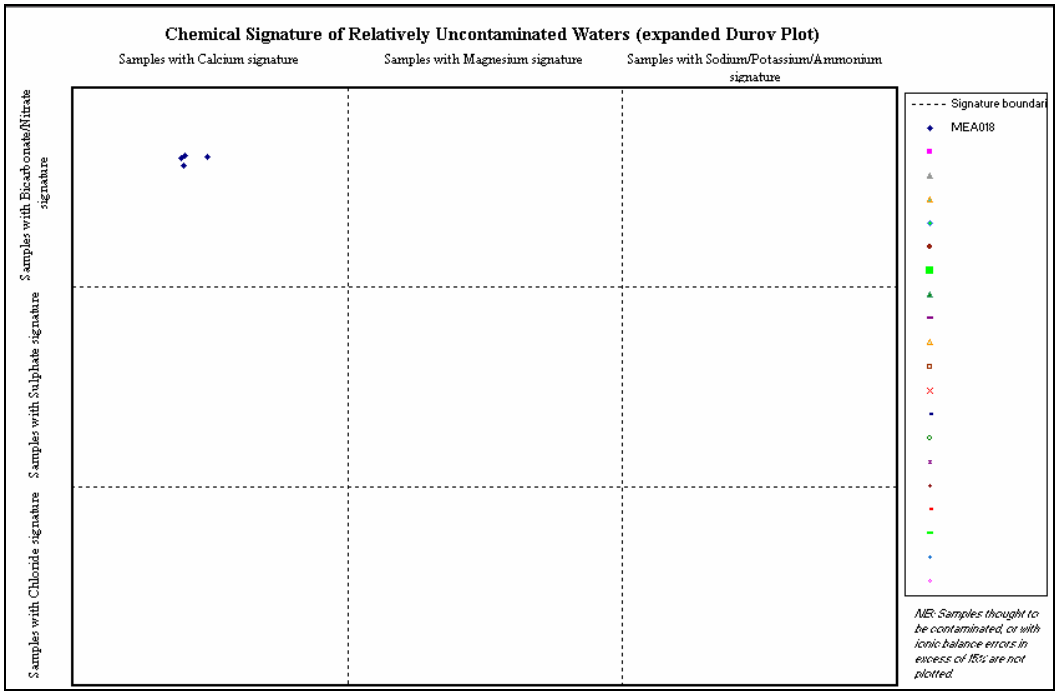
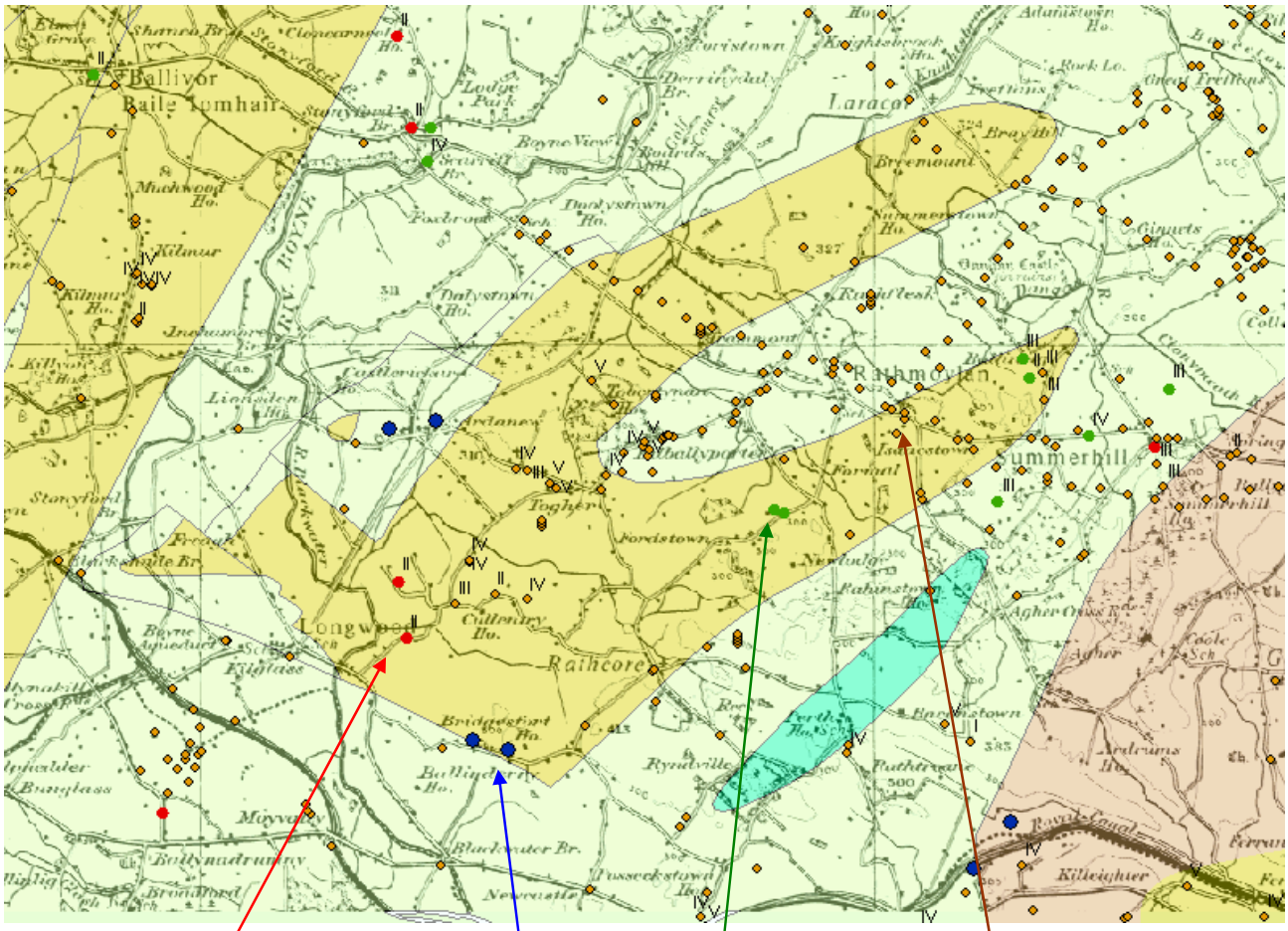
Longwood GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
Meath Co. Co. Hydrometric Area 07		Blackwater, Boyne, Kinghts Brook River,	Dollystown Bog (1577), Rathmoylan Esker (557).	50
Topography		This groundwater body is located in southwest Co. Meath around the village of Longwood. The area is low-lying with elevations ranging from 70 to 100 mOD. Elevations are in general decreasing from the southeast to the northwest.		
Geology and Aquifers	Aquifer type(s)	**Ll:** Locally important aquifer, moderately productive only in local zones		
	Main aquifer lithologies	Waulsortian Limestone (WA) Massive Unbedded Lime / mudstone		
	Key structures.	Faulting in the area of this groundwater body is in a southeast to northwest direction.		
	Key properties	Although very little water-well information is available for this area, drilling information from mining companies suggests that the limestones at Longwood are weathered and karstified. (Cullen 1985) Further east around Rathcore drilling suggests the Waulsortian is less permeable and a number of wells drilled there recorded very low yields and dry wells in some instances, with clay filled fissures. (Cullen 1992) There is very limited evidence of dolomitisation and karstification within the Waulsortian of Co. Meath, other than the warm springs. Two warm springs in particular are located in the south near Longwood: St Gorman's Spring and Ardanew Spring. As part of the Geothermal Project (Minerex 1983) two boreholes were drilled adjacent to St Gorman's Spring to a depth of 13m. The first borehole, 2m from the spring encountered very broken Waulsortian limestone and a cavity, which was