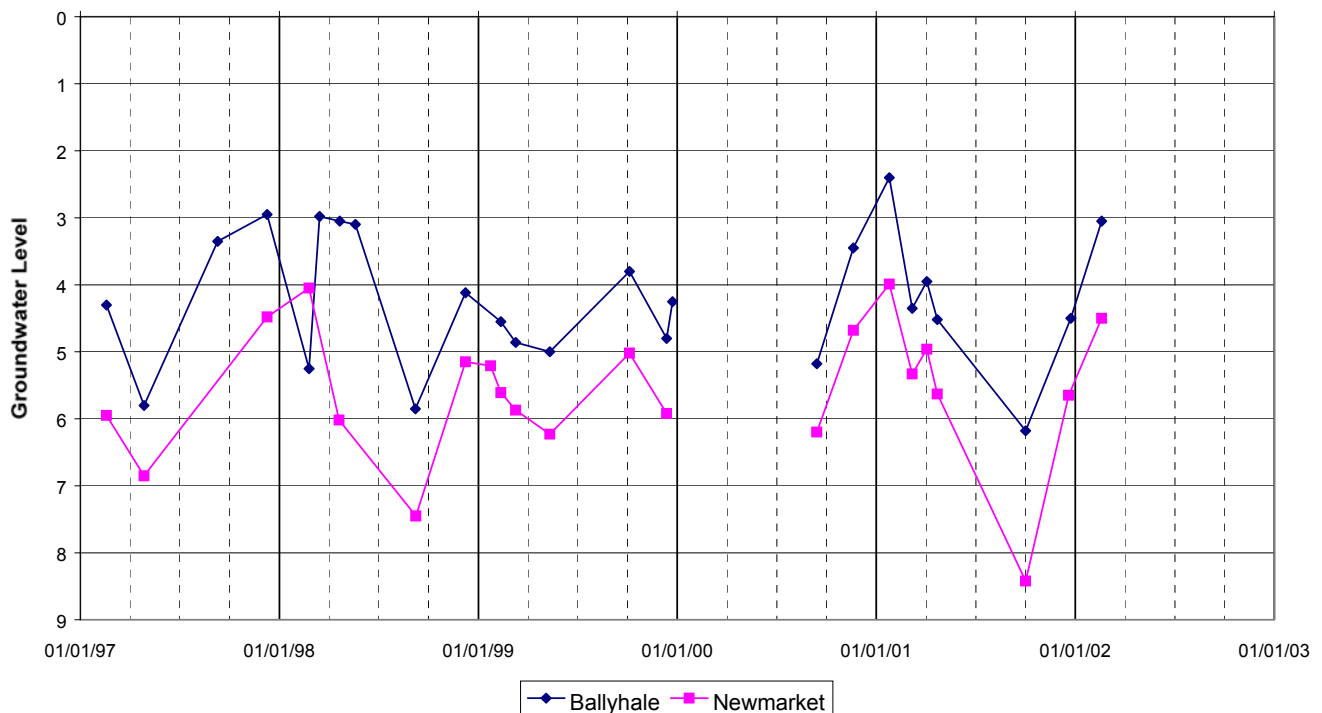


Thomastown GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km ²)
15 – Nore Kilkenny Co Co		Glory, Caherlesk Stream, Nore,	Kilkeasy Bog, Thomastown	97
Topography		This body lies on the boundary between the Nore and the Suir basins. The southern boundary is located along the foothills of the South Kilkenny Uplands. The elevations fall to the north and the land surface becomes much flatter. Drainage in this area is to the north despite the fact that the Nore is flowing to the south. Most surface drainage is flowing towards the Kings River east of Callan, which then contributes to the flow of the Nore, returning the water to the south.		
Geology and Aquifers	Aquifer type(s)	Rf: Regionally Important Fractured Aquifer. Daly (1988) described a gradual change from sandstone to shale moving upwards from the Kiltorcan into the Porters Gate Formation, which means that separate aquifer classifications for each formation cannot be made. KT : Kiltorcan Sandstone Formation – Yellow & red sandstone & green mudstone PG : Porters Gate Formation – Sandstones, shales and thin limestones		
	Main aquifer lithologies			
	Key structures.	The rocks have undergone at least one major phase of structural deformation. The zone of cleaner sandstones around the contact between the two formations is likely to have reacted in a more brittle manner to the deformation, allowing the development of a denser network of fracturing and fracture permeability than in the shalier sandstones elsewhere in the aquifer. Significant faults are expected to cut the aquifer every kilometre (Daly, 1988)		
	Key properties	Transmissivity 75 – 1800m ² /d, the highest values are likely to be associated with low-lying areas close to anticlines or faults. Storage Coefficient – 3.9 x 10 ⁻⁶ . Field observations in the South Kilkenny area suggest that vertical and horizontal permeability are about equal. There will be a reduction in the transmissivity of this aquifer in the eastern part of the South Kilkenny Uplands and also at depth in the centre of the basin where the Kiltorcan Sandstone is thinner.		
Thickness	Geophysical borehole logging data suggest that significant water movements occur at depths of over 60m where the aquifer is not confined by overlying shaly limestones. Where confined, active groundwater circulation is expected to be much more limited, but some deep flow has been inferred from mineral exploration boreholes at depths of over 200m (Daly, 1985).			
Overlying Strata	Lithologies	To the south the subsoil cover of this aquifer is very thin. In the north towards the central lowlands the subsoil overlying is glacial till. In the area of Thomastown in the Nore flood plain there is also an area of sand and gravel.		
	Thickness	The thickness of the subsoil increases to the north and there is more deposition at the lower elevations.		
	% area aquifer near surface	There are significant areas of rock close to surface in the south.		
	Vulnerability	Vulnerability is Extreme in the south as the elevation increase and subsoil cover reduces. There are areas of lower vulnerability to the south.		
Recharge	Main recharge mechanisms	Groundwater recharge is from the elevated peaks to the south and also directly to the rock where the subsoil cover is thinner.		
	Est. recharge rates	<i>[Recharge estimates will be added at a later date]</i>		
Discharge	Springs and large known abstractions (m ³ /d)	Thomastown well 9 (360m ³ /d)		
