

**Brinny GWB: Summary of Initial Characterisation.**

Hydrometric Area Local Authority		Associated surface water features	Associated terrestrial ecosystem(s)	Area (km <sup>2</sup> )
18 Cork County Council		<b>Rivers:</b> Ballymahane, Brinny, Owenboy, Aughnaghboy	None currently listed	12.7
<b>Topography</b>	<p>This small GWB occupies a valley wholly surrounded by the less permeable sandstones and mudstones of the Cork Group in the Bandon GWB. The aquifer is very elongated east-west, and narrow in the north-south direction. The GWB is a local alluvial gravel aquifer.</p> <p>The floor of the valley is quite flat, at an elevation of approximately 30-40 metres OD.</p> <p>The surface drainage is both east and west: via the Brinny River to the Bandon, and via the Owenboy to Cork Harbour.</p>			
<b>Geology and Aquifers</b>	<b>Aquifer categories</b>	<b>Lg:</b> Locally important gravel aquifer.		
	<b>Main aquifer lithologies</b>	<p>Gravel.</p> <p>Alluvial sediments are deposited by rivers and include unconsolidated materials of all grain sizes, from coarse gravels down to finer silts and clays and may contain organic detritus. Close to the hills and mountains they are likely to be sandy or gravelly as flow velocities are faster. The Brinny/Upton deposit extends from Mishells (in the west), about 4 km west of Kilpatrick, to almost as far as Halfway (in the east). The gravels are 15 km long and 0.5 to 1 km wide, with an area of approximately 12.7 km<sup>2</sup>.</p> <p>The gravels at Brinny along the Bandon River have been exploited for groundwater by industry since about 1974.</p> <p>This gravel aquifer is over 10 km<sup>2</sup> in area but its saturated thickness probably exceeds 5 m only in some places (namely Brinny and Upton), so by GSI criteria this aquifer is classed as a <b>locally important sand/gravel aquifer (Lg)</b>.</p>		
	<b>Key structures</b>			
	<b>Key properties</b>	<p>GSI well records indicate 6 ‘excellent’ wells abstracting from the gravels at Brinny (yields &gt; 400 m<sup>3</sup>/d) with sample specific capacities being 54.5, 101 and 288 m<sup>3</sup>/d/m. There is also one ‘good’ well with a yield of 327 m<sup>3</sup>/d and a specific capacity of 25 m<sup>3</sup>/d/m. A well at St. Patrick’s Institution, Upton, also tapped a thinner continuation of these gravels, with a yield of 238 m<sup>3</sup>/d and a specific capacity of 14.8 m<sup>3</sup>/d/m. A GSI borehole at Annagh More indicated a possible yield of 327 m<sup>3</sup>/d.</p> <p>A report by KT Cullen (1982) indicated a permeability of 50 m/d.</p>		
	<b>Thickness</b>	<p>Borehole logs and well records indicate the subsoils are 10 - 24 m thick. Saturated thicknesses are estimated from well records at between 12 and 20 m. At Brinny itself the aquifer consists of 14 m of coarse gravel which is considered to be semi-confined by layers of silt and clayey gravel. A GSI borehole investigated the eastern end in 1980 in the alluvial flat of the Owenboy River at Annagh More, to a depth of 9 m, encountering an aquifer of fine gravel at 4.3 to 8.0 m below ground.</p>		
<b>Overlying Strata</b>	<b>Lithologies</b>	<p>Alluvial silt and clayey gravel.</p> <p><i>Subsoil Types identified in Brinny GWB by Teagasc Parent Material Mapping (Draft): Alluvium (A);</i></p>		
	<b>Thickness</b>	Up to 12 metres.		
	<b>% area aquifer near surface</b>			
	<b>Vulnerability</b>	Generally High		
<b>Recharge</b>	<b>Main recharge mechanisms</b>	<p>Discharge will be predominantly diffuse, but the sandstone/mudstone ridges to the north and south of this GWB (Bandon GWB) provide runoff which may augment recharge to the gravel aquifer in the valley: presumably this would occur around the margins of the alluvium. There may also be some lateral recharge from the rivers.</p>		
	<b>Est. recharge rates</b>	<i>To be assessed</i>		