connected to the spring. The second borehole, 12m from the spring, also encountered fractured limestone. Both boreholes responded rapidly to the abstraction of water from the spring and to fluctuations in the pumping rate (1300-1800m^3/d). The temperature ranged from 20.9-21.3°C and the conductivity from 570-585 µS/cm. The well records indicate seven "good" wells (100-400m^3/d), all located around the Longwood and Summerhill areas. Specific capacities range from 5-140 m^3/d/m and transmissivities from 30 to 40 m^2/d. (Woods 1998)		
	Thickness	Drilling in the Longwood area indicated 15m of soft black shaly limestone. This is underlain by more solid and compact limestone, within which a major fissure was located within a 2m thick layer of light coloured limestone at 55 to 57m.b.g.l. (Cullen 1985)		
Overlying Strata	Lithologies	The dominant subsoil lithology in this area is limestone-derived till. There are also numerous gravel deposits, mostly small, e.g. eskers.		
	Thickness	Subsoil thickness is generally between 3 and 10m. It must be noted that subsoil thickness, as is the case all over Ireland, is highly variable even over short distances.		
	% area aquifer near surface	There are small areas where rock is close to the surface or outcropping. The main areas occur to the north and northeast, where there are some areas of higher elevation.		
	Vulnerability	Vulnerability is in general Moderate but with significant areas of both High and Low.		
Recharge	Main recharge mechanisms	Rrecharge will be dominantly diffuse. Highest recharge rates can be expected where the subsoil is thinnest or most permeable. There is no evidence of point recharge (losing rivers or sink holes), which is common in Karst limestones.		
