

**Dunmore-Cloonfad GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
30 Galway and Roscommon Co. Co.	<b>Rivers:</b> Sinking, Dalgan		54
<b>Topography</b>	The GWB is a fault bounded inlier that occupies an area located between Milltown, Dunmore and Cloonfad. It includes an area to the northeast of Dunmore due to the proximity and the similarity of the rocks. The GWB stands proud from the surrounding landscape, with a relatively hilly topography. Elevations range from 60-140 mAOD. The centre of the triangular shaped GWB forms a spine trending NE-SW. The slopes on the southern side of the GWB are steeper than those on the northern side. The western end slopes gently to about 60 mAOD. Karstified limestones form the boundaries, apart from the eastern boundary, which is a regional surface water catchment divide with the Shannon RBD area. Figure 1 shows the location and boundaries of the GWB.		
<b>Geology and Aquifers</b>	Aquifer categories	<b>LI:</b> Locally important bedrock aquifer that is productive in local zones.	
	Main aquifer lithologies	Dinantian Mixed Sandstones, Shales, Limestones, Dinantian Lower Impure Limestones and a very small area of Dinantian Pure Unbedded Limestones.	
	Key structures	The rock units of this GWB occur as a fault bounded inlier in surrounding Dinantian Pure Bedded Limestones. This elongate GWB trends northeast southwest. Northwest southeast trending faults cross-cut the body at Castlerea. Boyle Sandstone (Dinantian Mixed Sandstones, Shales and Limestones) dips south southeast.	
	Key properties	Five 'Good' yielding wells are present at the western end of the GWB and a specific capacity of 175 m <sup>3</sup> /d/m is reported for one well. The data suggests that there is a zone of relatively high transmissivity toward the western end of the GWB. In general, the lower transmissivities are expected. Transmissivities ranging from 2-76m <sup>2</sup> /d have been recorded in the Boyle Sandstone (Dinantian Mixed Sandstones, Shales and Limestones). Typical transmissivities in the Dinantian Lower Impure Limestones are usually in the range from 5-10 m <sup>2</sup> /d. Storativity is expected to be low, less than 1%. Karstification is expected to be limited, and there are no karst features recorded.	
	Thickness	Most groundwater flux is likely to be in the uppermost part of the aquifer; comprising a broken and weathered zone typically less than 3 m thick; a zone of interconnected fissuring 10-15 m thick; and a zone of isolated poorly connected fissuring typically less than 150 m.	
<b>Overlying Strata</b>	Lithologies	Till and cutover peat dominate the subsoils. A small portion of the northern part of the GWB is described under the Roscommon Groundwater Protection Scheme (Lee and Daly, 2003) The till in this area is described as "SILT" (BS 5930), and is classed as "Moderate" permeability.	
	Thickness	The thinnest subsoils (<3 m) occur on the upland areas along the spine of the GWB. Toward the edges of the GWB, on the lower slopes, the thicknesses are generally greater. In the vicinity of Milltown, thicknesses are up to 22 m.	
	% area aquifer near surface	<i>[Information to be added at a later date]</i>	
	Vulnerability	The vulnerability for a small portion of the northern part of the GWB is described in the County Roscommon Groundwater Protection Scheme (Lee and Daly, 2003). In this area the vulnerability classification is variable dependent on the depth to bedrock.	
<b>Recharge</b>	Main recharge mechanisms	Diffuse recharge occurs via rainfall percolating through the subsoil and rock outcrops.	
	Est. recharge rates	<i>[Information to be added at a later date]</i>	
<b>Discharge</b>	Springs and large known abstractions (m <sup>3</sup> /d)	Two Good yielding wells in Garrafrauns (107, 218 m <sup>3</sup> /d). Irish Town (218 m <sup>3</sup> /d).	
	Main discharge mechanisms	The main groundwater discharges are to the streams, rivers and small springs. There may also be some discharge to the surrounding karstified limestones.	
	Hydrochemical Signature	The groundwater is likely to have a calcium–bicarbonate signature.	
<b>Groundwater Flow Paths</b>	Generally, water levels are 0-10 m below ground level. Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones. Flow paths are likely to be short - up to 300 m, with groundwater discharging rapidly to nearby streams and small springs. The proportion of groundwater taken by the swallow holes is expected to be low and is likely to be returned quickly to the surface network. Groundwater flow directions are expected to follow topography.		
<b>Groundwater &amp; Surface water interactions</b>	Groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater - surface water interactions occur. Baseflow to rivers and streams is likely to be relatively low.		

<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>The GWB is a fault bounded inlier that occupies an area located between Milltown, Dunmore and Cloonfad. It includes an area to the northeast of Dunmore due to the proximity and the similarity of the rocks. The GWB stands proud from the surrounding landscape, with a relatively hilly topography. Elevations range from 60-140 mAOD. The centre of the triangular shaped GWB forms a spine trending NE-SW. The slopes on the southern side of the GWB are steeper than those on the northern side. The western end slopes gently to about 60 mAOD.</li> <li>Karstified limestones form the boundaries, apart from the eastern boundary, which is a regional surface water catchment divide with the Shannon RBD area.</li> <li>The GWB is composed primarily of low transmissivity rocks, but the data suggest that there is a zone of higher transmissivity in the western end of the GWB toward Milltown. Most of the groundwater flux is likely to be in the uppermost part of the aquifer: comprising a broken and weathered zone typically less than 3m thick; a zone of interconnected fissuring typically less than 10m; and a zone of isolated fissuring typically less than 150m.</li> <li>Groundwater flow is expected to be concentrated in fractured and weathered zones and in the vicinity of fault zones.</li> <li>Recharge occurs diffusely through the subsoils and rock outcrops. Recharge is limited by the low permeability bedrock and in places by low permeability till, thus most of the available recharge discharges rapidly to nearby streams. A small proportion of point recharge occurs via the limited number of swallow holes present.</li> <li>The groundwater is expected to have a calcium bicarbonate signature (CaHCO<sub>3</sub>).</li> <li>Flow paths are likely to be short – up to 300 m, with groundwater discharging rapidly to nearby streams and small springs and flow directions are expected to follow topography.</li> </ul>
<b>Attachments</b>	(Figure 1).
<b>Instrumentation</b>	Stream gauges: 30032 EPA Water Level Monitoring boreholes: n/a EPA Representative Monitoring boreholes: n/a
<b>Information Sources</b>	Lee, M. & Daly D. (2003) <i>County Roscommon Groundwater Protection Scheme</i> . Main Report. Roscommon County Council & Geological Survey of Ireland, 54pp. Aquifer Chapters: Dinantian Mixed Sandstones, Shales and Limestones & Dinantian Lower Impure Limestones, Dinantian Pure Unbedded Limestones.
<b>Disclaimer</b>	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Table 1 Rock units in GWB

Rock unit name and code	Description	Rock unit group
Boyle Sandstone (BO)	Sandstone, siltstone, black mudstone	Dinantian Mixed Sandstones, Shales and Limestones
Kilbryan Limestone (KL)	Dark nodular calcarenite & shale	Dinantian Lower Impure Limestones
Waulsortian Limestone (LI)	Massive unbedded lime-mudstone	Dinantian Pure Unbedded Limestones

Figure 1 Location and Boundaries of GWB

