

WAT-FORM-11: Groundwater Abstraction Application Screening Assessment



This form is to be completed by Regulatory Service (RS) when carrying out the initial screening of a groundwater abstraction licence application in line with WAT-RM-11 procedures.

Site Details

Site Name & Work Request No.	Portintruan, Islay	CAR reference	CAR/R/5004458
NGR(s)	BH5 138202 645942 BH7 138233 645900	Location Code(s)	n/a
RS Contact	[REDACTED]	Date Assessed	20/03/2024
Abstraction Type (borehole, spring)	2 boreholes	Max Abstraction Rate	200 m ³ /d, 73,000 m ³ /yr
Abstraction Aquifer	Bedrock, GWB ID 150683 (Islay), FL	Abstraction Purpose	Industrial, distillery
Abstraction Frequency (permanent or temporary, seasonal or all year)	Permanent all year round	Author(s)	[REDACTED]
		Reviewer(s)	[REDACTED]

Screening Failures (to be completed by WRU)

1. Environmental Standards Test (Surface water flow impact)	PASS	2. Adequate Resource Test	PASS
3. Existing Abstraction within survey radius	FAIL	4. Wetland within survey radius	PASS
5. Water- dependant designated areas of conservation within survey radius, or any watercourse within 500m upstream of such an area	PASS	6. Coast/other area of poor quality water within the maximum coastal buffer zone of 4km	PASS
7. England/Scotland border within survey radius	PASS		

RS Actions and Applicant Response (to be completed by RS)

Contact applicant by telephone or letter to see if applicant wishes to/can reduce volume or re-locate the abstraction to avoid further assessment.

Applicant Response	Choice	RS Action	Choice
Will reduce volume		Request WRU to undertake screening assessment based on new volume to check ok. If ok send to Registry for authorisation	
Will move borehole		Request WRU to undertake screening assessment based on new location to check ok. If ok send to Registry for authorisation	
Will undertake further investigation		Refer to Specialist to determine further action	
Unwilling to reduce or investigate		Refer to Registry to refuse application	
No response within allocated time		Refer to WRU specialist to determine further action	

Appendix 1 – Screening tests (to be completed by WRU)

1.1. Potential surface water impact - Environmental Standards Test for flows

The closest surface water feature to the two abstraction boreholes is the Sruthan na Cille, a small unclassified stream flowing from north to south at approx. 250m west. This stream was monitored during the boreholes testing, the acquired data do not show any appreciable impact. It is noted that both boreholes are fed by groundwater from fractured bedrock with water strikes located below 30m from ground level. Based on the hydrogeological setting and the testing carried out WRU are satisfied the proposed groundwater abstraction is hydraulically disconnected from the nearest surface water body and therefore will not cause a deterioration in flows.

2. Adequate Groundwater Resource Test

The 2022 classification results of the Water Balance Test for the Islay (GWB ID 150683) groundwater body is Good Status and Green (low) risk. Recharge for the groundwater body is estimated as 1.2×10^8 m³/year.

The percentage of raw abstraction over recharge for the groundwater body is currently 0 %. With the proposed abstraction included in the calculation the percentage of raw abstraction over recharge would be 0.1 %. The proposed abstraction does not have a significance impact on this percentage which is well below the 16% threshold for medium risk and 20% threshold for high risk classification. An application for abstraction at the proposed location would therefore pass the Adequate Resource Screening Test and no further assessment would be deemed required for this test.

