |
|                                   | Y   |   | N  |                                    | N                     |
| Site Comments:                    | ---   |   |  |                                    |                       |
| SITE DIRECTIONS                   |   |   |  |                                    |                       |
| Location and Access Information:  | Located 4.5 km northwest of Monaghan Town beside the R186 and just before Cappog Bridge over the River Blackwater.                                  |   |  |                                    |                       |
| Additional Comments:              | ---   |   |  |                                    |                       |
| WELL INFORMATION                  |   |   |  |                                    |                       |
| Monitoring Point Type:            | BH  | Abstraction Rate (m³/d):                    | 1161   | Ground Elevation (m OD):           | 59.4                  |
| Borehole Log Available:           | ---   | Total Drilled Depth (m bgl):                | 103  | Depth to Bedrock (m bgl):          | 6                     |
| Top of Casing (m agl):            | ---   | Upper Casing Diameter (mm):                 | 300  | 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):         | 1700  | Comments on Monitoring Site:                | Two "Roosky boreholes" have been decommissioned. The Wood is also in the EPA GW Monitoring Network |                                    |                       |
| Specific Capacity (m³/d/m):       | ---   |   |  |                                    |                       |
| Static Water Level (m bgl):       | 59  |   |  |                                    |                       |
| Scheme Name:                      | Monaghan  | Number of Abstraction Points in the Scheme: | 8  | Source Report Available            | Y                     |
| Source Report Info:               | Source report prepared by GSI in 2002.  |   |  |                                    |                       |
| Scheme Summary:                   | Cappog Bridge is one of eight boreholes are used for the Monaghan Public Water Supply. One to two boreholes are used at a time depending on demand. |   |  |                                    |                       |

| HYDROGEOLOGY   |  |   |   |   |                            |                   |                       |          |
|--|--|---|---|---|----------------------------|-------------------|-----------------------|----------|
| GEOLOGY  | Soil:                                  | Deep well drained mineral (AminDW)  |   |   |                            |                   | Subsoil Permeability: | Moderate |
|  | Subsoil:                               | Tills (diamictons) (TDCSs)  |   |   |                            |                   |                       |          |
|  | Bedrock:                               | Dinantian Shales and Limestones   |   |   |                            |                   |                       |          |
| HYDROGEOLOGY   | Aquifer Category:                      | LI  | Vulnerability at Monitoring site:       | High  | Flow Regime:               | Poorly productive |                       |          |
| ZONE OF CONTRIBUTION                                 | Estimated ZOC Size (km <sup>2</sup> ): | 28.68   | ZOC Delineated By:                      | TOBIN (CK)  | Recharge Estimate (mm/yr): | 168               |                       |          |
|  | ZOC Delineation Comments:              | ZOC is based on 150% abstraction rate, topography and the GSI Outer Protection Area for the well field. Groundwater is assumed to flow toward the Blackwater River, predominantly in a southeasterly direction (based on NRDO water table map), but it is considered that the borehole can draw water from the other side of the river. The boundaries are uncertain, particularly given the presence of deep drumlins. |   |   |                            |                   |                       |          |
| Groundwater Vulnerability within ZOC (% area):       | Extreme (X)                            | Extreme (E)   | High                                    | Moderate  | Low                        | High to Low       | Unclassified          |          |
|  | 0.37                                   | 1   | 3.56                                    | 40.43   | 51.92                      | 0                 | 2.74                  |          |
| HYDROCHEMISTRY                                       |  |   |   |   |                            |                   |                       |          |
| Hydrochemical Signature:                             | Ca-HCO <sub>3</sub>                    |   | Additional Water Chemistry Information: | During the monitoring period: The average nitrate concentration was <1 mg/l NO <sub>3</sub> and the maximum nitrate concentration was 1 mg/l NO <sub>3</sub> . The average ammonium concentration was 0.187 mg/l N and the maximum ammonium concentration was 0.685 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.005 mg/l P and the maximum MRP concentration was 0.02 mg/l P. The average chloride concentration was 18.1 mg/l Cl and the maximum chloride concentration was 23 mg/l Cl. |                            |                   |                       |          |
| Alkalinity (mg/l HCO <sub>3</sub> ):                 | Average:                               | Range:  |   |   |                            |                   |                       |          |
|  | 331                                    | 280-372   |   |   |                            |                   |                       |          |
| Hardness (mg/l CaCO <sub>3</sub> ):                  | Average:                               | Range:  |   |   |                            |                   |                       |          |
|  | 372                                    | 326-427   |   |   |                            |                   |                       |          |
| Conductivity (uS/cm):                                | Average:                               | Range:  |   |   |                            |                   |                       |          |
|  | 668                                    | 544-777   |   |   |                            |                   |                       |          |
| 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:                |                   |                       |          |
|  | 0.47                                   | 22.93   | 59.42                                   | 0.70  | 16.48                      |                   |                       |          |
| OTHER INFORMATION                                    |  |   |   |   |                            |                   |                       |          |
| ---  |  |   |   |   |                            |                   |                       |          |



