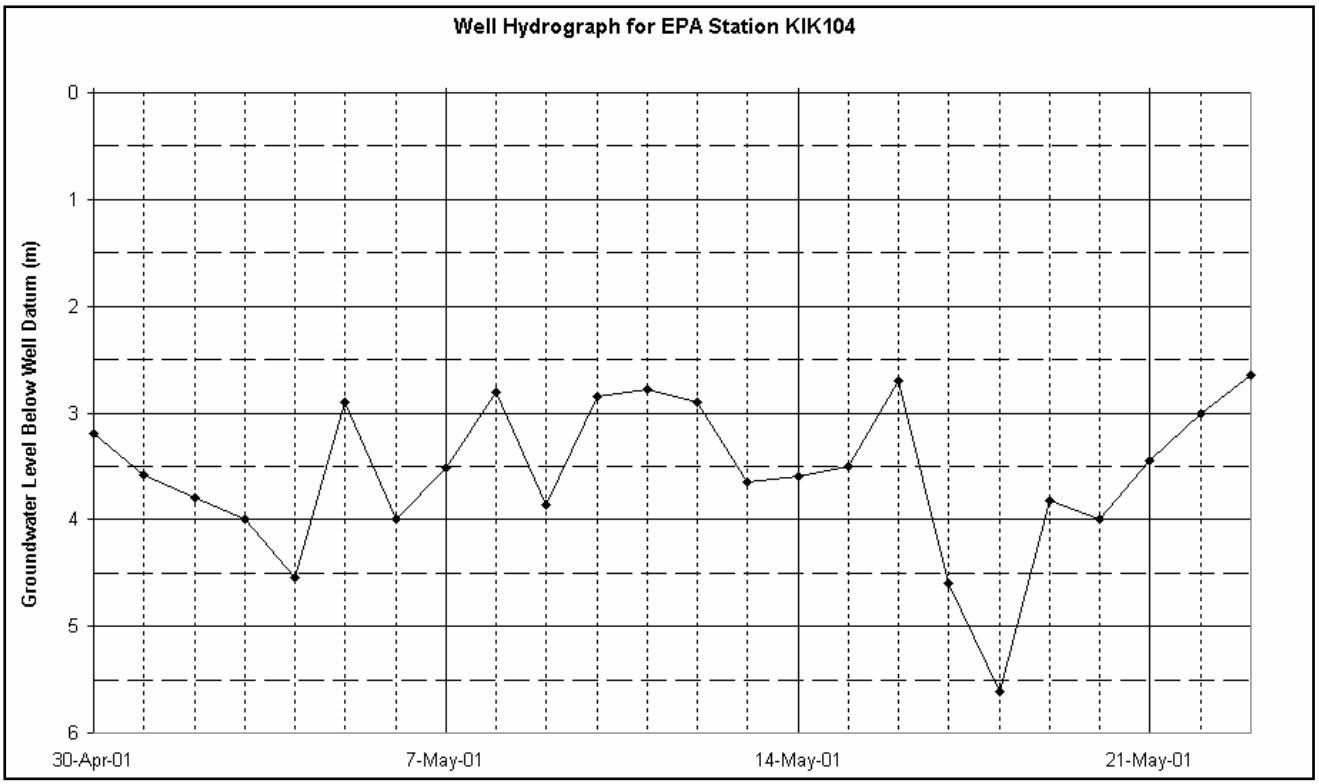
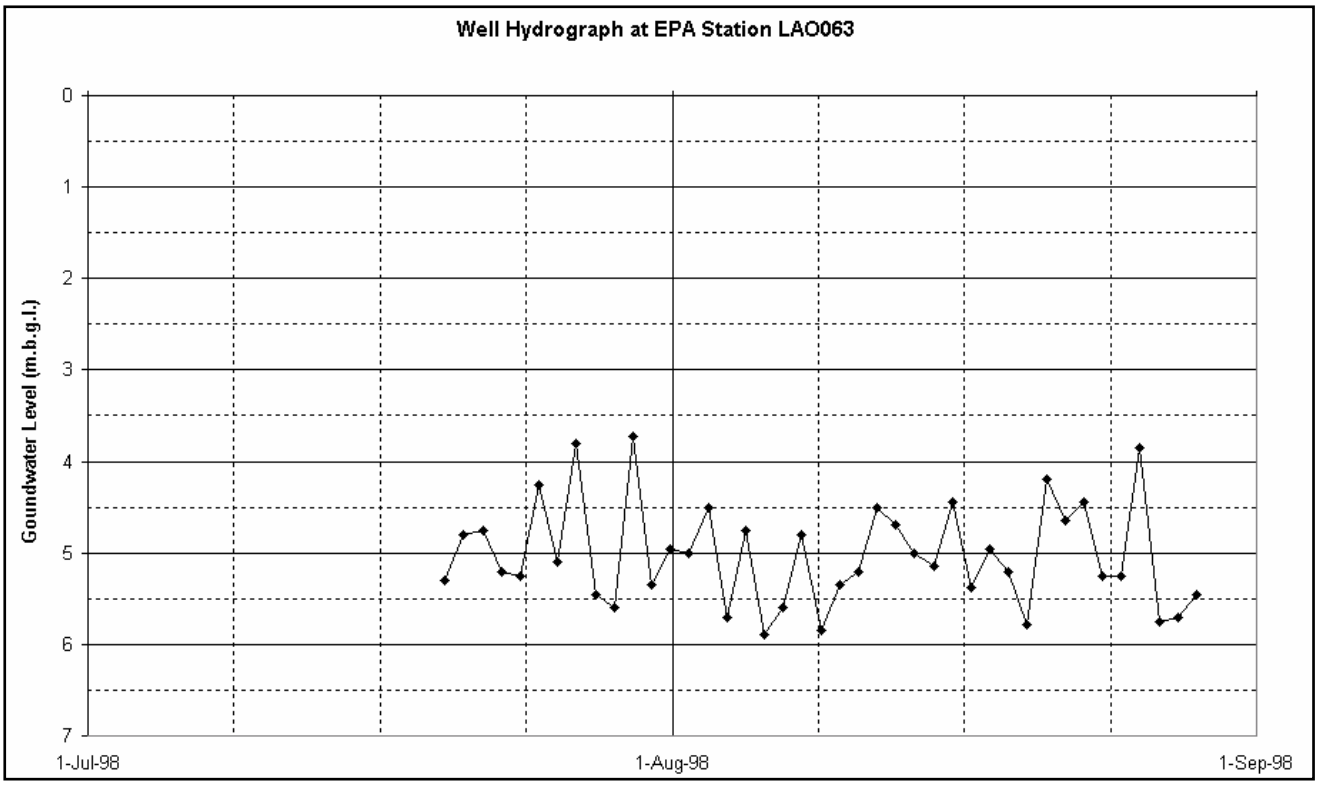
Freshford GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
15 – Nore Kilkenny Co Co Laois Co Co	Nore, Cappanacloghy, Ballytarsna, Ballytarsna, Owenveg, Lisdowney Stream, Nuenna, Gorteenahilla, Arigna, Gully, Erkina, Newtown,	Shanahoe Marsh, River Nore/Abbeyleix woods complex, Inchbeg, Ardloo Fen.	71

Topography		Much of the area has a characteristic hummocky terrain, which is typical of water-lain sand and gravels, although some more poorly sorted lenses have also been encountered, particularly in the north. There are areas of higher elevation to the east (Cullahill Mountain) and west (Castlecomer Plateau) of the gravels, which lie within the Nore floodplain/valley.
Geology and Aquifers	Aquifer type(s)	**Rg**: Regionally Important Sand and Gravel Aquifer.
	Main aquifer lithologies	Sand and Gravel. The sand and gravel deposits associated with the Nore are believed to be fluvio-glacial in origin, deposited by the large quantities of meltwater associated with ice-retreat. This means that coarse sands and gravels are likely to predominate. Lenses of finer material occur, and some parts are overlain by till.
	Key structures.	
	Key properties	Though permeability testing data are limited, productivity, borehole logging and quarry data tend to support the suggestion that coarse material predominates and that the permeability of the aquifer is high.