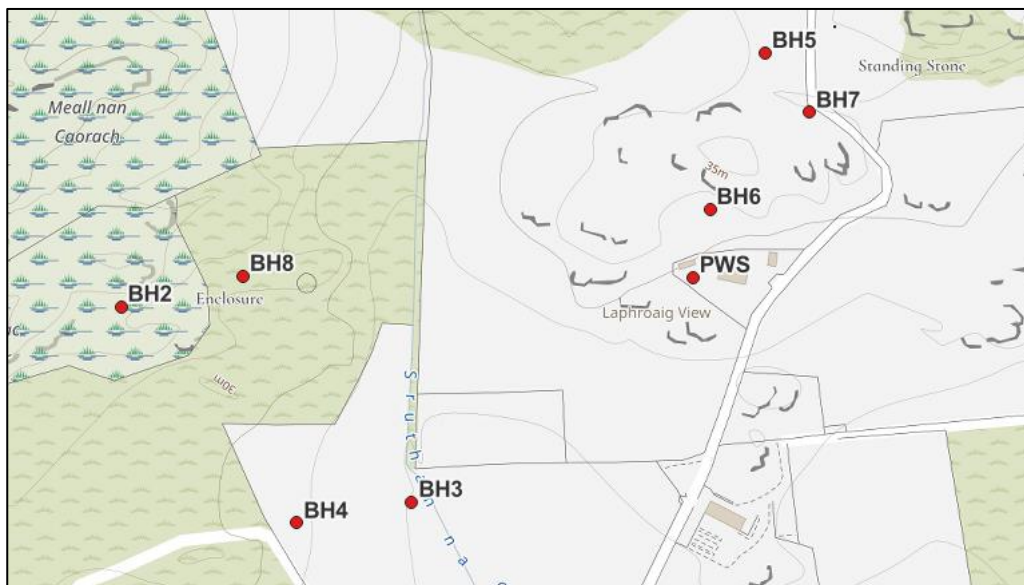
3. Potential Impact on Other Abstractions

As per WAT-RM-11, for all licence levels abstractions, the applicant must submit a Water Feature Survey (WAT-FORM-10) in accordance with SEPA's 'An Applicant's Guide to Water Supply Boreholes'. As this application is for a proposed abstraction of 200m³/day, a survey radius of 0.85km is required. The Water Features Survey information submitted is considered generally acceptable.

There is one known existing groundwater abstraction, a Private Water Supply (PWS) within 850m (radius for Water Feature Survey) of the site. The PWS is serving Laphroaig View premise and used for human consumption (domestic and commercial bed and breakfast). Several boreholes have been installed by the applicant in the area to obtain the needed abstraction rate. The information on the boreholes and PWS are summarised in the following table (* Laphroaig View daily water use based on 5 people permanent occupancy).

BH name	E	N	abstraction rate (m ³ /d)	Depth (mbGL)	Notes
BH2	137748	645763	5	100	Previously assessed
BH3	137953	645626	9	150	Previously assessed
BH4	137872	645611	43	120	Previously assessed
BH5	138202	645942	65	45	Pumping test and observation well
BH6	138163	645832	0	45	Observation well
BH7	138233	645900	213	63	Pumping test and observation well
BH8	137834	645785	n/a	90	Observation well
PWS	138151	645784	1*	36	Abstr. Rate estimated by occupancy

The following figure shows the spatial distribution of the installed boreholes and the location of the PWS:



The applicant has undertaken several pumping tests to quantify the abstraction rate obtainable from BH5 and BH7 and evaluate the impact on the PWS receptor. The main tests of interest are the constant rate pumping tests performed in BH7 and BH5. During these tests groundwater level measurements were taken also at BH6, BH8 and water levels at the Sruthan na Cille water stream.

The pumping tests show that BH7 is the most productive with an abstraction rate over the 24h tested period of approx. 200m³/d. However, at the end of the 24h pumping period the groundwater level in BH7 were not stabilised and carried on dropping to a 14cm/hr rate. It is unlikely that BH7 can sustain an abstraction rate of 200m³/d on a daily basis. This is however not of concern for SEPA.

BH5 testing show that this borehole has a much lower yield quantified in approx. 65m³/d.