Site Location



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  $\mu$ 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).

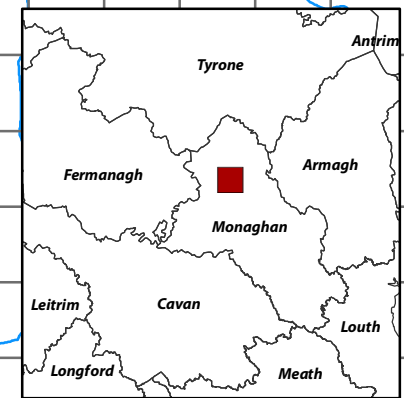
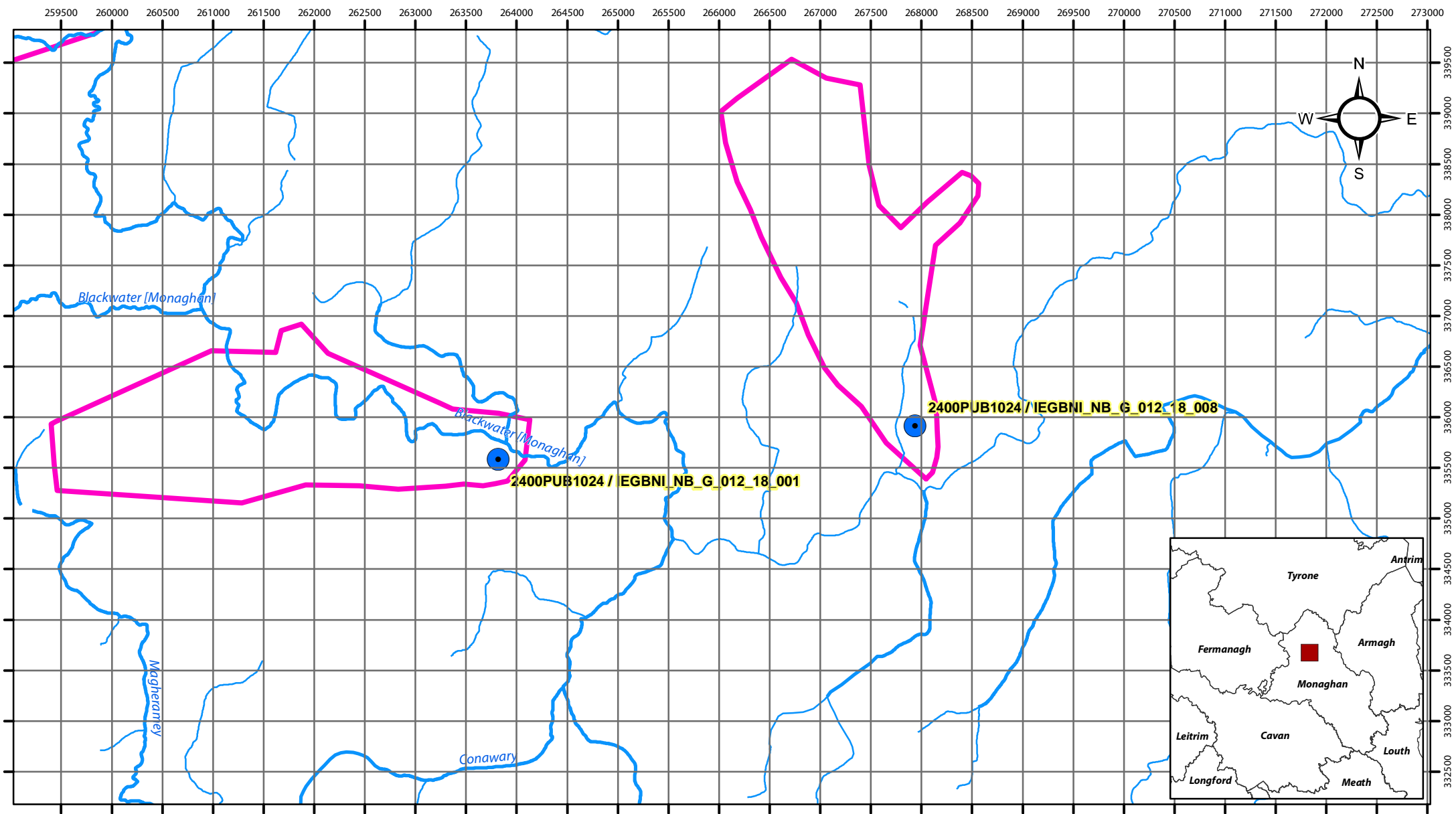
### General Downgradient Distances

