

Callan GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
15 - Nore Kilkenny Co Co		Ennisnag Stream, Desart Stream.	None	23
Topography		This small groundwater body is located in the central lowlands of the Nore Basin. To the northeast are the Slieveardagh Hills and to the south the Southern Kilkenny uplands. The drainage direction is to the southeast and the drainage density is low in some places. Elevations are subdued; the only peak is at Desart Demesne at 103m OD		
Geology and Aquifers	Aquifer type(s)	Rf: Regionally Important Fractured Aquifer. Lm: Locally Important Aquifer, generally moderately productive.		
	Main aquifer lithologies	WAdo – Dolomitised Waulsortian Limestone. CS – Crosspatrick Limestone - Pale grey cherty crinoidal limestone		
	Key structures.	There is an area to the southwest, just north of Callan, where three faults converge. Two extend to the southwest and one crosses the base of the groundwater body to the east, setting the dolomite against the Calp-like limestones of the Aghmacart Formation.		
	Key properties	Transmissivities range from 50 – 500m ² /d and permeabilities from 0.5 – 10m/d. The storage coefficient is in the order of 10 ⁻³ – 10 ⁻⁴ . The wide range of transmissivity values are due to the variations in rock type, thickness, dolomitisation and permeability.		
	Thickness	The effective thickness of the aquifer is very variable and depends on the intensity of dolomitisation in a given area. Dolomitisation is not just a near surface phenomenon, consequently significant permeability has been found at depths greater than 100m. In cross section, it is apparent that the two bands form the ends of a large U-bend structure (part of the central syncline of Kilkenny), which runs underneath Slieveardagh and the Castlecomer Plateau at depths of over 300m.		
Overlying Strata	Lithologies	Till is the most widespread subsoil in Kilkenny. It is a diverse material, which is deposited sub-glacially, and it has a wide range of characteristics due to the variety of parent materials and different processes of deposition. The permeability of the till overlying this groundwater body is low.		
	Thickness	The subsoil thickness in this area is mostly between three and five metres; in some areas there are thinner deposits at Desart Demesne and there are some thicker deposits to the south a few kilometres east of Callan.		
	% area aquifer near surface	The percentage of aquifer near the surface is very small and it is confined to the north at Desart.		
	Vulnerability	The vulnerability is mostly MODERATE with some isolated areas of LOW to the south and some areas of HIGH to the north.		
Recharge	Main recharge mechanisms	Most recharge to the aquifer may come from the poor limestone aquifers to the north. There may be some conduit flow systems controlled by structural geology and less dependent on lithology that are allowing leakage from the poorer aquifers to the north. There will also be diffuse recharge especially in areas such as Desart Demesne where subsoil thickness is low.		
	Est. recharge rates	<i>[Recharge estimates will be presented at a later date.]</i>		
Discharge	Springs and large known abstractions (m ³ /d)	Ballyline Village (west), Skeagh GWS (Skeaghacloran - 40), Cuffsgrange GWS (22), Greatoak, Tullamaine (Avonree Buildings – 5)		
	Main discharge mechanisms	In the Callan – Bennettsbridge lowland area the aquifer discharges mainly by a series of large springs close to the Desart stream.		
	Hydrochemical Signature	Dolomite areas in the Nore are indicated by very hard waters with high Mg/Ca ratio and a calcium/magnesium bicarbonate type. The bedrock strata of the aquifer are Calcareous .		
Groundwater Flow Paths		This is the one aquifer in the Nore River Basin where significant amounts of deep (>200m) groundwater flow may occur. The following are cited as evidence: (1) This aquifer is continuous at depths under the centre of the basin. (2) There is significant permeability at depth. (3) There is a head difference of more than 30m between the discharge levels in the two lowlands, which could provide the hydraulic drive. (4) The large springs at Callan – Bennettsbridge Lowlands. (5) the slightly elevated temperature of some of the discharge waters from this aquifer in the Callan – Bennettsbridge lowlands.		
Groundwater and surface water interactions		Three springs located along the Desart stream indicate where groundwater directly discharges to a surface water body.		

Conceptual model	<p>The area of Dolomitised Waulsortian Limestone and Crosspatrick Formation just to the northeast of Callan defines the extent of this groundwater body. There are springs located along the course of the Desart stream, which imply a conduit flow system has developed even over these short distances.</p> <p>The dolomitisation of the original limestones has resulted in increased porosity. Subsequently other processes such as faulting, development of joints and karstification enhanced this porosity. The end product is a rock that is quite porous and permeable and which has been reduced in some places to the consistency of sand. The borehole hydrograph for Greatoal shows, even for the short time of a month, that there are large fluctuations in the groundwater level of about 6m indicating an aquifer with low storage, which would be expected of the conduit flow system described.</p>
Attachments	(Figure 1) Well Hydrograph for KIK 109 at Greaton
Instrumentation	<p>Stream gauge: None</p> <p>EPA Borehole Hydrograph: GREATOAL (KIK109 - S409476)</p> <p>EPA Representative Monitoring boreholes: None</p>
Information Sources	<p>Buckley, R. & Fitzsimons, V. (2002) Kilkenny Co Co Groundwater Protection Scheme.</p> <p>Daly, E. P. (1993) Hydrogeology of the Dolomite Aquifer in the Southeast of Ireland. Geol. Surv. Ire. Unpubl. Rep.</p> <p>Daly, E.P. (1994) Groundwater resources of the Nore River Basin. Geol. Surv. Ire. Unpubl. Rep.</p>
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Well Hydrograph at EPA Station KIK109 at Greatol