	Est. recharge rates	*[Information will be added at a later date]*		
Discharge	Springs and large known abstractions	EPA Source Register – Longwood (175m^3/d), Brannockstown, Trammon, Cloncone, Ballinaskea. As described earlier there are warm springs located around 2.5km southeast of Longwood town.		
	Main discharge mechanisms	This groundwater body discharges to the surface water features that overlie it and also to the adjacent surrounding groundwater body. Warm spring discharges at St Gorman's Spring and Ardanew Spring indicate some deep groundwater flow in the area.		
	Hydrochemical Signature	The data from the Longwood public supply source show that the water has a calcium bicarbonate signature and has typical electrical conductivity values of around 700µS/cm and can be considered to be HARD to VERY HARD water.		
Groundwater Flow Paths		The majority of groundwater flow in this aquifer can be considered to take place in the upper 3m where the bedrock is weathered and an epikarst layer may have developed. This groundwater flow will be rapid and there will be little storage in the aquifer as it is expected that groundwater flow occurs through preferential flow paths. Below this groundwater flow will be concentrated along a network of fractures, fissures and conduits, which in local areas may be interconnected, allow greater development of a flow network. Such fissuring and fracturing decreases with depths and does not normally extend below 50mb.g.l. Groundwater flow directions will be from the local point of recharge to the local discharge area e.g. a river. Drilling evidence at Longwood indicates that the groundwater is flowing under pressure in confined fractures at depths of 55m below ground. A well drilled around 1.4km east of Longwood encountered a major fracture at this depths, which then produced an artesian flow of around 100m^3/d. (Cullen 1985).		

Groundwater & surface water interactions	Groundwater and surface water interactions are of particular concern in areas where protected ecosystems have some dependency on groundwater. Of note is Doolystown Bog, a small remnant of raised bog located 5 km west of Rathmoylan, all that remains of a much larger bog which has been largely cut away. The remaining portions, however, are still of scientific interest as the bog supports a good diversity of species and displays several typical bog features. Despite being burnt and affected by drainage operations, this bog is one of the most interesting in the county, one of its attractive features is a pronounced hummock and hollow topography on its surface. This feature is indicative of active growth on the bog and is atypical for this region. Over the past 30 years, the southern side of the site has been reduced in size by afforestation. The bog margins have been affected by turbary, drainage and reclamation and many areas are drying out.
Conceptual model	This groundwater body is located in southwest Co. Meath around the village of Longwood. The area is low-lying with elevations ranging from 70 to 100mOD. The groundwater body is composed primarily of low permeability rocks, although localized zones of enhanced permeability do occur. The area of Waulsortian around Longwood defines the extent of the GWB. Recharge occurs diffusely through the subsoils and via outcrops. It takes place mainly in the upland areas where subsoils are thinner or more permeable. The aquifers within the GWB are generally unconfined, but may become locally confined where the subsoil is thicker and/or lower permeability. Most flow in this aquifer will occur near the surface. In general, the majority of groundwater flow will occur in the upper 10 m, comprising a weathered zone of a few metres and a connected fractured zone below this. However, deep-water strikes in more isolated faults/ fractures can be encountered at 50-70 mbgl. Flow path lengths are relatively short, and in general are between 30 and 300 m. The regional groundwater flow direction is to the northwest although on a local scale groundwater will follow the local hydraulic gradient towards rivers in the area.
Attachments	Durov Diagram & Map
Instrumentation	Stream gauge: 07002, 07003 Borehole Hydrograph: The EPA monitor the groundwater level in the borehole south of Doolystown (MEA134), but the results are not representative of this groundwater body as there is a sand and gravel body overlying this aquifer. EPA Representative Monitoring boreholes: Longwood (MEA018)
Information Sources	Cullen K T (1985) *Preliminary Hydrogeological Report on South County Meath*. Report to Meath Co. Co. Cullent K T (1985) *Results of the Drilling and Testing of Two Trial Water Wells at Longwood.* Report to Meath Co. Co. Cullen K T (1992) *Impact of Rathcore Quarry Development on Groundwater*. Hydrogeological Report, Rathcore Quarry EIS. Minerex Ltd (1983) *Irish Geothermal Project, Phase 1, Vols. 1 & 2*. Report to the Geological Survey of Ireland. McConnell B, Philcox M & Geraghty M, 2001. *Geology of Meath: A geological description to accompany the bedrock geology 1:100,000 scale map series, Sheet 13, Meath*. Geological Survey of Ireland. 77 p. Woods L, Meehan R & Wright G R, 1998. *County Meath Groundwater Protection Scheme*. Report to Meath County Council. Geological Survey of Ireland. 54 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




Ballivor
Baile Lomhair
Longwood
Rathcore
Rathmolyon
Summerhill
Laraco
Excellent Yields
Warm Springs
Good Yields
Other Yields