Gormanstown GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
Wicklow Co. Co. Kildare Co. Co. Hydrometric Area 09		Lemonstown Stream.	Newtown Marshes (1759)	9.5
Topography		This GWB lies between Dunlavin and Hollywood, Co. Wicklow, in the lowland to the west of the Wicklow Mountains. The hill slopes are of the order of 0.04. Elevations range from about 180 m at the source to 257 m at Wards of Tober. The area lies on the boundary between the Eastern and South Eastern RBDs.		
Geology and Aquifers	Aquifer type(s)	Lg: Locally Important Sand and Gravel Aquifer		
	Main aquifer lithologies	Sand & Gravel and some limestone tills. The logs of boreholes drilled close to the Gormanstown USC supply indicate 6 m of "gray gravel and cobbles predominantly sub angular and sub rounded, sandy at upper levels" sitting on at least 0.7 m of "boulder clay" (IGSL, 1983).		
	Key structures.	N/A		
	Key properties	The permeability of the sand & gravel is assumed to be high. Estimated specific capacity~128 m^2/d		
	Thickness	By definition (DELG/EPA/GSI, 1999) this gravel deposit must be at least 10 m thick. Drilling evidence from Wicklow suggest the thickness of this deposit varies from 10 - 30 m		
Overlying Strata	Lithologies	None		
	Thickness	N/A		
	% Area aquifer near surface	High		
	Vulnerability	High		
Recharge	Main recharge mechanisms	This GWB is recharged from rainwater percolating through the topsoil and entering the sand and gravel deposits. The slopes around the source and the nature of the deposits in the area need to be considered in order to give a representative value for the runoff that occurs in the area. Steep slopes usually suggest a high proportion of the rainfall would move down the hillsides as runoff (overland flow). However, the sand & gravel deposits that occur on the hill slopes above the Tober Spring are highly permeable, suggesting that a high proportion of the rainfall may infiltrate into the subsurface and down to the water table and in this instance may not allow runoff to occur to the same degree if the slopes were not draped by sand and gravel deposits, except during high intensity rainfall events. This view is supported by the number of small springs that occur at the base of the sand & gravel deposits around the hillsides. Typically the proportion of recharge that infiltrates to ground water in sand & gravel is around 80%, this figure has been reduced to 70% to take account of the steep slopes. The presence of less permeable layers in the deposit, even if thin, can create perched water tables and prevent recharge of the true water table. Where the water table lies below the local river network it is likely that some stream water may pass into the aquifer.		
	Est. recharge rates	*(Information to be added at a later date)*		
Discharge	Springs and large known abstractions	Gormanstown USC (250-340 m^3/d - Although located outside the GWB it does extract water from the aquifer) According to GSI archive 1:10,560 scale maps of the area, a series of springs occur towards the bottom of the slope on either side of the hills. The largest of these springs is the one used by the group water scheme and is likely to be the historical reason for the townland name (Tober) and is also the source of the River Greese. The spring flows were estimated by group scheme personnel using a V-notch weir in September 1977 to be about 1000 m^3/d and was then estimated to be in the region of 3000 m^3/d when measured by GSI staff in May 2002.		
	Main discharge mechanisms	Groundwater will leave this aquifer where the water table is above river stage and a permeable riverbed exists. There is also likely to be groundwater seepage from the extremities of the gravel body at the lower elevations, which may appear as springs, seeps or a rise in baseflow to a river. Water may also come to the surface where there is a boundary to groundwater flow i.e. an impermeable layer of till within the gravel deposit.		
	Hydrochemical Signature	The water is hard to very hard, with total hardness of 306-405 mg/l (as $CaCO_3$) and electrical conductivity of 591-628 µS/cm. These values are indicative of groundwater from limestone or from sand & gravel deposits.		
Groundwater Flow Paths		Although the aquifer is permeable groundwater velocity is slow because storativity in the aquifer is high and water table elevations are generally subdued. This also means that discharge to rivers will not be flashy and will be sustained through drier periods of the year. Water levels in the vicinity of the source are generally close to or at the ground surface. Water levels in the supply borehole are approximately 1 m below ground. The water table coincides with the ground surface where the springs emerge. Information on the water levels elsewhere is limited. There is not enough hydrogeological data to calculate precise groundwater gradients, but low gradients are typical of gravels and it is assumed to be less than the topographic gradient. For the purposes of calculations it is assumed to be 0.01		

Groundwater & surface water interactions	Newtown Marshes are located about 2 km west of Hollywood, immediately beside Lemonstown crossroads. The site comprises a series of marshes and ponds within an area of calcareous gravel deposits. The area is grazed mostly by sheep and some of the grassland has been improved in recent years, with signs of eutrophication in some of the wetlands. However, the grasslands are included as part of the site for hydrological reasons. Apart from the ecological interest, this site is of geomorphological interest. Areas of freshwater marsh are now scarce in this part of Ireland.
Conceptual model	This GWB lies between Dunlavin and Hollywood Co. Wicklow in the lowland to the west of the Wicklow Mountains. The extent of the body is defined by the presence of gravel deposits over 10 m thick. The GWB comprises permeable sand and gravel deposits, which will have a high storativity. Recharge occurs diffusely through the overlying topsoil. The aquifer is generally unconfined, but may become locally confined where lower permeability deposits overlie the gravels. The water table within gravel aquifers is usually quite flat and therefore the depth to water will depend on the topography of the area. The flow paths within the aquifer are constrained by the extent of the deposit and therefore will not develop to a regional scale. Groundwater discharge will occur via springs and seeps along the lowest boundary of the body and also along river courses. There may also be discharge to rivers as baseflow where the water table lies above the river stage. There is a dependent ecosystem overlying the aquifer and the interaction between the groundwater such habitats should be examined closely.
Attachments	
Instrumentation	Stream gauge: None Borehole Hydrograph: None EPA Representative Monitoring boreholes: None
Information Sources	Irish Geotechnical Services (IGSL) (1983) *Report on a groundwater investigation for Gormanstown/Kildare Group Water Scheme* Report No.571. DELG/EPA/GSI (1999) *Groundwater Protection Schemes.* Department of Environment & Local Government, Environmental Protection Agency and Geological Survey of Ireland, joint publication. Kelly C, Fitzsimons V (2002) *County Kildare Groundwater Protection Scheme*. Report to Kildare County Council. Geological Survey of Ireland 55pp McConnell B, Philcox M, Sleeman A G, Stanley G, Flegg A M, Daly E P, Warren W P (1994) *A Geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 16, Kildare-Wicklow*. Geological Survey of Ireland, 70 pp.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae