

METROLINK

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A19.7

**Groundwater
Protection Response
Matrix for MetroLink**

Zone	Reference Station	Ref. Chainage	Aquifer Type	GSI Vulnerability Class (General Area)	Groundwater Protection Response (GPR)	Comments	Impact Significance (TII 2009, guidelines)
AZ1 - Northern Section	Estuary Park & Ride	1+250	Locally Important Aquifer (LI)	M	R2 (1)	Vulnerability of M-H likely in places. Surface water discharge points A1 and A2 (treated and attenuated to SWTV prior to discharge at greenfield run-off rates). Catchment A runs from Estuary Park & Ride (Ch. 1+000) to the Broadmeadow/Ward Bridge (Ch. 1+479). This is a total track length of 479m, and A also receives flows from part of the Park & Ride site. Gravity system and the attenuation pond (lined as required) discharges to the Broadmeadow River. Area also includes for geocellular drainage, swales and Hydro-Brake @.	Imperceptible
	R132 - Retained cuts and Cut and cover alignment (Chainage reference include for proposed stations at Seatown, Swords Central and Fosterstown)	Various (see comments column)	Locally Important Aquifer (LI)	M (near Broadmeadow/Ward Bridge) L - Predominant class to the south	R1	Catchment B runs from the Broadmeadow/Ward Bridge (Ch. 1+479) to Swords Business Park (Ch. 2+804). This is a total track length of 1,325m and includes for the Retained cut at Ch. 2+253 to 2+424; and Cut and cover at Ch. 2+424 to 2+824. Pumped system with Stormtech @ tanks and Hydro-Brake @ to reduce outflows to greenfield rates.	
			Locally Important Aquifer (LI)	L	R1	Catchment C1 runs from Swords Business Park (Ch. 2+804) to Airside Retail Park (Ch. 5+200). This is a total track length of 2,396m and includes intermittent Retained cuts and Cut and cover sections throughout. Retained cut: Seatown Station Ch. 2+824 to 2+889; Swords Central Station Ch. 3+792 to 3+857; and Fosterstown Station Ch. 4+759 to 4+823. Pumped system with Stormtech @ attenuation tank and Hydro-Brake @ to reduce outflows to greenfield rates.	
			Locally Important Aquifer (LI)	L (northern extent of C2-D1) to M to H (southern extent of C2-D1); Catchment D2 - classed as H	R2 (1)	Catchment C2-D1 runs from Airside Retail Park (Ch. 5+200) to a tributary of the Mayne River. This is a total track length of 1,680m and includes for the Retained cut at Ch. 5+200 to 5+363; and Cut and cover at Ch. 5+363 to 5+588 (the remaining section to Ch. 5+880 is At grade). Pumped system with attenuation and Hydro-Brake @ to reduce outflows to greenfield rates (to Sluice River Tributary). Catchment D2 (gravity system) runs from Ch. 5+880 to Ch. 6+022. This is a total track length of 142m and includes for track outfall at Ch. 6+022 to swale using Hydro-Brake @ to reduce outflows to greenfield rates (Sluice River).	
	Seatown	2+850	Locally Important Aquifer (LI)	L	R1	Surface water discharge catchment C1 (treated and attenuated to SWTV prior to controlled discharge at track outfall at Ch. 2+900).	
Swords Central	3+860	Locally Important Aquifer (LI)	L	R1			
Fosterstown	4+780	Locally Important Aquifer (LI)	L	R1			
AZ2 - Airport Section	North Portal (DANP)	6+040 & 6+940	Locally Important Aquifer (LI)	M - H	R2 (2)	DANP - Vulnerability of L likely; GPR subject to change to R1/R2(1). South of DA - Vulnerability of L likely; GPR subject to change to R1. MetroLink is at tunnel alignment with no surface water discharges to existing watercourses. Proposed station and tunnel sections are sealed entities, any wastewater collected here will be subject to approved discharge to foul sewer. Water collection is in controlled environment.	Imperceptible to Slight
	Dublin Airport Station area	6+940 & 7+240	Locally Important Aquifer (LI)	H - E/X	R3 (1)		
	South of Dublin Airport	7+240 & 7+600	Poor Aquifer (PI)	M - H	R2 (1)		
	South to South Portal (DASP and Intervention Tunnel)	7+600 & 8+480	Poor Aquifer (PI)	L	R1		
AZ3 - Dardistown to Northwood Section	Dardistown	9+040	Locally Important Aquifer (LI)	L	R1	The storm drainage designed as a separate network here - rainwater is collected, treated as necessary and discharged into a receiving watercourse, in conjunction with SuDS (geocellular (modular storage systems) drainage, filter strips (to promote sedimentation and infiltration to the ground) - bedding layer minimum 1m above water table. Note: Infiltration rates are relatively low at this site and the design will incorporate drainage system provision for [controlled] conveyance to the receiving watercourse (discharge point: E1).	Imperceptible
	Northwood	10+320	Locally Important Aquifer (LI)	L	R1	Surface water discharge point F (treated and attenuated to SWTV prior to approved discharge).	
AZ4 - Northwood to Charlemont Section	Ballymun	11+260	Locally Important Aquifer (LI)	L	R1	Griffith Park - Vulnerability of M likely; GPR subject to change to R2(1). MetroLink is at tunnel alignment with no surface water discharges to existing watercourses. Station and main tunnel as well as parallel intervention tunnels (emergency access/ egress) are sealed entities - any wastewater collected in the tunnel and stations is discharged under permit to foul sewer. Intervention shaft is located between the consecutive stations at Collins Avenue and Griffith Park.	Imperceptible
	Intervention Shaft (Albert College Park)	12+820	Locally Important Aquifer (LI)	L	R1		
	Collins Avenue	12+220	Locally Important Aquifer (LI)	L	R1		
	Griffith Park	13+800	Locally Important Aquifer (LI)	M-H	R2 (2)		
	Glasnevin	14+850	Locally Important Aquifer (LI)	L	R1		
	Mater	15+640	Locally Important Aquifer (LI)	L	R1		
	O'Connell St.	16+660	Locally Important Aquifer (LI)	L	R1		
	Tara St.	17+400	Locally Important Aquifer (LI)	M	R2 (1)		
	St. Stephen's Green	18+480	Locally Important Aquifer (LI)	M	R2 (1)		
	Charlemont (and Intervention Tunnel)	19+360	Locally Important Aquifer (LI)	M	R2 (1)		
AZ2 - AZ4	Tunnel Route-wide	(see above)	PI/ LI	Various (as indicated)	(see above)	Sealing as the TBM progresses, pressure head, water quality issues negated with consumables applied/ contained/ recycled in process	Imperceptible

