### Hydrometric Area

**Local Authority**
- Westmeath Co Co.
- Offaly Co Co.
- Hydrometric Area 07

### Associated surface water bodies
- Rivers: Yellow, Stonyford, Rochfordbridge, Riverstown, Milltownpass, Kinnegad, Deel, Castlejordan, Blackwater, Athboy
- Loughs: Yellow, White, Stillallidder, Reynella, Newtown, Doolin, Freekan, Cunningshams, Crowntown, Crooby, Cloran, Bracklin, Black Ballyhealy

### Associated terrestrial ecosystems
- Raheemmore Bog (SAC - 582), Mount Hevey Bog (SAC - 1584), Molerick Bog (1582), Girley Bog (1580), Jamestown Bog (1324), Wooddown Bog (694) & Lough Shesk (556)

### Area (km²)
- 964

### Topography
- This large GWB extends from Navan in the northeast to Tyrellspass and Rochfordbridge in Westmeath. The area is typical of the midlands of Ireland with little relief. There are some isolated hills which rarely rise above 150 m OD. In general the elevation falls from northwest to southeast, reflected in the overall drainage pattern. The region shows a distinctive topography, a typical product of the last glaciation. The land surface is undulating, with large hummocks of glacial drift, deposited under the ice as moraines.

### Aquifer type(s)
- Mostly: Locally important aquifer, moderately productive only in local zones
- Small amounts of: Poor aquifer, generally unproductive except for local zones (~1.2%)
- Lm: Locally important aquifer, generally moderately productive (~2%)

### Main aquifer lithologies
- Dinantian Upper Impure Limestones
- Dinantian Pure Unbedded Limestones
- Dinantian Lower Impure Limestones
- Dinantian Early Sandstones, Shales and Limestones

### Key properties
- Pumping test analyses from Ballivor WS provided apparent transmissivities of 10 - 200 m²/d from the 12-hour pumping test and from recovery tests. A value of 50 m²/d is taken as the most reasonable figure of apparent transmissivity based on test results from other wells in the region.

### Key structures
- A pumping test at a factory in Ballivor provided an apparent transmissivity of around 30m²/d. The drilling encountered 28 m of till overlying deeply weathered and broken limestone bedrock. The main groundwater inflow is at a depth of 51 m. The aquifer remained confined during the pumping test. (Cullen 1985) Analysis of a 72-hour pumping test at Athboy WS indicated transmissivities around 100-230 m²/d. Higher figures were estimated from a 12-hour test in 1996; a higher permeability zone may have been developed close to the surface, possibly along the interface of the broken limestone bedrock and the overlying sands and gravels.

### Thickness
- In a large limestone aquifer such as this the bedrock is highly heterogeneous and the depth to which major groundwater flows are encountered varies even over short distances. In general in a locally important aquifer such as this the majority of groundwater flow is expected to occur in an upper broken and weathered zone, which is considered to be about 3m thick. Additional flows are commonly found in the upper 10m where groundwater flows along fracture networks. Occasionally deeper isolated groundwater flows are found in cavities which may have been layers or pure limestone solutionally enlarged by karstification. The examples below give a details description of the rock profile in a number of locations.

### Lithologies
- There is a varied subsoil cover overlying this aquifer. The dominant subsoil type is till, in most cases this is derived from limestone clasts, although in the northern area of the body there are till derived from Lower Paleozoic rocks. In addition to till there are also numerous deposits of gravels and in other places Peat. Subsoil mapping in Co. Meath indicates there are many gravel deposits overlying the aquifer. The gravel deposits form hummocky hills and also eskers, which are seen through out the area.

### Overlying Strata
- Thick till covers most of this area although a high degree of variability is expected over such a large area. Subsoil thickness has not yet been adequately mapped in Westmeath.

### Associated surface water bodies
- Loughs: White, Stillallidder, Reynella, Newtown, Doolin, Freekan, Cunningshams, Crowntown, Crooby, Cloran, Bracklin, Black Ballyhealy

### Associated terrestrial ecosystems
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### Area (km²)
- 964
The percentage of the area where the aquifer is close to the surface is quite low.

Vulnerability mapping is available only for the area within Meath and Offaly, where the vulnerability is mostly Moderate but with significant areas of both higher and lower vulnerability.

Diffuse recharge appears to be the dominant process for water to reach the aquifer. The slope and the thickness and permeability of the soil and subsoil will determine the amount of recharge reaching the aquifer. Due to the generally low permeability of the aquifer a high proportion of the recharge will then discharge rapidly to surface water courses via the upper weathered layers of the aquifer, effectively reducing the available groundwater resources in the aquifer.

