

## Water Framework Directive Groundwater Monitoring Programme

### Site Information

### Kilbannon



Kilbannon is a spring that was used for a group water supply, but is now disused. This site is located in a karstified aquifer. This site is included in EPA's surveillance and operational groundwater monitoring networks.



Galway

**August 2011**

SITE INFORMATION					
Site Name:	Kilbannon		County:	Galway	
RBD:	WRBD		EU Reporting Code:	IE_WE_G_0020_07_010	
Easting:	141200		GWB Name:	Clare-corrib	
Northing:	253899		GWB Code:	IE_WE_G_0020	
Site Use:	Drinking Water (GWS)		Drinking Water Code:	1200PRI7357	
Hydrometric Area:	30		Water Level Monitoring Network:	Level	Flow
Townland:	TONLEGEE (DUNMORE BY)			N	Y
Ownership:	Kilbannon Group Water Scheme				
Water Quality Monitoring Network:	Surveillance		Operational (Point)		Operational (Diffuse)
	Y		N		Y
Site Comments:	---				

SITE DIRECTIONS					
Location and Access Information:	Located 3km northwest of Tuam, off a minor road off the R322 just off the N67. The spring and separate pumphouse are located in a field at the end of a lane. The sample is taken directly from the spring source.				
Additional Comments:	---				

WELL INFORMATION					
Monitoring Point Type:	Spring	Abstraction Rate (m³/d):	204-764	Ground Elevation (m OD):	---
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:	---		
Specific Capacity (m³/d/m):	---				
Static Water Level (m bgl):	---				
Scheme Name:	---	Number of Abstraction Points in the Scheme:	---	Source Report Available	N
Source Report Info:	---				
Scheme Summary:	---				

HYDROGEOLOGY							
GEOLOGY	Soil:	Cutaway/cutover peat (Cut)				Subsoil Permeability:	Low
	Subsoil:	Peat (Cut)					
	Bedrock:	Dinantian Pure Bedded Limestones					
HYDROGEOLOGY	Aquifer Category:	Rkc	Vulnerability at Monitoring site:	Low	Flow Regime:	Karstified	
ZONE OF CONTRIBUTION	Estimated ZOC Size (km <sup>2</sup> ):	636.62	ZOC Delineated By:	Tobin (CK)	Recharge Estimate (mm/yr):	213	
	ZOC Delineation Comments:	Entire upgradient topographic catchment could contribute water to the spring. Water tracing required to narrow down the specific groundwater catchment.					
Groundwater Vulnerability within ZOC (% area):	Extreme (X)	Extreme (E)	High	Moderate	Low	High to Low	Unclassified
	1.5	5.47	20.4	19.02	35.99	17.06	0.56
HYDROCHEMISTRY							
Hydrochemical Signature:	Ca-HCO <sub>3</sub>		Additional Water Chemistry Information:	During the monitoring period: The average nitrate concentration was 9 mg/l NO <sub>3</sub> and the maximum nitrate concentration was 19 mg/l NO <sub>3</sub> . The average ammonium concentration was 0.029 mg/l N and the maximum ammonium concentration was 0.29 mg/l N. The average molybdate reductive phosphorus (MRP) concentration was 0.034 mg/l P and the maximum MRP concentration was 0.369 mg/l P. The average chloride concentration was 20.3 mg/l Cl and the maximum chloride concentration was 37 mg/l Cl.			
Alkalinity (mg/l HCO <sub>3</sub> ):	Average:	Range:					
	327	229-450					
Hardness (mg/l CaCO <sub>3</sub> ):	Average:	Range:					
	346	280-388					
Conductivity (uS/cm):	Average:	Range:					
	657	415-744					
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	7.12	29.90	34.73	28.25		
OTHER INFORMATION							
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Site Location