Vulnerability Rating	Source Protection Area	Resource Protection Area (Aquifer Category)								
		Regionally Important Aquifer			Locally Important Aquifer			Poor Aquifer		
		Rk	Rf	Rg	Lg	Lm	LI	PI	Pu	
Rock at/ near surface or Karst (X)	R4	R4	R4	R3 (2)	R3 (2)	R3 (1)	R3 (1)	R3 (1)	R3 (1)	R3 (1)
Extreme (E)	R4	R2 (3)	R2 (2)	R3 (2)	R3 (2)	R2 (2)	R2 (2)	R2 (1)	R2 (1)	R2 (1)
High (H)	R3 (2)	R2 (2)	R2 (2)	R2 (2)	R2 (2)	R2 (2)	R2 (2)	R2 (1)	R2 (1)	R2 (1)
Moderate (M)	R3 (1)	R2 (1)	R2 (1)			R2 (1)	R2 (1)	R1	R1	R1
Low (L)	R3 (1)	R1	R1			R1	R1	R1	R1	R1

Table A.4: Groundwater Protection Response Matrix for the use of permeable drains in road schemes. Sourced from: TII, (2015), Road Drainage and the Water Environment (DN-DNG-03065) report by Transport Infrastructure Ireland, March 2015

Interpretation (includes assessment at local scale following extensive Ground Investigations)

R1	Acceptable subject to minimum design standards in the [TII] NRA DMRB
R2 (1)	Acceptable subject to minimum design standards in the NRA DMRB and to meeting the following requirements: 1. There is a consistent minimum thickness of 1 m unsaturated subsoil, or 2 m in areas of karstified rock (Rk & Lk), beneath the invert level of the drainage system. 2. During all stages of design particular attention must be paid to the presence of karst features and additional assessments undertaken if required. If karst features are identified response R2 (3) must be applied as a minimum. 3. During all stages of design particular attention must be paid to receptors (such as: public wells, group schemes, industrial water supply sources and springs) and additional assessments undertaken if required.
R2 (2)	Acceptable subject to minimum design standards in the NRA DMRB, meeting requirements 1, 2 and 3 of above and the following additional requirements: 4. Where the subsoil is classed using BS5930 as: SAND, GRAVEL or SILT (in circumstances where the clay content is <10%) AND/OR is underlain by limestone bedrock, there is a consistent minimum thickness of 2 m unsaturated subsoil beneath the invert level of the drainage system. OR There is a minimum consistent unsaturated thickness 1m of "appropriate material" (Note 1 below) either natural or man-made beneath the invert level of the point of discharge. 5. Where a gravel aquifer is present, a consistent minimum thickness of 3 m unsaturated subsoil beneath the invert level of the drainage system must be present.
R3 (1)	Not generally acceptable, unless requirements 1, 2, 3 and 4 above and the following additional requirements are met: - If discharge to surface water is not possible then additional assessments by an appropriately qualified groundwater specialist are required to determine the risk to groundwater resources (the aquifer).

Note: * Transport Infrastructure Ireland (TII) was established through a merger of the National Roads Authority and the Railway Procurement Agency under the Roads Act 2015, with effect from 01/08/2015