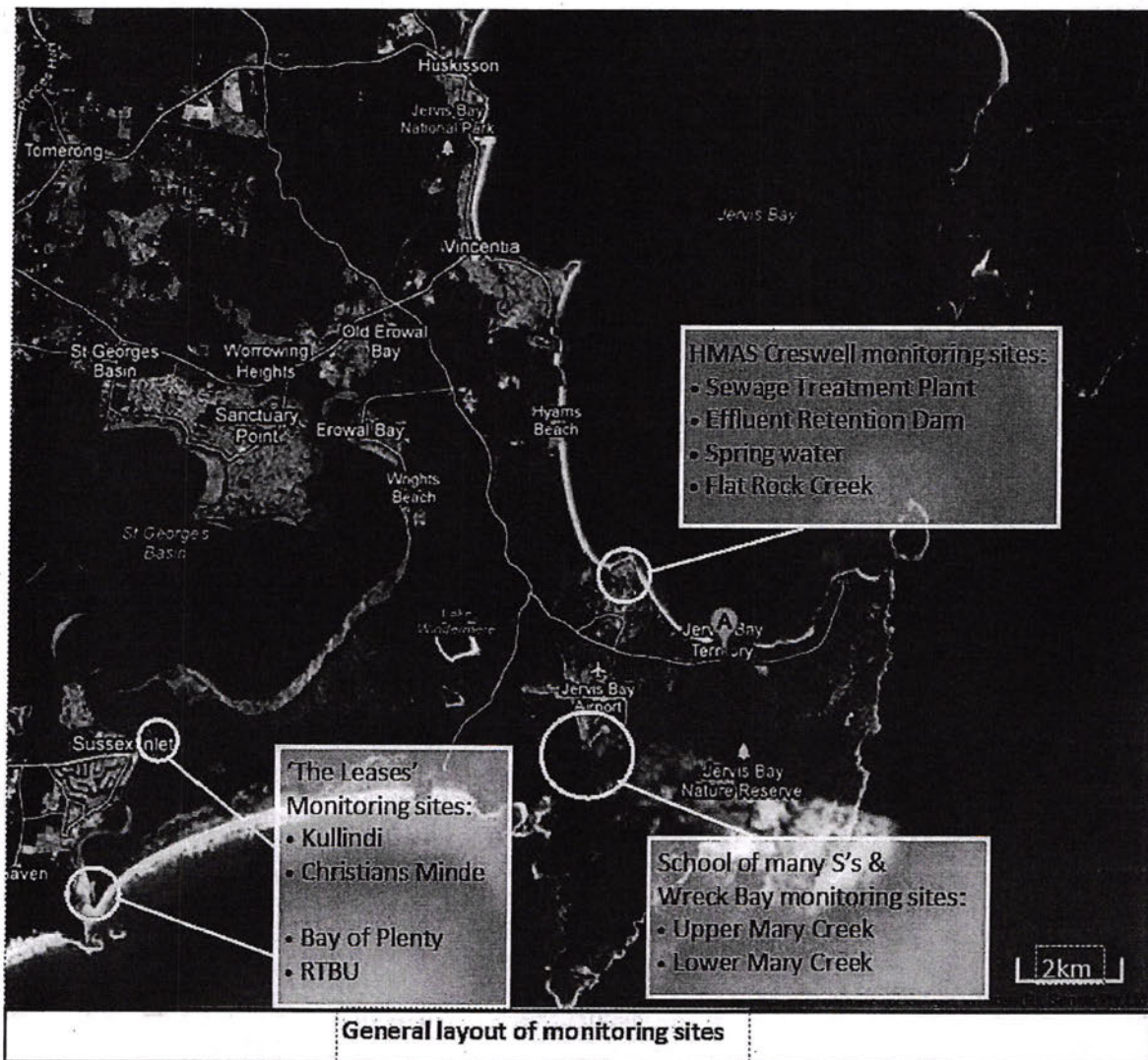




**ACT**  
Government

Chief Minister, Treasury and  
Economic Development

**Map of Sampling Locations:**





**ACT**  
Government

Chief Minister, Treasury and  
Economic Development

### Methodology

Due to the potentially ubiquitous and persistent nature of PFC pollutants sampling was undertaken at all EPA sampling locations within the Jervis Bay Territory (JBT).

