Aghagower GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority	Associated surface water features	Associated terrestrial ecosystem(s)	Area (km^2)
32 Mayo Co. Co.	**Rivers**: Carrowbeg. **Lakes**: Cornacarta, Lahardaun, Kinlooey, Cushin, Cusinsheen.	Kinlooey Lough (001518)	21

Topography	The GWB occupies an area centred on Aghagower. The land surface is generally low-lying, with areas of higher relief toward the southern boundary. Elevations range from 30 mAOD to 130 mAOD. The eastern boundary is a topographic divide. The northern, southern and western boundaries comprise the poorer aquifers of the Clifden-Louisburgh GWB. The drainage is to the north, toward Newport. The location and boundaries of the GWB are illustrated in Figure 1.	
Geology and Aquifers	**Aquifer categories**	**Rk^c:** Regionally important karstified aquifer dominated by conduit flow. The 'c' signifies conduit flow.
	Main aquifer lithologies	Dinantian Pure Bedded Limestones dominate the GWB. There is a sliver (trending NE-SW) of Granites & other Igneous Intrusive rocks occupying approximately $0.1km^2$ toward the northern limit of the GWB. Table 1 presents all the rock units in the GWB.
	Key structures	As the shape of the GWB suggests, the key structural trend is NE-SW and is a continuation of the structural trend evident in the neighbouring Swinford GWB. Faults in this area trend almost E-W. The bedding strikes NE-SW, generally dipping at $2\text{-}10^o$ on either side of a NE-SW trending syncline runs through the northern arm.
	Key properties	There are no hydrogeological data specific to the GWB. Sink holes are reported in Kilooey Lough (Duchas Heritage Data) illustrating the karstification expected across the GWB. Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m^2/d. Storativity is likely to be low - approximately 0.01-0.02. Groundwater velocities are expected to range from 10-100m/hr. Flow directions are likely to be to the northwest under hydraulic gradients that are expected to be greater than 0.0005.
	Thickness	Most groundwater flow is likely to be in an epikarstic layer a couple of metres thick and in a zone of interconnected solutionally-enlarged fissures and conduits that extends approximately 30 m below this. Deeper inflows can occur in areas associated with faults or dolomitisation.
Overlying Strata	**Lithologies**	Till is the dominant subsoil type.
	Thickness	There are no data, but are expected to be generally less than 3 m.
	% area aquifer near surface	*[Information to be added at a later date]*
	Vulnerability	*[Information to be added at a later date]*
Recharge	**Main recharge mechanisms**	Both point and diffuse recharge are expected to occur over the GWB. Diffuse recharge occurs over the GWB via rainfall percolating through permeable subsoil. Point recharge to the underlying aquifer occurs by means of swallow holes and collapse features/dolines. Recharge may also occur along 'losing' sections of streams.
	Est. recharge rates	*[Information to be added at a later date]*
Discharge	**Large springs and high yielding wells (m^3/d)**	No good wells or large springs identified.
	Main discharge mechanisms	The main discharges are to the streams and rivers.
	Hydrochemical Signature	There are no data, however, the groundwater is expected to have a calcium bicarbonate signature, with high alkalinities and hardness (in the order of 300 and 350 mg/l $CaCO_3$). Electrical conductivity is also expected to be high, approximately 700 μS/cm.

Groundwater Flow Paths	These rocks are generally devoid of intergranular permeability. Groundwater flows through fissures, faults, joints and bedding planes. In pure bedded limestones these openings are enlarged by karstification which significantly enhances the permeability of the rock. Karstification can be accentuated along structural features such as fold axes and faults. Groundwater flow through karst areas is extremely complex and difficult to predict. As flow pathways are often determined by discrete conduits, actual flow directions will not necessarily be perpendicular to the assumed water table contours. Groundwater can flow across surface water catchment divides and beneath surface water channels. Flow velocities can be rapid and variable, both spatially and temporally. Overall groundwater flow will be towards the rivers and lakes, generally to the northwest, but the karstified nature of the bedrock means that locally, groundwater flow directions can be highly variable.
Groundwater & Surface water interactions	The area is principally drained by several rivers which originate at the southern side of the GWB. Generally, there is a high degree of interconnection between groundwater and surface water in karstified limestone areas. Any contamination of surface water is rapidly transported into the groundwater system, and vice versa. Kinlooey Lough has sinkholes associated with it, where surface water is converted to groundwater illustrating the interconnection between groundwater and surface water.
Conceptual model	• The GWB occupies an area centred on Aghagower. The land surface is generally low-lying, with areas of higher relief toward the southern boundary. Elevations range from 30 mAOD to 130 mAOD. • The eastern boundary is a topographic divide. The northern, southern and western boundaries comprise the poorer aquifers of the Clifden-Louisburgh GWB. The drainage is to the north, toward Newport. • The aquifer is a Regionally important karstified aquifer (**Rk^{c}**). • Karst features (sink holes) are reported in Kilooey Lough. • Transmissivities are expected to be variable, ranging from 1 to greater than 2000 m^2/d. Storativity is likely to be in the range of 1-2%. • Most groundwater flux is likely to be in the upper part of the aquifer. • Till is the dominant subsoil type. • Recharge occurs via losing streams, point and diffuse mechanisms. Point recharge to the underlying aquifer occurs by means of swallow holes and enclosed depressions. • The main discharges are to the small springs, streams and rivers. • The groundwater is expected to have a calcium bicarbonate signature. • There is a high degree of interconnection between groundwater and surface water.
Attachments	Table 1, Figures 1.
Instrumentation	**Stream gauges:** None **EPA Water Level Monitoring boreholes:** None **EPA Representative Monitoring points:** None
Information Sources	Mc Connell, B., Mac Dermot, C.V., Long, B. (2002).). *A geological description to accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 11, South Mayo.* Geological Survey of Ireland Map Series Report. Geological Survey of Ireland: The Pure Bedded Limestones Aquifer Chapters. Unpublished.
Disclaimer	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

StratCode	UnitName	Description	RockUnit	Aquifer Class
Al	Aille Limestone Formation	Dark fine-grained limestone, shale	Dinantian Pure Bedded Limestones	Rkc
AS	Ardnasillagh Formation	Dark cherty limestone, thin shale	Dinantian Pure Bedded Limestones	Rkc
OKbh	Burrishoole Member	Cross-bedded peloidal limestone	Dinantian Pure Bedded Limestones	Rkc
CR	Castlebar River Fm. / Lough Akeel Fm.	Dark limestone & shale, sandy oolite	Dinantian Pure Bedded Limestones	Rkc
OKcr	Creagh Member	Fine-grained dark limestone & thin shale	Dinantian Pure Bedded Limestones	Rkc
D	Dolerite and Gabbro	Dolerite & gabbro, commonly silica poor	Granites & other Igneous Intrusive rocks	Rkc
OK	Oakport Limestone Formation	Pale grey massive limestone	Dinantian Pure Bedded Limestones	Rkc

Figure 1 Location and boundaries of GWB