In certain areas of the aquifer the surface drainage system appears to be disjointed, a typical sign of a karstic environment, with rivers disappearing underground in swallow holes or caves and reappearing as springs. It is likely in these areas that point recharge occurs. The gravel deposits overlying the aquifer may also influence the drainage pattern; a more detailed understanding is not possible until subsoil mapping is available for the areas of interest e.g. around Delvin, Co. Westmeath.

The EPA GW Abstraction Register – Name (Abstraction (m³/d))

Clonmellon (94-Spring), BNM at Derrygreenagh (27), Clonard GWS (20), Riversdale Concrete (18), Raharney WS (14), Ballinbrackey Housing (7), Lewinstown GWS (7), Cloneycavan, Robinstown, Killwarden, Clonard, Rossan, Granstown (Spring), Greannastown.

Data collected by the EPA for this GWB shows the water is generally Hard (250-350 mg/l CaCO₃) with high Electrical Conductivity (600-700 µS/cm). The Durov diagram attached shows the waters have a calcium bicarbonate signature and the water has alkalinity values of over 250 mg/l.

The specific yield data from various pumping tests in the area indicates that the aquifer is unconfined. Groundwater flow in the aquifer will generally take place in the upper 3 to 5 m of the bedrock where there has been weathering. In some local areas there may be the development of deeper flow through a network of connected fractures and fissures. In some instances these fractures be come enlarged by solution to form karstic conduits, which can transport large quantities of water at high speeds.

A calculation of the drainage density for the entire area is 0.662 km/km². This is considered to be indicative of a moderately good aquifer. The typical groundwater flow path length is estimated at 0.75 km.

The three EPA water level monitoring station located around Sion Hill, north of Kilucan, show the variation in the depth of the water table between the river and the hill. The highest gauge shows the water table around 8 m below ground, the next borehole shows it around 5 m below ground and close the river the water table is less than 2 m below the surface. This indicates a hydraulic gradient of 0.05 on the hill and 0.005 on the flood plain.

In karstic areas there is a direct link between the surface and groundwater systems. There is evidence that in some areas of this GWB the limestone is karstified. Springs, swallow holes and caves are three typical karstic features present where groundwater and surface water are directly linked.

The area contains numerous surface water bodies, which are considered as protected areas and to differing extents are dependent on groundwater.

One site at Lough Shesk, near Clonmellon on the Meath/Westmeath border is worth special consideration. The hummocky nature of the terrain in this area produces frequent springs and seepages, rich in lime. Consequently, a series of base-rich marshes have developed in the poorly drained hollows, generally linked with three larger lakes, i.e. Lough Shesk, Freehan Lough and Newtown Lough. This site has been rated as of national importance. There is no other place in the county where the full sequence of stages in the open water/peat bog transition is so well illustrated within a compact area. The main threat to the site lies in drainage of the wetland areas, either directly or by means of dredging of the adjacent river systems or lowering the water table by over abstraction.

This large GWB extends from Navan in the northeast to Tyrellspass and Rochfortbridge in Westmeath. The area is low-lying; some isolated hills rarely rise above 150 m OD. The GWB boundary is defined to the south and west by the topographic boundary with other RBDs. To the north the boundary is at the contact with the Lower Paleozoic rocks and to the east the boundary coincides with the change in aquifer classification of the Calp from an L1 aquifer to an Lm aquifer. The GWB is composed primarily of moderate permeability rocks, although localized zones of enhanced permeability do occur. Groundwater flow will mainly occur laterally through the upper weathered zone of the aquifer. Below this, flow occurs along fractures, faults and karstic conduits. Recharge occurs diffusely through the subsoils and outcrops and in some local areas direct recharge may be possible where via sinking streams. The aquifers are generally unconfined, but may be locally confined where the subsoil is thicker and/or less permeable.

Regional groundwater flow is from northwest to southeast, but locally, groundwater discharges to the streams and rivers crossing the aquifer. In general groundwater flow paths will be less than a kilometre from recharge to discharge point; longer groundwater flow paths may develop where there is a higher degree of karstification. Groundwater discharges to the numerous small streams crossing the aquifer, and to the springs and seeps. There may also be some discharge to the Trim GWB to the east of this body.
Four Borehole Hydrographs measured at EPA Stations within the GWB

Stream gauge: 07002, 07006, 07008, 07014, 07015, 07023, 07028, 07029, 07030, 07031, 07032, 07036, 07044, 07045, 07049, 07050, 07051, and 07052.

GRENNENSTOWN (Dillon) (WES025) Scardan House (WES027)

The following hydrographs are not plotted, as there is very little data available. Sionhill (WES031), Borrow (WES032)

EPA Representative Monitoring boreholes:
Clonard GWS (MEA093) O’Conner (Parke) (MEA107), Lewinstown GWS (WES007), Granston (WES026)


Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae.

<table>
<thead>
<tr>
<th>Formation Name</th>
<th>Code</th>
<th>Description</th>
<th>Rock Unit Group</th>
<th>Aquifer Classification</th>
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