Following advice from the Department of Defence on the types of AFFF used with the JBT the following reduced suite of PFC pollutants were analysed:

6:2 Fluorotelomer sulfonate (6:2 FtS)  
8:2 Fluorotelomer sulfonate (8:2 FtS)  
Perfluorooctanoic acid (PFOA)  
Perfluorooctane sulfonic acid (PFOS)

All samples were taken in accordance with ALS (Analytical testing laboratory) sampling requirements by an EPA Environment Protection Officer.

ALS laboratory method EP231-PFC was utilised for all non-saline water samples and method EP231-PFC-LL use for all saline water samples.

Given that there are currently no ACT EPA or nationally adopted criteria for PFC impacts to water the ACT EPA, following discussions with the Department of Infrastructure & Regional Development, chose to adopt criteria from the Department of Defence "*Defence Contamination Directive #8 Interim Screening Criteria Consistency of Toxicology or Ecotoxicology based Environmental Screening Levels for PFOS, PFOA, 6:2 FTS*", 19 May 2015.



Table of Results

Compound Lab Method	LOR	Unit	Criteria <sup>a</sup>				Client sample ID										
			C1	C2	C3	C4	Effluent Retention Dam (ERD)	Lower Mary Creek	Upper Mary Creek	Flat Rock Creek	HMAS Creswell STP	Spring Water	Christians Minde	Kullindi	RTBU	Bay of Plenty	
							JERV002	JERV003	JERV004	JERV005	JERV006	JERV009	JERV011	JERV012	JERV014	JERV015	
							25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016
							Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
6:2 FTS EP231-PFC	0.1	µg/L	5	NC	0.0065	50	<0.1	<0.1	<0.1		<0.1	<0.1		<0.1	<0.1		
8:2 FTS EP231-PFC	0.1	µg/L	NC	NC	NC	NC	<0.1	<0.1	<0.1		<0.1	<0.1		<0.1	<0.1		
PFOA EP231-PFC	0.02	µg/L	0.4	2900	0.3	4	<0.02	<0.02	0.03		<0.02	<0.02		<0.02	<0.02		
PFOS EP231-PFC	0.02	µg/L	0.2	6.66	0.00065	2	0.44	0.22	0.22		0.45	0.18		<0.02	<0.02		
6:2 FTS EP231-PFC-LL	0.01	µg/L	5	NC	0.0065	50				<0.01			<0.01				<0.01
8:2 FTS EP231-PFC-LL	0.01	µg/L	NC	NC	NC	NC				<0.01			<0.01				<0.01
PFOA EP231-PFC-LL	0.002	µg/L	0.4	2900	0.3	4				<0.002			<0.002				<0.002
PFOS EP231-PFC-LL	0.002	µg/L	0.2	6.66	0.00065	2				0.078			<0.002				<0.002

## Legend

Effluent based water sample  
Surface water sample  
Groundwater sample

NC – no criteria established

**Bold** – exceeds laboratory's limit of reporting (LOR)

**0.18** – exceeds Surface water - Human health (consumption of fish) criteria

**0.44** – exceeds Surface water - Human health (consumption of fish) and Groundwater – Human health (drinking water) criteria

**0.22** – exceeds Surface water - Human health (consumption of fish) and Groundwater – Human health (drinking water) and Surface Water - Recreational use criteria

**Note** – LOR exceeds Surface water - Human health (consumption of fish) criterion

C1 – Groundwater – Human health (drinking water) criteria  
C2 – Surface water - Ecological (toxicity effects on aquatic organisms) criteria  
C3 – Surface water - Human Health Consumption of fish criteria  
C4 – Surface Water - Recreational use criteria

6:2 FTS - 6:2 Fluorotelomer sulfonate

8:2 FTS - 8:2 Fluorotelomer sulfonate

PFOA - Perfluorooctanoic acid

PFOS - Perfluorooctane sulfonic acid

a - Criteria taken from "Defence Contamination Directive #8 Interim Screening Criteria Consistency of Toxicology or Ecotoxicology based Environmental Screening Levels for PFOS, PFOA, 6:2 FTS", Department of Defence, 19 May 2015





**ACT**  
Government

Chief Minister, Treasury and  
Economic Development

### Discussion of Results

In the absence of a Surface Water - Human health (drinking water) criteria for each PFC compound the Groundwater – Human health (drinking water) criteria have been applied to the relevant surface water samples.

Where effluent derived water samples have been analysed Human health (drinking water) criteria have not been applied due to the low likelihood of this water being used for drinking water purposes – a comparison of relevant surface water criteria only has been made.