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: | 01/08/2002 |
| Version 1: | Prepared by | TOBIN | Date: | Feb 2011   |
| Version 2: | Prepared by |       | Date: |            |
| Version 3: | Prepared by |       | Date: |            |
| Version 4: | Prepared by |       | Date: |            |



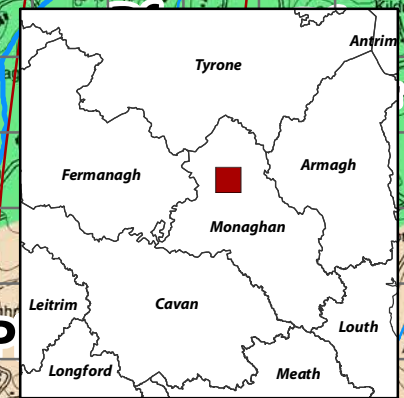
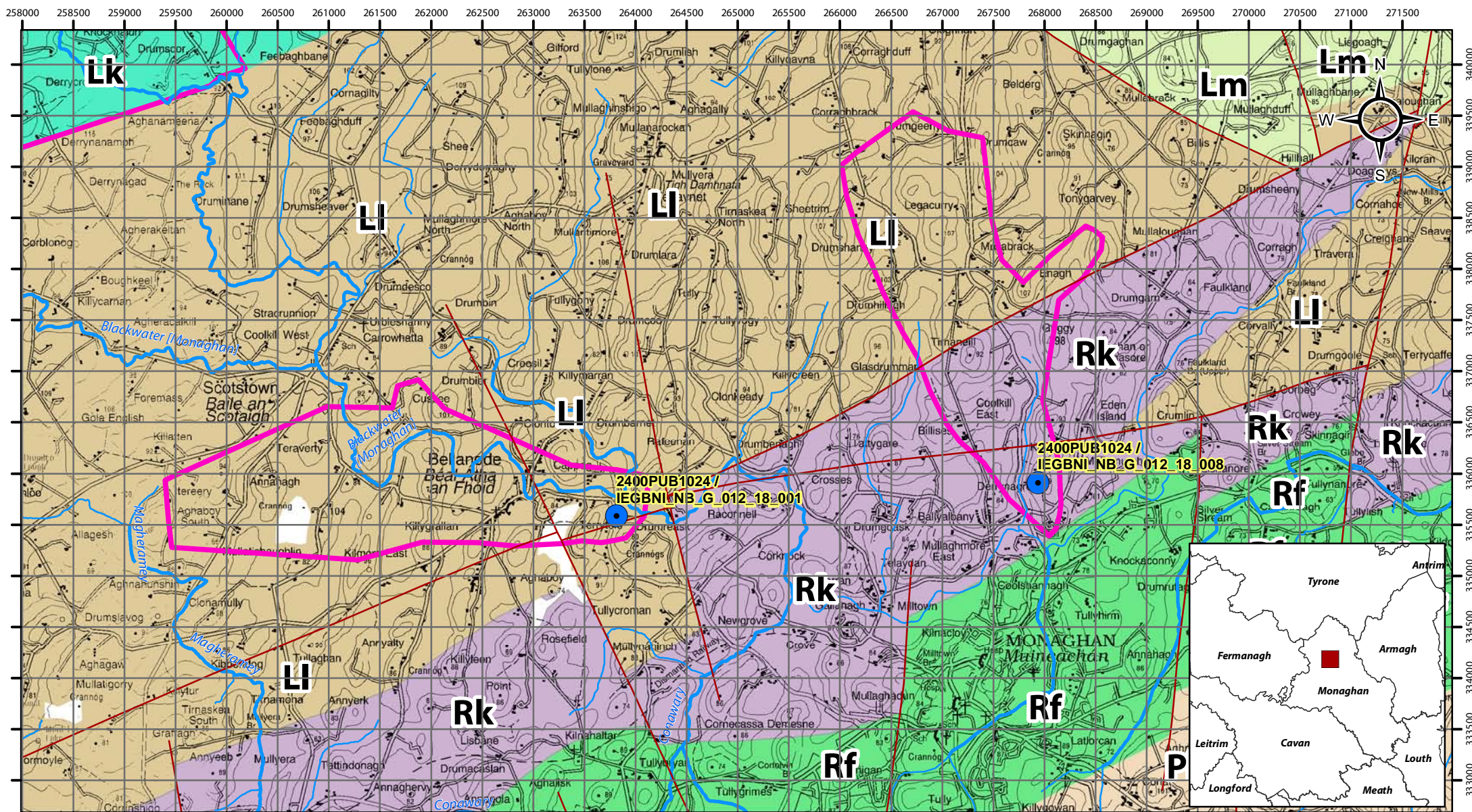
## Location Map for Monaghan The Wood & Cappog Bridge