Spring



Spring

## 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

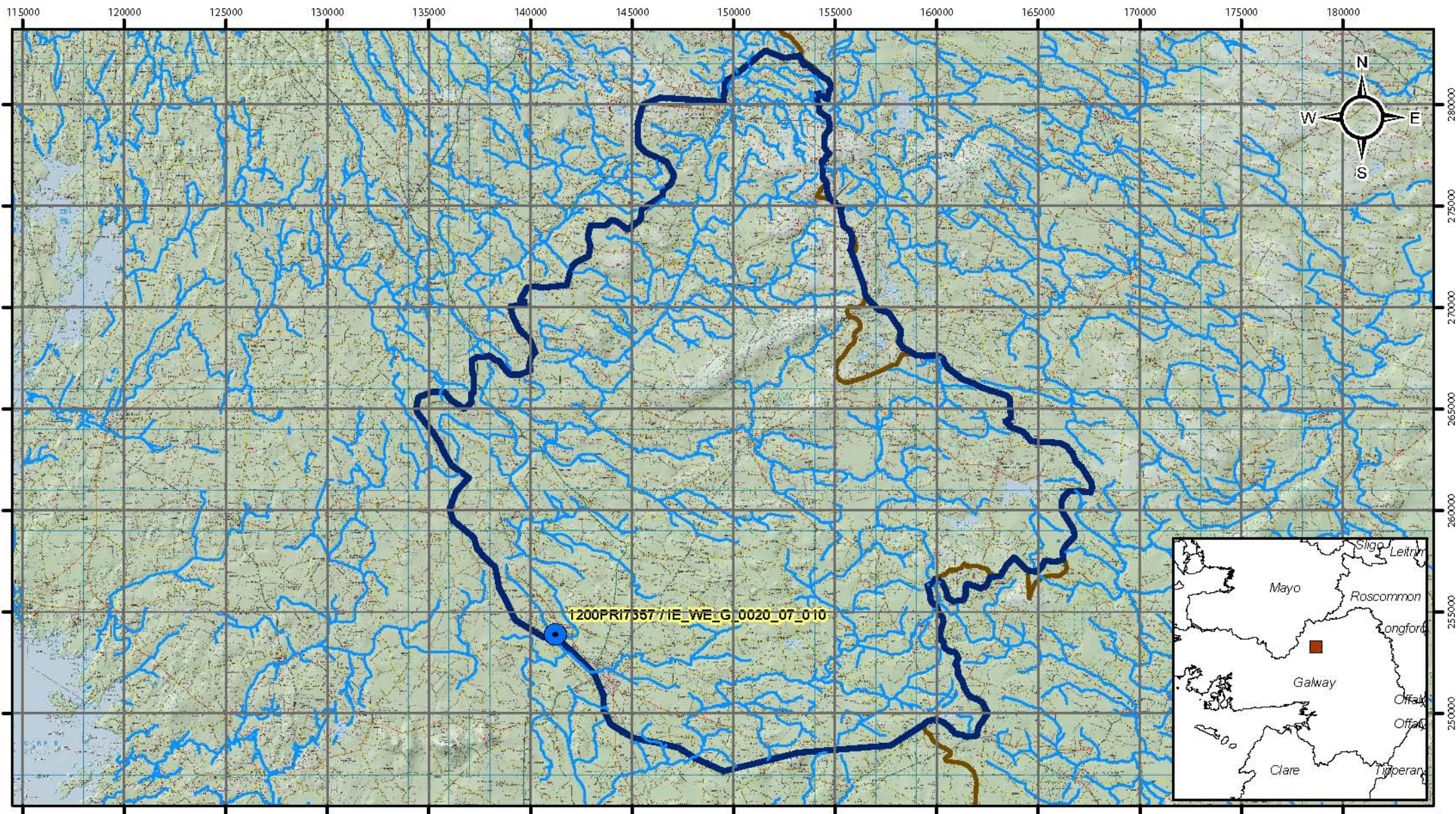
General Downgradient Distances (XL) applied to boreholes sourced in bedrock aquifers are constrained to estimate approximate limits based on data at the GSI. In some cases they may be higher or lower depending on local conditions.

Rk, Rkd, Lk	225 m
Lm	150 m
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 CK)	Date:	Feb 2011
Version 2:	Prepared by		Date:	
Version 3:	Prepared by		Date:	
Version 4:	Prepared by		Date:	





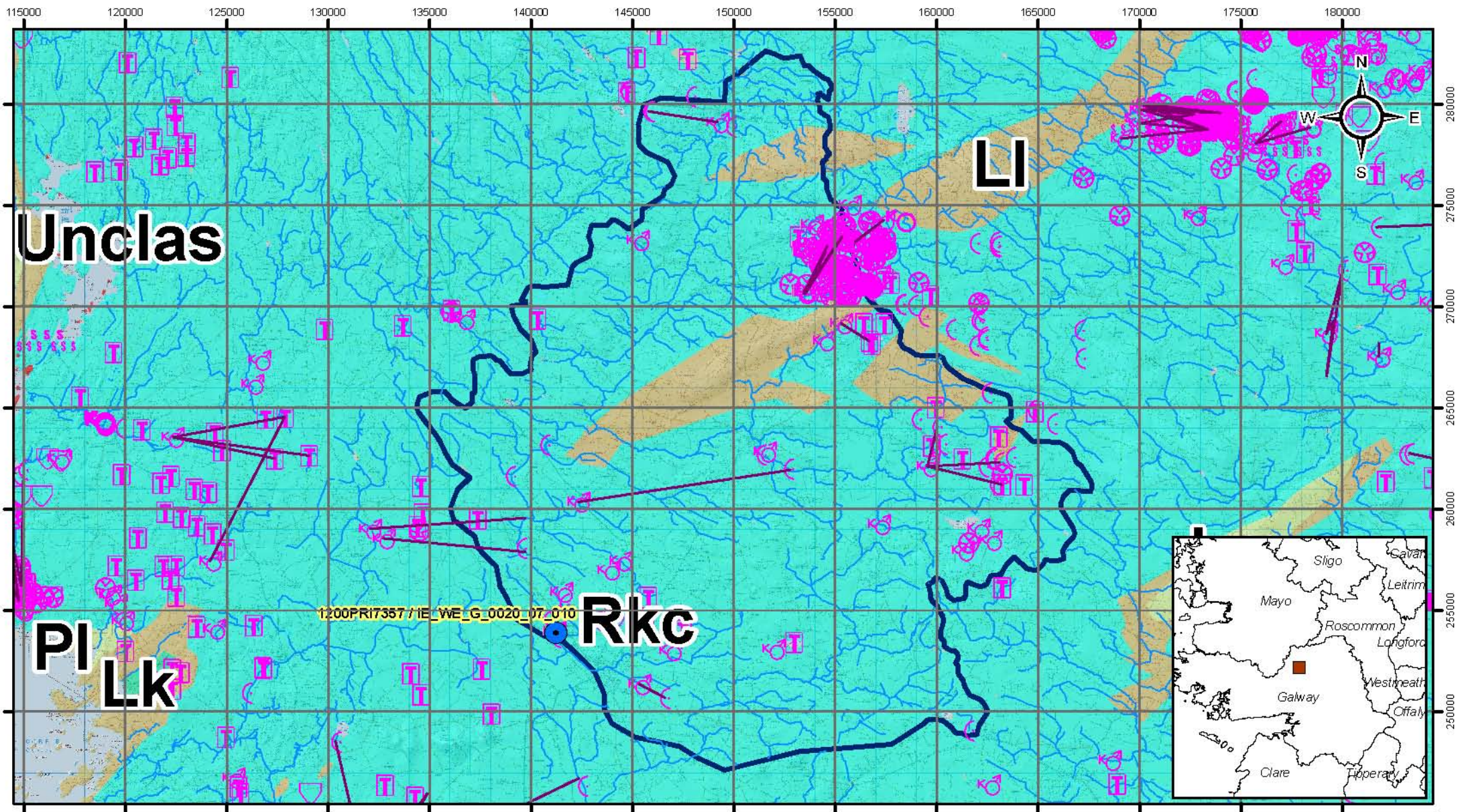
## Location Map for Kilbannon

- Abstractions
- RiverBasinDistrict
- River
- Zone of Contribution

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0 0.5 1 2 3 4 5 6 7 8 9 10 km