Both BH5 and BH7 were used in alternance as observation wells during the pumping tests. Groundwater levels in BH5 and BH7 reacted to the pumping on the other borehole. This was expected as the two boreholes are 52m apart and drilling logs show intercepting productive fracture zones at the same depth of 30mbGL. Observation wells located further apart, namely BH6 (100m from BH7 and 115m from BH5) and BH8 (415m from BH7 and 400m from BH5) did not show any appreciable lowering of groundwater levels during the pumping tests. Similarly, the water level measurements taken at the Sruthan na Cille water stream did not show appreciable variations.

The applicant concluded that the cone of depression is of limited extent and may not have propagated to BH6 during the test period. WRU agree with this conceptualisation pointing out that the limited testing period (24h) may have been too short to induce any effect on BH6 from the pumping action at BH7. This however may differ if BH7 is pumped continuously every day to the proposed abstraction rate.

The applicant progress to the interpretation of the drawdown and recovery curves (resulting in a transmissivity of 51m²/d) and calculates the potential radius of influence using the Sichardt equation which, for an aquifer thickness of 59m, results in 56m radius from BH7. The applicant warns that (quoting) '*this ROI (radius of influence) calculation is an initial estimate only and should be treated with caution*'. The use of the Sichardt equation in this case is not supported by WRU as based on empirical not documented/published methodology, used mainly as a rule-of-thumb to assess the radius of influence for excavation dewatering. As an alternative WRU used the distance-drawdown graphic solution based on the drawdowns in BH7 and BH5 during the BH7 constant rate pumping test, obtaining a radius of influence of approx. 125m from BH7.

Either of the above methodology however are heavily constraint by the assumption that the aquifer is homogeneous, isotropic, uniform in thickness and that the pumping test has reached a steady state, all assumption which are not applicable to the fractured aquifer and the length of testing at the Portinruan site, resulting in a great uncertainty around the potential reach of the radius of influence during BH7 operational conditions (i.e. 200m³/d every day). As such an impact of the BH7 abstraction on BH6 and the PWS cannot be excluded. The significance of such impact could be assessed by the continuous monitoring of groundwater levels in BH6 during BH7 operational use.

The applicant suggests that a longer testing period is needed to assess impacts on the PWS and saline intrusion risk. On these basis WRU recommends conditioning the BH7 and BH5 abstraction authorisation to the continuous monitoring of groundwater levels in BH6 for 1 year during BH7 operational conditions. A threshold of 1m groundwater level drawdown in BH6, not attributed to natural events (e.g. period of drought), should trig the reduction or temporary cessation of the abstraction in BH7 till the BH6 levels are recovered to natural conditions. After 1 year and upon assessment of the monitoring results the application of the condition can be revised or withdrawn. Details of the recommended conditions are forwarded to SEPA Water Permitting in the WAT-FORM-14.

The applicant also recommends the monitoring of the electrical conductivity in BH7 and BH5. WRU welcome such proposal although it shouldn't be part of a licence condition.

It is unlikely that the abstraction from BH5 would impact significantly on BH6 and the PWS as this borehole is further away from BH6 and the PWS and having a much lower abstraction capacity than BH7.

4. Potential Impact on Groundwater Dependant Terrestrial Ecosystems (Wetlands)

There are no known Groundwater Dependant Terrestrial Ecosystems (GWDTEs) within the 850 m Water Features Survey radius which may be impacted by the proposed abstraction.

5. Potential Impact on Water Dependant Designated Areas

There are no known water-dependant designated areas of conservation within survey radius, or any watercourse within 500m upstream of such an area which may be impacted by the proposed abstraction.

6. Potential Saline Intrusion

The new proposed boreholes lie within the saline risk buffer zone for the given abstraction rate. The applicant has demonstrated through electrical conductivity (EC) monitoring taken during the pumping tests that the saline intrusion at this location is unlikely to occur. In particular the continuous EC monitoring for BH5 show maximum EC of 335 μ S/cm and for BH7 a maximum EC of 450 μ S/cm for BH7, both measurements are well below the 800 μ S/cm for high risk and the 1000 μ S/cm environmental threshold.

7. England-Scotland Border

The England-Scotland border does not intersect the survey area radius of 0.85km. No further assessment is required.