-  Abstractions
-  River
-  Zone of Contribution

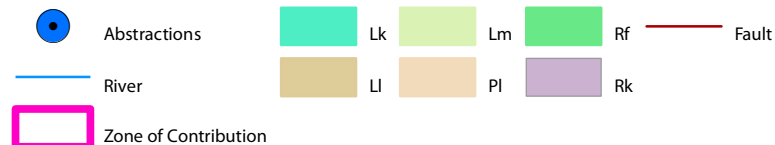
© Ordnance Survey Ireland. All rights reserved.  
Licence number EN0059208

0 0.25 0.5 1  
km

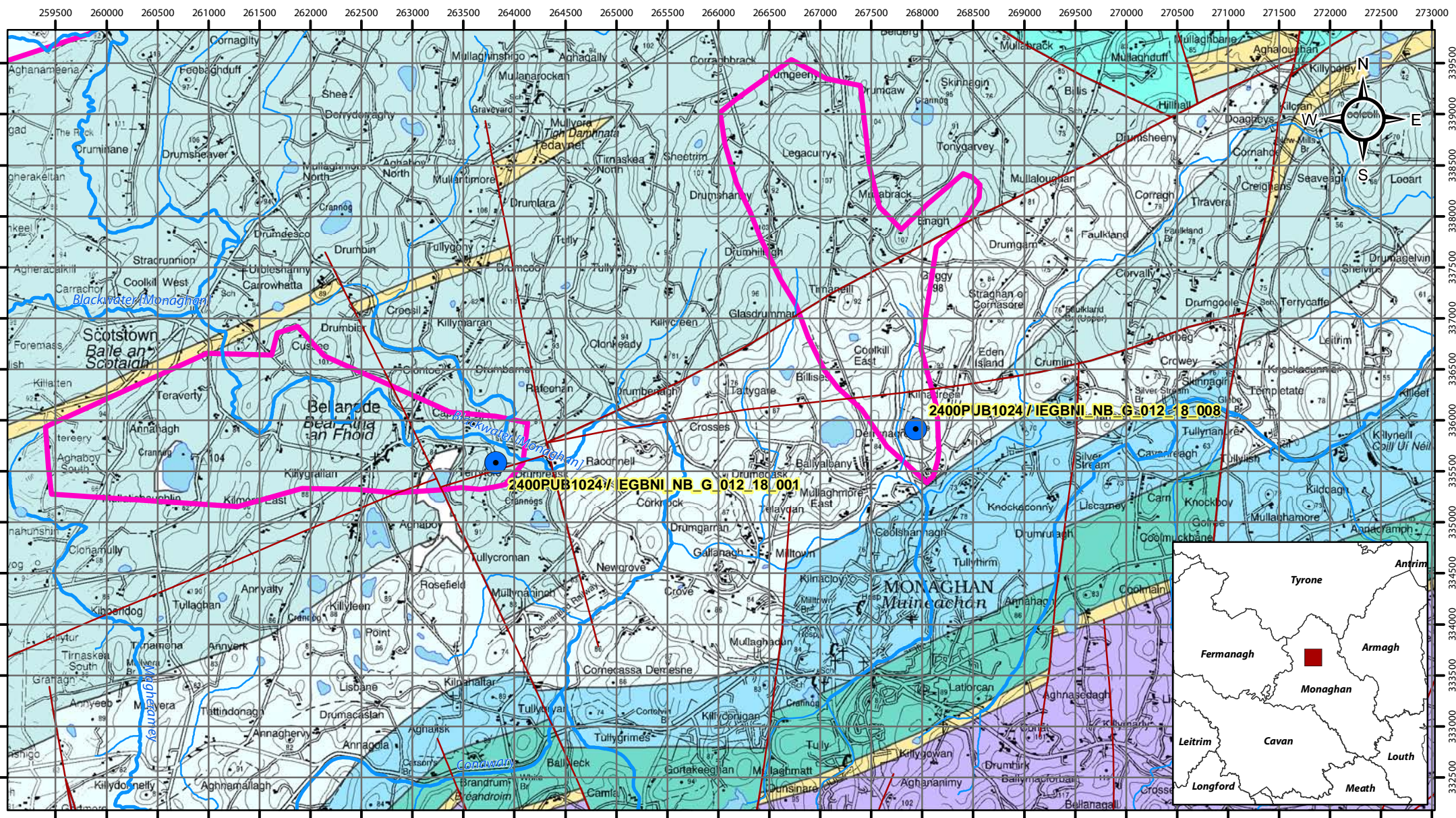




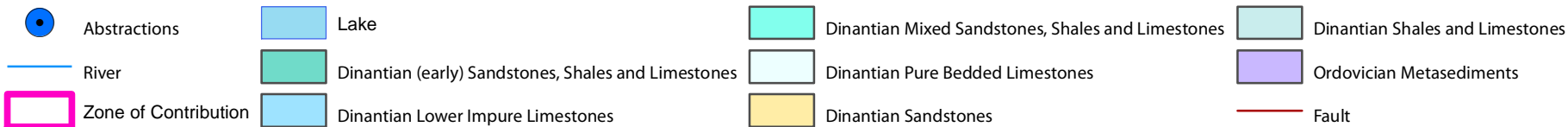
# Aquifer Category Map for Monaghan The Wood & Cappog Bridge



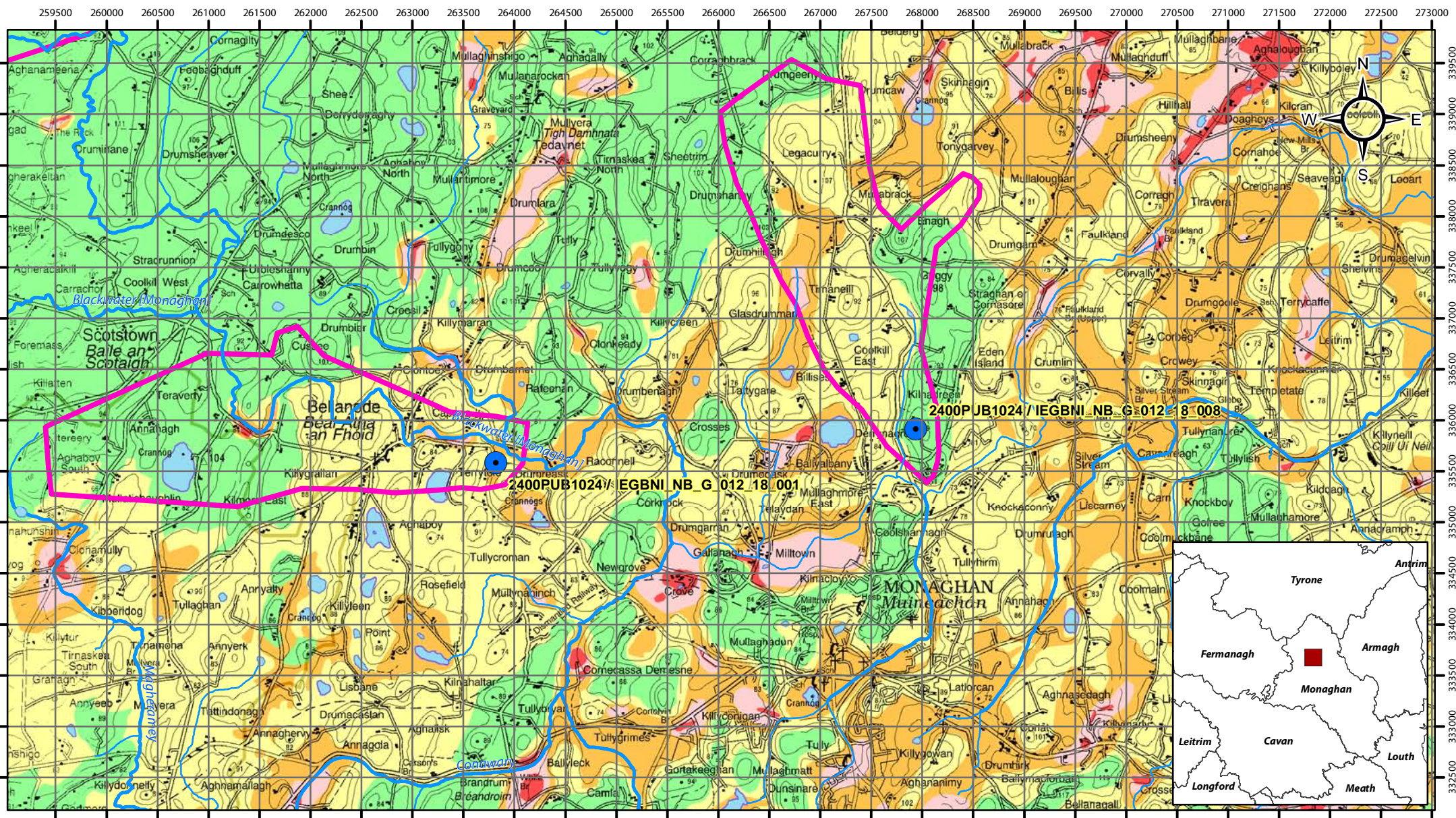




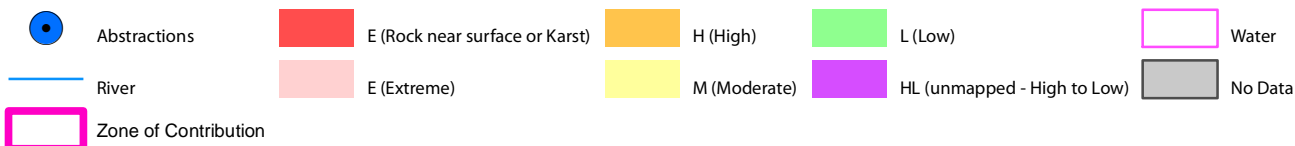
## Bedrock Map for Monaghan The Wood & Cappog Bridge