**1<sup>st</sup> Draft Brinny GWB Description –.....2004**

<b>Discharge</b>	<b>Large springs and high yielding wells (m<sup>3</sup>/d)</b>	<p><i>Note: The following data needs to be checked and updated by RBD Project Consultants.</i></p> <p>GSI records indicate at least 7 boreholes (at Brinny) with yields over 400 m<sup>3</sup>/day, with a further 4 (at Brinny, Annagh More and St. Patrick's, Upton) with yields over 100 m<sup>3</sup>/day.</p> <p><i>Actual abstractions are not clear – at Brinny, abstractions could be at least 1200 m<sup>3</sup>/day, and a planning permission is said to allow over 3400 m<sup>3</sup>/day. Current abstraction at St Patrick's (formerly an Industrial School) is not known.</i></p> <p>Data from EPA Groundwater Sources List:</p>
	<b>Main discharge mechanisms</b>	Discharge would be expected to the rivers over a distance.
	<b>Hydrochemical Signature</b>	Sparse data from St Patrick's, Upton, indicates EC of 200-230, low Hardness of 75-100 (moderately soft), low pH of 5.8-5.9, and 2.6 mg/l Nitrate-N.
<b>Groundwater Flow Paths</b>	Groundwater flow path lengths will be restricted by the small extent of the aquifer.	
<b>Groundwater &amp; Surface water interactions</b>	There may be two-way movement of water to and from the rivers: into the aquifer at high river stages, and into the rivers at low flows. The extent of these interactions is not known, but the heavy abstraction by Schering-Plough should encourage water being drawn into the aquifer.	
<b>Conceptual model</b>	<ul style="list-style-type: none"> <li>• This small GWB occupies a valley wholly surrounded by the less permeable sandstones and mudstones of the Cork Group in the Bandon GWB.</li> <li>• The GWB is a local alluvial gravel aquifer.</li> <li>• The floor of the valley is quite flat, at an elevation of approximately 30-40 metres OD.</li> <li>• The surface drainage is both east and west: via the Brinny River to the Bandon, and via the Owenboy to Cork Harbour.</li> <li>• The gravels are 15 km long and 0.5 to 1 km wide, with an area of approximately 12.7 km<sup>2</sup>.</li> <li>• A report by KT Cullen (1982) indicated a permeability of 50 m/d.</li> <li>• Borehole logs and well records indicate the subsoils are 10 - 24 m thick. Saturated thicknesses are estimated from well records at between 12 and 20 m.</li> <li>• Sparse data from St Patrick's, Upton, indicates moderately soft water with a low pH of (&lt;6) and 2.6 mg/l Nitrate-N.</li> <li>• Groundwater flow path lengths will be restricted by the small extent of the aquifer.</li> <li>• There may be two-way movement of water to and from the rivers: into the aquifer at high river stages, and into the rivers at low flows.</li> </ul>	
<b>Attachments</b>		
<b>Instrumentation</b>	<p><b>Stream gauges:</b> None</p> <p><b>EPA Water Level Monitoring boreholes:</b> None</p> <p><b>EPA Representative Monitoring points:</b> None</p>	
<b>Information Sources</b>	<p>E.G. Pettit &amp; Company (1993) <i>Schering-Plough (Brinny) Company: proposed Expansion: Environmental Impact Statement.</i></p> <p>Fondedile Foundations Limited (1975) <i>Report on groundwater: pumping tests.</i> Report for A &amp; P (Ireland) Limited, Brinny.</p> <p>IGSL Ltd (1194) <i>Report on Site Investigation for Schering Plough, Brinny.</i></p> <p>K.T. Cullen (1982) <i>Report on groundwater levels at Chemibiotic (Irl) Ltd, Brinny, Co. Cork.</i></p> <p>Kelly D, Leader U, Wright G (2002) <i>South Cork Groundwater Protection Scheme.</i> Report to Cork County Council (South). Geological Survey of Ireland.</p>	
<b>Disclaimer</b>	Note that all calculations and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae	