

Technical Note

Project:	Jersey Airport FTG	Job No: 60031084/T10621a
Subject:	JA2016/2: Water Quality at Mont a la Brune Housing Estate	
Prepared by:	Philip Smart	Date: 7 September 2016
Checked by:	Murtala Bashir	Date: 8 September 2016

Background

AECOM Limited is commissioned by Jersey Airport (Ports of Jersey Limited) to provide hydrogeological advice in respect of the results of groundwater and surface water quality monitoring undertaken in St Ouen's Bay, Jersey. Past operations at the fire training ground (FTG) at the western end of Jersey Airport have resulted in contamination of the groundwater beneath the site with persistent components contained in AFFF fire fighting foams. Contamination has migrated off-site and elevated contaminant concentrations have been recorded in a number of private wells and boreholes to the north west, west and south west of the FTG. Regular sampling of groundwater supplies for the analysis of fire fighting foam components commenced in January 2000 and is undertaken by Jersey Airport staff.

Concern has been raised regarding the potability of the water abstracted from a borehole on the Mont a la Brune Housing Estate. The borehole is located on the eastern side of the estate and supplies a number of properties on the estate. It is considered likely that the borehole abstracts from the Jersey Shale Formation.

Groundwater Quality

Water quality samples have been collected since 1999 from a property on the Mont a la Brune Housing Estate, known as Reefbreak, which it is understood is supplied from the estate borehole. A total of eight samples were collected from Reefbreak between July 1999 and December 2006. Since December 2006, samples have been collected directly from the storage tank which feeds the estate supply. A total of 11 samples have been collected since December 2006. In addition, in May 2015, duplicate samples were collected from the property of Tumbleside, which also is on the estate borehole supply.

Appendix A provides the analytical results for the samples taken from three sites. Prior to 2000, the laboratory analytical technique could only detect the two components perfluorohexylsulphonate (PFHS) and perfluorooctylsulphonate (PFOS). Since 2000, the analytical technique has been enhanced and now nine components of fire fighting foams can be analysed.

There remains considerable uncertainty regarding the toxicity and health effects associated with the components of AFFF and a number of different guidance level concentrations have been proposed by different countries across the world. The monitoring results for the components of fire fighting foam are interpreted in relation to the concentrations of the compounds perfluorooctylsulphonate or perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA), as these substances have been highlighted as being the most persistent with measurable effects on human health.

In Jersey, the guidance concentrations for these two substances are based on the UK Drinking Water Inspectorate (DWI) guideline values. The current DWI guidance limit for PFOS in drinking water is 1µg/l. The DWI guidance limit for PFOA in drinking water is 5µg/l. The current (2016) laboratory detection limits for PFOS and PFOA are 0.01µg/l and 0.03µg/l respectively.

Data Assessment

Low levels of PFOS above the limit of detection, up to a maximum 0.19µg/l recorded in December 2006, have been reported for two samples taken from Reefbreak and for one sample taken from the estate borehole supply tank. None of the nine samples taken since January 2010 have reported PFOS above the limit of detection. PFOA above the limit of detection has been recorded on only one occasion over the period of sampling, with a concentration of 0.12µg/l in April 2011. Where detected, all of the samples have reported concentrations of either PFOS or PFOA significantly below the DWI guidance values. The results of the sample collected from Tumbleside in 2015 are consistent with those from the estate supply, which it is considered confirms that the property is on the estate borehole supply.

PFHS has been reported at low concentrations, up to 0.057µg/l for most of the samples taken since 2006.

Since 2006, the analytical results of the samples taken from the estate supply tank show no evidence of significant contamination of the groundwater or of obvious trends of increasing or decreasing concentrations of fire fighting foam components. For the most recent sample taken in July 2016 from the estate supply tank, none of the fire fighting foam components was recorded at concentrations above the laboratory limits of detection.

Conclusions

Based on the results of the analyses of the samples collected from Reefbreak and Tumbleside on the estate borehole supply and from the estate supply tank, it is concluded there is no evidence that the borehole supply is contaminated by fire fighting foam components arising from past activities on the airport. The analytical results of the water samples from the properties show that components of fire fighting foams are absent or are present either at levels below the laboratory limits of detection or very occasionally at low concentrations, significantly below the DWI guidance levels.

An assessment of the data collected from other properties in the St Ouen's area has identified that the main plume of contaminated groundwater is flowing in a generally westerly direction from the FTG. There is evidence that pumping from Simon's Sand Pit locally has encouraged the flow of contaminated groundwater in a south westerly direction towards the lagoon in the sand pit. It is considered that the estate borehole is located up hydraulic gradient of the lagoon and at least 250m from the sand pit lagoon. It is concluded that abstraction from the borehole does not encourage the flow of contaminated groundwater to the supply. Accordingly, it is considered that the estate borehole is at negligible risk of being impacted in the future by groundwater contaminated by components of fire fighting foam.



Philip Smart BSc MSc C Geol FGS
Technical Director – Hydrogeology
Groundwater and Water Resources
AECOM

Appendix A: Laboratory analytical testing results: Mont a la Brune Housing Estate

Date	PFBS	PFPS	PFHS	TDFOS	PFHpS	PFOS	TDFOXAS	TDFOPAS	PFOA
05/07/1999			nd			nd			
14/07/1999			nd			nd			
22/07/1999			nd			nd			
28/07/1999			nd			nd			
04/08/1999			nd			nd			
17/08/1999			nd			nd			
06/06/2006						0.02			
06/12/2006	nd	0.02	0.04	nd	nd	0.19	nd	nd	nd
19/12/2008	nd	nd	nd	nd	nd	nd	nd	nd	nd
23/06/2009	nd	nd	nd	nd	nd	nd	nd	nd	nd
20/01/2010	nd	nd	0.03	nd	nd	0.03	nd	nd	nd
14/02/2011	nd	nd	nd	nd	nd	nd	nd	nd	nd
04/04/2011	0.086	nd	0.041	nd	nd	nd	nd	nd	0.12
09/03/2012	0.013	nd	0.039	nd	nd	nd	nd	nd	nd
20/08/2012	nd	nd	0.028	nd	nd	nd	nd	nd	nd
06/03/2013	0.02	nd	0.03	nd	nd	nd	nd	nd	nd
16/04/2014	nd	nd	0.057	nd	nd	nd	nd	nd	nd
25/08/2015	nd	nd	0.04	nd	nd	nd	nd	nd	nd
01/07/2016	nd	nd	nd	nd	nd	nd	nd	nd	nd
27/05/2015 ⁺	nd/nd	nd/nd	0.039/0.041	nd/nd	nd/nd	nd/nd	nd/nd	nd/nd	nd/nd

Concentrations as µg/l

nd – not detected.

⁺ - duplicate sample