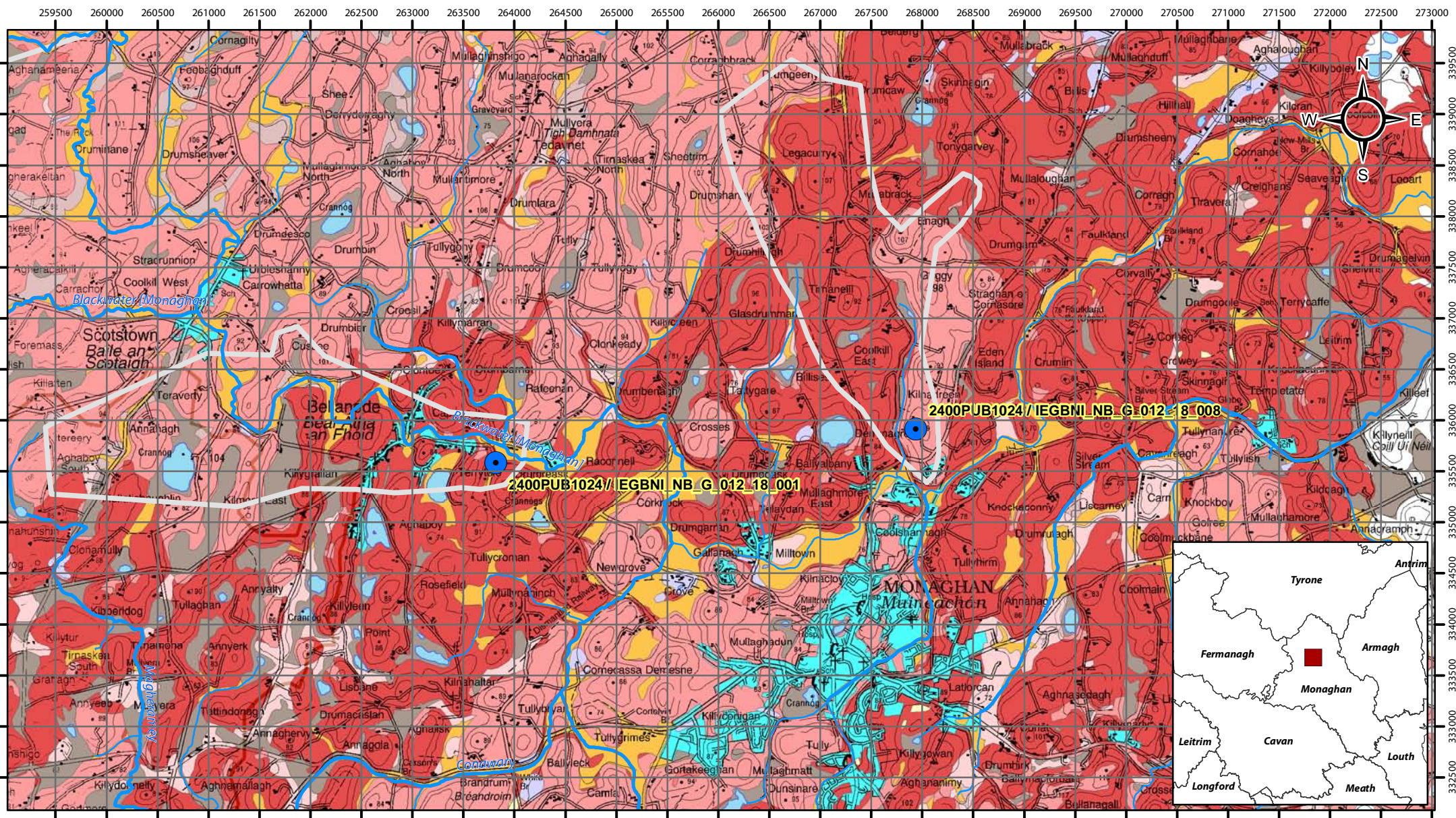
# Groundwater Vulnerability Map for Monaghan The Wood & Cappog Bridge











## Soils Map for Monaghan The Wood & Cappog Bridge

