Dromiskin Gravel GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
06 Louth Co. Co.	**Rivers**: Fane.	Dundalk Bay (IE0000455)	8.3

Topography		The sand/gravel GWB is situated on the coast and is roughly equant, being about 3.5 km long and wide. The location and boundaries of the GWB are shown in Figure 1. The sand/gravel deposit is flat and at an elevation of less than 10 mAOD. It is situated in a low-lying landscape where gently undulating hills are generally less than 40 mAOD. Small streams and drainage channels cross the GWB, and the River Fane crosses the deposit at the north of the GWB. Surface drainage is generally eastwards, with a confluence in the northeast of the GWB. Surface drainage is poor, with artificial channels draining the deposits.
Geology and Aquifers	**Aquifer categories**	The deposits are between 1 and 10 km^2, and the saturated thickness is unknown. Accordingly, the deposits are classified as **Locally Important Sand and Gravel Aquifers (Lg)** (DELG/EPA/GSI (1999). The sands/gravels overlie bedrock aquifers which are Generally Unproductive except for Local Zones (Pl).
	Main aquifer lithologies	The deposits near Dromiskin mainly comprise marine sands and gravels (MGs) (Meehan, 2004). There is a strip of beach sand (Mbs) adjacent to the sea. These deposits are described as being composed predominantly of fine-grained lagoonal and offshore silts and beach deposits, which are interbedded with sands and gravels (NERDO, 1981).
	Key structures	N/A
	Key properties	The marine sands and gravels are likely to have high but variable permeability and transmissivity. In similar deposits elsewhere in Co. Louth (at Dundalk), sand and gravel deposits are known to be highly but variably productive, with transmissivities ranging from 3-1000 m^2/d (NERDO, 1981). There are no water level data, but from topographic considerations, groundwater gradients are likely to be on the order of 0.002 or less. Sand/gravel aquifers generally consist of unconsolidated coarse-grained material, usually containing less than 8% fines (O'Suilleabháin, 2000). Storativity is expected to be high (0.1 to 0.2). Poor surface drainage indicates that water levels are generally close to or at ground surface. Groundwater is likely to be unconfined or may be partially confined by possible fine-grained sediments.
	Thickness	There are no thickness data for these deposits.
Overlying Strata	**Lithologies**	Due to the high water table, indicated by poor drainage and artificial drainage channels, there may be a finer-grained layer overlying the sands/gravels. Made ground (Meehan, 2004) covers some of the deposits.
	Thickness	N/A.
	% area aquifer near surface	*[Further Information to be added at a later date]*
	Vulnerability	*[Further Information to be added at a later date]*
Recharge	**Main recharge mechanisms**	Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Typically, due to the high permeability of sand/gravel, a high proportion of available recharge to gravel aquifers will percolate down to the water table. However, the indicated high water table in these deposits will tend to inhibit recharge. Depending on the river stage relative to groundwater levels, and on the permeability of the river bottom, river waters may recharge the aquifer at their upstream extents.
	Est. recharge rates	*[Information to be added to and checked]*
Discharge	**Large springs and large known abstractions (m^3/d)**	*[Information to be added to and checked]*
	Main discharge mechanisms	Groundwater discharges to the River Fane that flows to the north of the GWB, to the rivers and drainage channels that flow through and adjacent to the deposits, and to the sea in the east of the GWB.
	Hydrochemical Signature	There are no data currently available to assess.
Groundwater Flow Paths		Groundwater flow path length depends on the size and dimensions of the sand/gravel deposit, and also upon the spacing of internal groundwater divides and the distance between streams, if groundwater is discharging to them. Overall, groundwater flow is to the north, where it discharges to the River Fane, and to the east, where it discharges to Dundalk Bay. Groundwater will also flow locally to streams crossing the GWB. Flowpaths will be on the order of 200-1000 m. The GWB is crossed by small drainage channels, so shallow groundwater flow path lengths may be significantly shorter, with groundwater flow directions being dictated by local surface drainage patterns.

Groundwater & Surface water interactions	The hydraulic connection between the groundwater in the aquifer and the streams crossing the aquifer, and the River Fane to the north, is expected to be variable due to the spatially varying permeabilities of the aquifer and of the subsoil overlying the gravel. Water may be able move into and out of the aquifer from the streams in certain locations depending on the river stages and permeability of the subsoils.
Conceptual model	• The GWB consists of a sand/gravel deposit just north of Dromiskin. • The deposits are located adjacent to the coast and immediately south of the River Fane, and are situated at elevations less than 10 mAOD, within a low-lying landscap. Overall, the surface drainage is eastwards, with some streams flowing north to the main drainage channel (River Fane). Surface drainage is poor. • The aquifer is comprised of marine gravel and sand deposits. Drilling in similar deposits at Dundalk indicates that they have variable composition such that offshore and lagoonal fine-grained sediments may be interbedded with the sands and gravels. • Pumping test data in similar deposits indicate that transmissivity in will be variable, ranging from 5-1000 m^2/d. Storativities are likely to be about 0.1. • Ground surface gradients indicate that groundwater gradients will be 0.002 or less. • Diffuse recharge occurs via rainfall percolating through the unsaturated sand/gravel. Recharge is likely to be inhibited by the high groundwater levels and possibly, in places, by low permeability deposits overlying the sands/gravels. • Groundwater discharges to the River Fane, to the streams and drainage channels that flow across the deposits, and to Dundalk Bay. • The hydraulic connection between the aquifer and the streams crossing the aquifer is expected to be variable due to the spatially varying permeabilities of the aquifer and of the subsoil overlying the gravel. • Overall, groundwater flows north to the River Fane and eastwards to the sea. Local groundwater flow directions will be influenced by the streams and drainage channels crossing the GWB. Flow path lengths are on the order of 200-1000 m. Shallow groundwater flow paths may be significantly shorter where drainage channels cause groundwater to discharge to surface water courses.
Attachments	Figure 1.
Instrumentation	None
Information Sources	An Foras Forbartha & Geological Survey Office (1981) Groundwater Resources in the NE (RDO) Region. DELG/EPA/GSI (1999) *Groundwater Protection Schemes.* Department of the Environment and Local Government, Environmental Protection Agency and Geological Survey of Ireland. Meehan, R.T., (2004) *Subsoils Map for County Louth*. Map produced as part of EPA Soil and Subsoil Mapping Project (formerly FIPS-IFS). Teagasc, Kinsealy. O' Riain, G., (2004). *Water Dependent Ecosystems and Subtypes Draft Report.* WFD Support Projects. Compass Informatics in association with National Wildlife and Parks Service (DEHLG). O'Suilleabháin, C., (2000). *Assessing the boundary between high and moderately permeable subsoils.* Unpublished MSc., University of Dublin. Department of Civil, Structural and Environmental Engineering, Trinity College Dublin.
Disclaimer	Note that all calculations and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Figure 1 Location and extent of Dromiskin Gravel GWB