	Main discharge mechanisms	Water table maps suggest that the discharge area for this aquifer is at Thomastown and in the Knocktopher/ Ballyhale area. Zones of more concentrated discharge occur into the Nore River near Thomastown and the Little Arrigle River near Ballyhale; both zones lying just up-slope of the area where the aquifer becomes confined by lower permeability shaly limestones. There is no obvious discharge zone for groundwaters moving at depth, yet there is evidence to suggest some natural flow does take place. It is most likely that this groundwater flows, via large faults and complex pathways into shallower groundwaters.		

Hydrochemical Signature	The bedrock here is considered to be Siliceous although there is some mixing in the upper layers of the Porters Gate Formation between Siliceous and Calcareous layers. Waters are 'soft' to 'moderately hard' in the sandstones and 'hard' to 'very hard' in the shales and limestones of the upper parts of the Porters Gate Formation. The hydrochemical signature varies between calcium bicarbonate and calcium-magnesium bicarbonate and the average electric conductivity level is 698 $\mu\text{s}/\text{cm}$ at Thomastown and 371 $\mu\text{s}/\text{cm}$ at Windgap. Daly suggests that the signature depends on the thickness of overlying subsoil, with calcium magnesium waters being associated with areas of thicker subsoil. The lower layers of these formations are Siliceous whereas the upper layers tend to be Calcareous .
Groundwater Flow Paths	There are numerous small springs and streams across most of the area where the aquifer occurs close to the surface. In this region, Daly (1985) suggests that recharge is actively occurring, that groundwater flow paths are typically in the order of a few hundred metres, and that most discharge occurs into small streams and springs.
Groundwater & surface water interactions.	The water table in the area of Thomastown is assumed to be controlled by topography, with a good hydraulic connection between the river and the groundwater (Buckley 2002).
Conceptual model	This aquifer is defined by the extent of the Kiltorcan Sandstone to the south, the Porters Gate Formation to the north and the boundary of the Nore Basin to the east and west. Groundwater recharges from the south in the South Kilkenny Uplands, travels north on to the central lowland plains of the Nore. A certain portion of the groundwater will travel into the confined aquifer while there will be some discharge at the geological contact to the north into the associated surface water bodies. The strata in this area of southern Kilkenny appear to be more permeable owing to the proximity of the Variscan deformation front in the south of Ireland and the greater intensity of faulting and jointing associated with it. The rock formations above and below this aquifer are considered aquitards and are therefore confine it.
Attachments	(Figure 1) EPA Groundwater levels at Ballyhale and Newmarket (Figure 2) GSI Groundwater Levels at Ballyhale
Instrumentation	Stream gauge: 15018, EPA Borehole Hydrograph: KIK102 (Ballyhale), KIK116 (Newmarket). GSI Borehole Hydrograph : Ballyhale KNY 31/72 (S503358) EPA Representative Monitoring boreholes: Thomastown WS (#32 - S589415), Windgap (#48 -S420358)
Information Sources	Buckley. R (2002). Kilkenny Co Co Groundwater Protection Scheme. Geological Survey of Ireland Daly, E.P. (1988). The Kiltorcan Sandstone Aquifer. <i>Proceedings of Eighth Annual International Association of Hydrogeologists (Irish Branch) Seminar</i> , Portlaoise, 1988. Daly E.P. (1994). Groundwater Resources of the Nore River Basin. Geological Survey of Ireland.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Groundwater levels in the Thomastown GWB



Well Hydrograph, KNY 31/72,
NGR S 530 358. 2313SEW061. Kiltorcan Formation