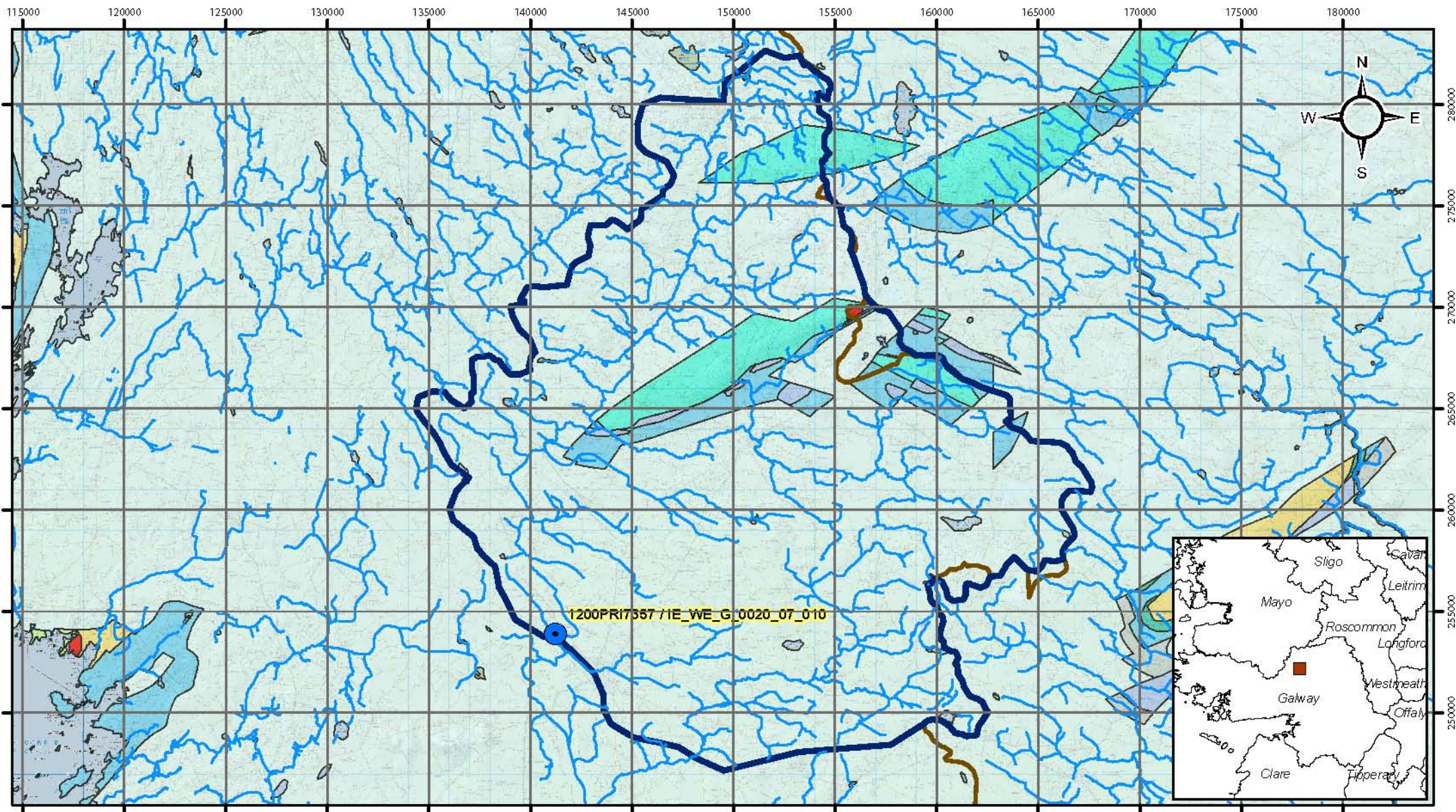




## Aquifer Category for Kilbannon







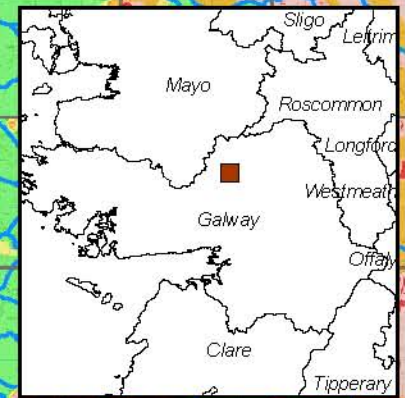
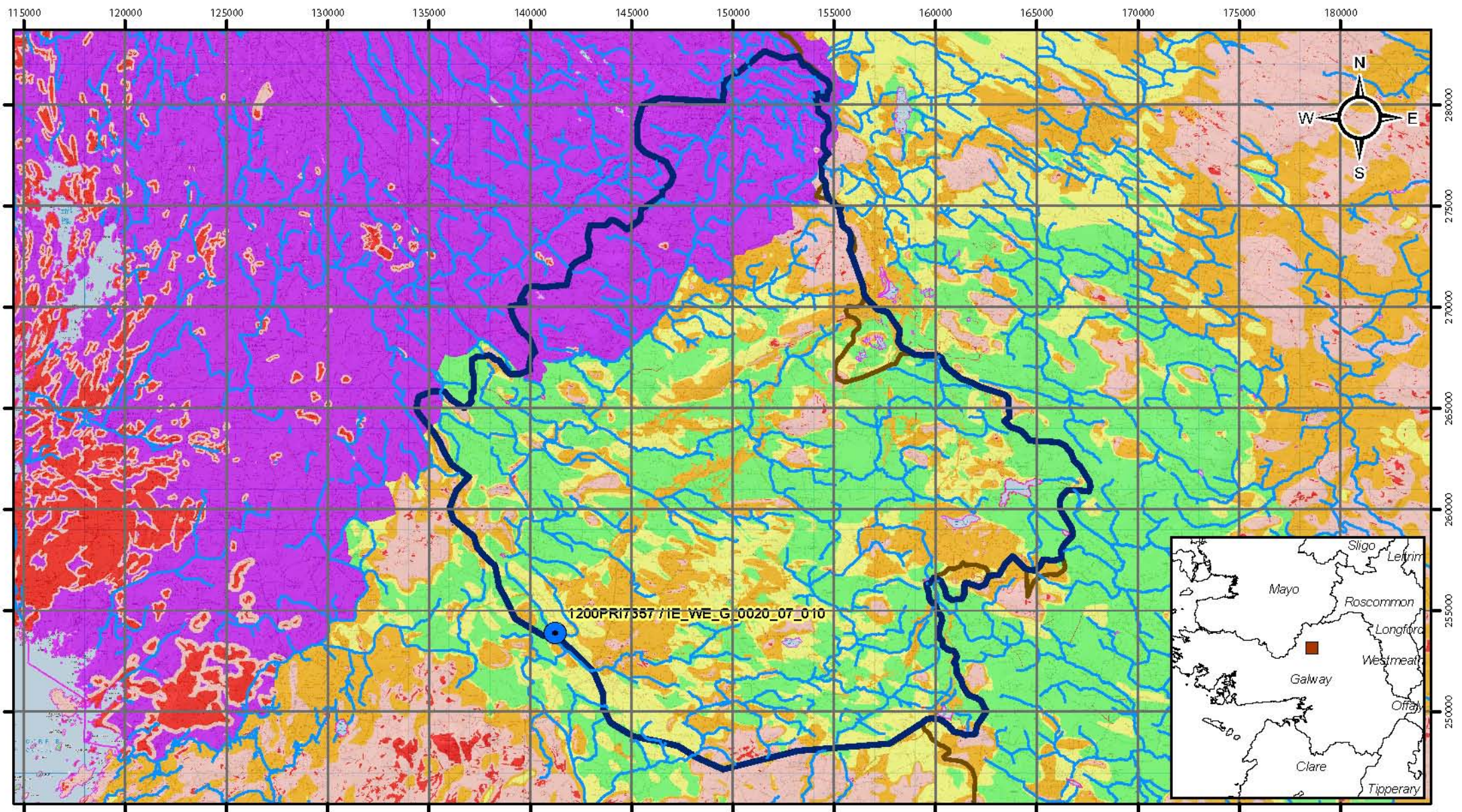
## Bedrock Map for Kilbannon