	Thickness	Gravels in this portion are generally more than 10 m thick over 13 km^2, and sometimes is over 30 m thick.
Overlying Strata	Lithologies	In certain areas (e.g. near Ballyragget), considerable thicknesses of clay-rich till overly the aquifer.
	Thickness	Variable over the areas of the aquifer.
	% area aquifer near surface	HIGH
	Vulnerability	HIGH
Recharge	Main recharge mechanisms	The recharge to this aquifer is direct from precipitation on the aquifer. There is also evidence that there is indirect recharge from the Nore and presumably other streams in the area that flow down from the surrounding elevated impermeable areas. Although considerable thicknesses of clay-rich till have been found overlying the aquifer, and these appear to have reduced the percolation into the aquifer, creating ponding at the surface and therefore reducing the proportion of effective rainfall which will become recharge. .
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	Springs and large known abstractions	Tullore (Ballyroan WS, Spring) (475), Ballyglisheen (Abbeyleix WS), Five wells (Abbeyleix WS), Aughfeerish (900) (Abbeyleix WS), Cloghoe (100) (Ballinakill WS), Attanagh, Ballyragget WS (Gallery - 590), North Kilkenny Meat Export, Freshford (45), Durrow (Convent) Water Supply Scheme, Fermoyle WS (Well A - Ballinakill & Well B - Durrow)
	Main discharge mechanisms	Discharge from this aquifer can be to the Nore river as baseflow. There are also springs present which may represent areas where there are local lenses of impermeable till forcing water out to the surface or may be a significant discharge from the underlying bedrock aquifer which is forced through the gravels.
	Hydrochemical Signature	The sand and gravel deposits within the groundwater body are **Calcareous**. Waters appear to be typically 'hard' to 'very hard', with a calcium-bicarbonate signature, reflecting the limestone mineralogy of much of the gravel .
Groundwater Flow Paths		The gravels are generally unconfined. Static water levels can fluctuate from 2 m to 20 m below ground level. At some points it also comes to the surface, as in Kilkenny City, where a high yielding spring is found. This suggests that the saturated thickness of the aquifer is likely to vary both spatially and temporally.
Groundwater & surface water interactions		River flow analysis carried out by E.P. Daly (1994) showed that the aquifer is likely to contribute to base-flow in the Nore, it also showed that over some stretches of the aquifer, particularly in the northern portion, the Nore could be influent into the sand and gravels.
Conceptual model	This groundwater body is defined by the extent of the sand and gravel deposits within the Nore Valley from Roskelton, Co. Laois to Threecastles Co. Kilkenny, about 4 km SE of Freshford. The groundwater body is considered to be a regionally important aquifer. The groundwater resource contained within this aquifer is considered to be highly vulnerable, although this vulnerability may be reduced in areas where there are considerably thick deposits of impermeable till overlying it. The groundwater body receives recharge from the effective precipitation that falls on the area and also from influent rivers. The groundwater flow direction is toward the Nore although this may change where levels in the river rise above the water table in the aquifer. Water from the river will flow into the gravels when the flood levels recede the water will move from the aquifer into the river again. This process is known as bank storage and is responsible for high baseflow observed in the river.	

Attachments	Well Hydrographs from EPA Stations - LAO063 & KIK104.
Instrumentation	Stream gauge: 15028, 15012, 15034, 15004, 15005 EPA Borehole Hydrograph: LAO063, KIK104 EPA Representative Monitoring boreholes: Spring at Abbeyleix (#1, 2 & 3 - S452841).
Information Sources	Buckley R, Fitzsimons V (2002) County Kilkenny Groundwater Protection Scheme. Daly EP (1994) Groundwater Resources of the Nore River Basin. Geological Survey of Ireland internal report.
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 for EPA Station KIK104
Groundwater Level Below Well Datum (m)
0
1
2
3
4
5
6
30-Apr-01
7-May-01
14-May-01
21-May-01


Well Hydrograph at EPA Station LAO063
Goundwater Level (m.b.g.l.)
0
1
2
3
4
5
6
7
1-Jul-98
1-Aug-98
1-Sep-98