- |                      |   |   |  |  |
|----------------------|---|---|--|--|
| Abstractions         | Basalts & other Volcanic rocks                      | Dinantian Mixed Sandstones, Shales and Limestones | Granites & other Igneous Intrusive rocks | Precambrian Marbles                        |
| River                | Cambrian Metasediments                              | Dinantian Pure Bedded Limestones                  | Namurian Sandstones                      | Precambrian Quartzites, Gneisses & Schists |
| Zone of Contribution | Dinantian (early) Sandstones, Shales and Limestones | Dinantian Pure Unbedded Limestones                | Namurian Shales                          | Silurian Metasediments and Volcanics       |
| RiverBasinDistrict   | Dinantian Dolomitised Limestones                    | Dinantian Sandstones                              | Ordovician Metasediments                 |  |
|                      | Dinantian Lower Impure Limestones                   | Dinantian Upper Impure Limestones                 | Ordovician Volcanics                     |  |

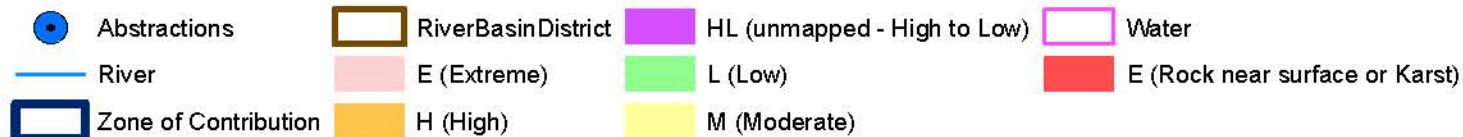
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0 0.5 1 2 3 4 5 6 7 8 9 10 km

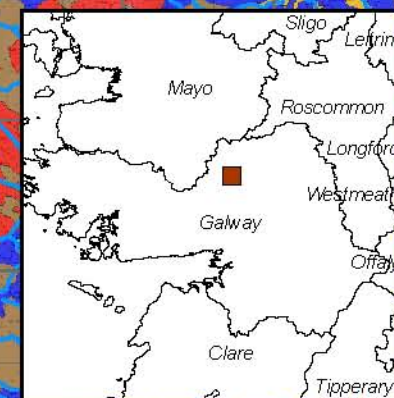
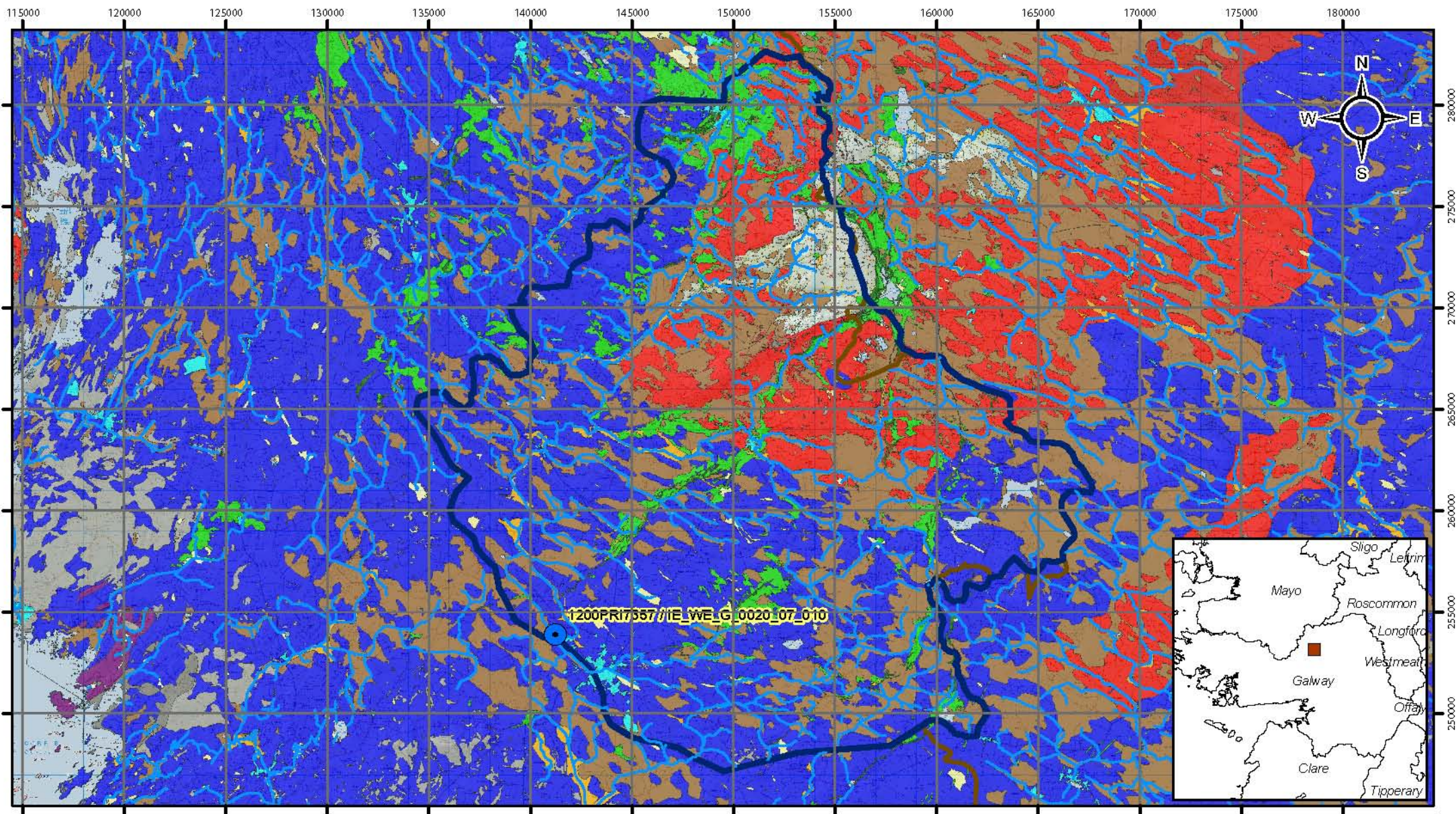




## Groundwater Vulnerability for Kilbannon







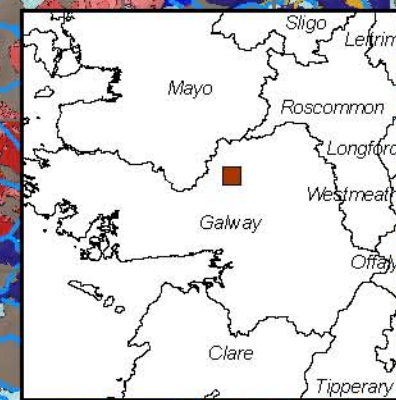
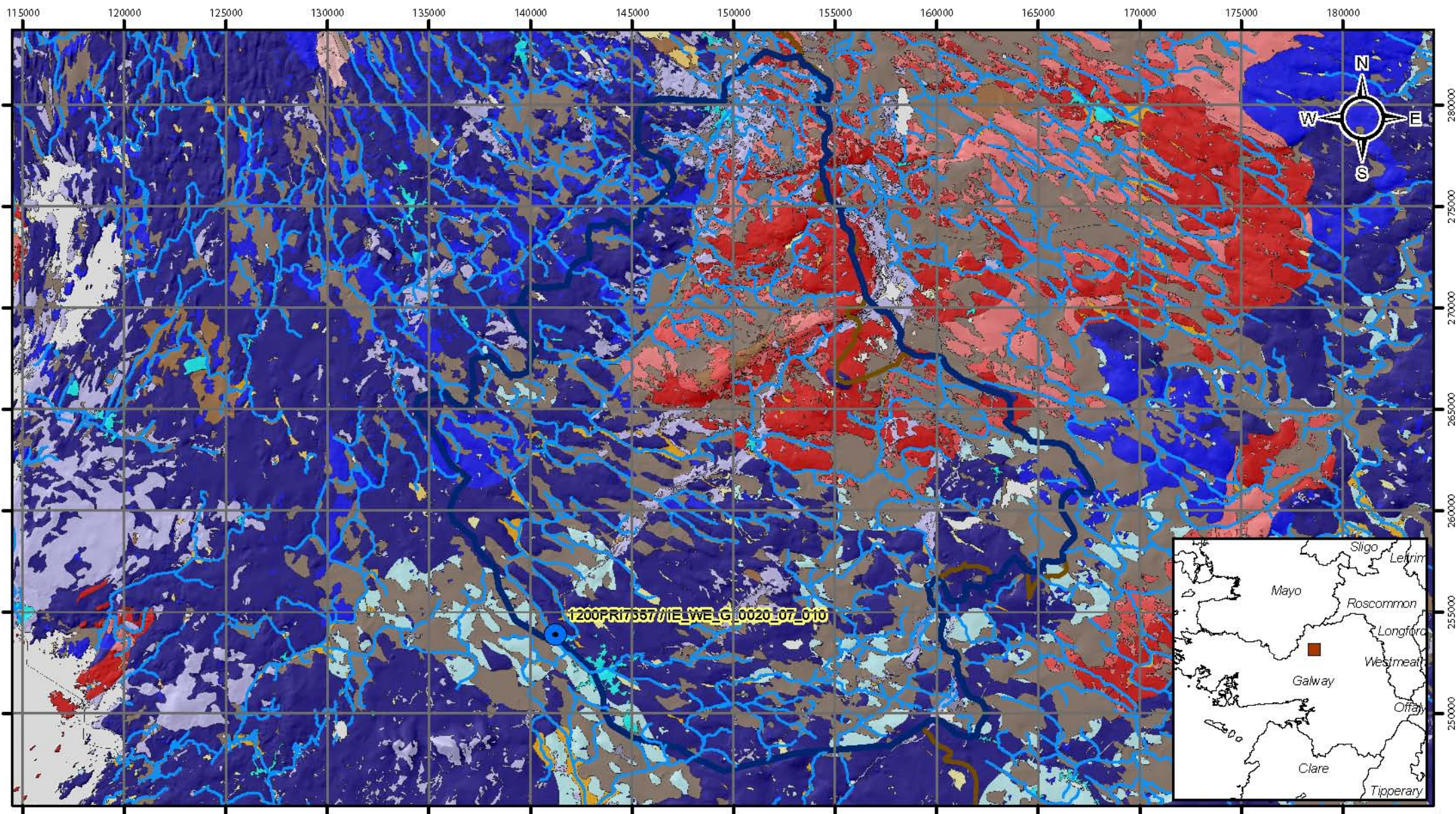
## Subsoils Map for Kilbannon

- |                      |   |   |                                       |  |  |
|----------------------|---|---|---------------------------------------|--|--|
| Abstractions         | Alluvium                                      | Esker comprised of gravels of basic reaction                | Bedrock outcrop or subcrop            | Till derived from Devonian and Carboniferous sandstones            | Till derived from limestones                     |
| River                | Alluvium (gravelly)                           | Gravels derived from Devonian and Carboniferous sandstones  | Karstified bedrock outcrop or subcrop | Till derived from Devonian and Carboniferous sandstones and shales | Till derived from metamorphic rocks              |
| Zone of Contribution | Blanket peat                                  | Gravels derived from Devonian sandstones                    | Scree                                 | Till derived from Devonian sandstones                              | Till derived from Namurian sandstones and shales |
| RiverBasinDistrict   | Fen peat                                      | Gravels derived from Lower Palaeozoic sandstones            | Lacustrine sediments                  | Till derived from granites   | Water  |
|                      | Raised peat (intact)                          | Gravels derived from Lower Palaeozoic sandstones and shales | Lacustrine clays                      | Till derived from Lower Palaeozoic and Devonian sandstones         |  |
|                      | Cutover raised peat                           | Gravels derived from limestones                             | Lake marl                             | Till derived from Lower Palaeozoic sandstones                      |  |
|                      | Esker comprised of gravels of acidic reaction | Gravels derived from granites                               | Made ground                           | Till derived from Lower Palaeozoic sandstones and shales           |  |

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0.051 2 3 4 5 6 7 8 9 10  
km





## Soils Map for Kilbannon