#### **HMAS Creswell – (effluent and surface water samples)**

Detections of PFOS above the the laboratory limit of reporting were identified in all water samples taken from the 4 HMAS Creswell sampling sites. Results were below the laboratory limit of reporting for all other pollutants.

All PFOS results exceeded the Surface water - Human health (consumption of fish) criterion of 0.00065g/L (0.65ng/L) but met all other surface water criteria.

Whilst exceedences of the PFOS Groundwater – Human health (drinking water) criterion were noted for samples taken from the ERD and STP sites exceedences against this criterion were not recorded in the above Table of Results due to the low likelihood of this water being used for drinking water purposes.

#### **RAN School of Ship Survivability and Safety – (surface water samples)**

All results were below the laboratory limit of reporting for the 6:2 FtS and 8:2 FtS pollutants.

PFOA was identified above the laboratory limit of reporting but below criteria in the Upper Mary Creek sample. PFOS was identified above the laboratory limit of reporting in both the Upper and Lower Mary Creek samples.

An exceedence of the PFOS Surface water - Human health (consumption of fish) **and** Groundwater – Human health (drinking water) criteria were identified in the Lower Mary Creek sample.

An exceedence of Surface water - Human health (consumption of fish) **and** Groundwater – Human health (drinking water) **and** Surface Water - Recreational use criteria were identified in the Upper Mary Creek Sample.

#### **Leases – (groundwater samples)**

All results from the 4 lease sites were below the laboratory limit of reporting and below the adopted groundwater criteria for all PFC compounds analysed.



### Recommendations

- A further water sampling and analysis event for PFC pollutants should take place within three to six months of this event to ascertain whether the results are representative of impacts to the receiving environment or are anomalous;
- On the basis of the above results discussions should be held with the Commonwealth Department of Defence on the need for wider PFC assessment of water, soil and sediment within HMAS Creswell, the RAN School of Ship Survivability and Safety and adjacent areas;
- Discussions should be held with the Commonwealth Departments of Defence, Health and the Environment on the potential impact on human health and the environment from the identified PFOS contamination;
- Following discussions and advice from with the Commonwealth Departments listed above DIRD should engage with local stakeholders.

Should you or your staff wish to discuss the above findings and recommendations please feel free to contact me on 02 6207 2151 or at [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au).

Yours sincerely



Mark Heckenberg  
Manager, Contaminated Sites  
Construction, Environment and Workplace Protection  
Access Canberra

15 June 2016

Attachments – ALS Certificate of Analysis dated 7 June 2016



**CERTIFICATE OF ANALYSIS**

Work Order : CA1603002  
 Client : Access Canberra  
 Contact : Mr Tim Gibb  
 Address : 16 Challis Street  
 Dickson ACT 2602  
 Telephone : 02 6207 5490  
 Project : Jervis Bay  
 Order number : ---  
 C-O-C number : ---  
 Sampler : Tim Gibb  
 Site : ---  
 Quote number : ---  
 No. of samples received : 10  
 No. of samples analysed : 10

Page : 1 of 8  
 Laboratory : ALS Water Resources Group  
 Contact : Client Services  
 Address : 16B Lithgow Street Fyshwick ACT Australia 2609  
 Telephone : +61 2 6202 5404  
 Date Samples Received : 25-May-2016 14:30  
 Date Analysis Commenced : 26-May-2016  
 Issue Date : 07-Jun-2016 16:32



NATA Accredited Laboratory 992  
 Accredited for compliance with  
 ISO/IEC 17025.

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
[Redacted]	Laboratory Technician	Inorganics, Fyshwick, ACT
[Redacted]	Chemistry Teamleader	Inorganics, Fyshwick, ACT
[Redacted]	Microbiology Teamleader	Microbiology / Biology, Fyshwick, ACT
[Redacted]	Laboratory Manager	Administration, Fyshwick, ACT
[Redacted]	Laboratory Manager	ALS Environmental, Fyshwick, ACT
[Redacted]	Laboratory Technician	Inorganics, Fyshwick, ACT



Page : 2 of 8  
Work Order : CA1603002  
Client : Access Canberra  
Project : Jervis Bay

---

### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
LOR = Limit of reporting  
^ = This result is computed from individual analyte detections at or above the level of reporting  
∅ = ALS is not NATA accredited for these tests.  
~ = Indicates an estimated value.

---





Page : 3 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				JERV006 HMAS Creswell STP	JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]
Compound	CAS Number	LOR	Unit	CA1603002-001	CA1603002-002	CA1603002-003	CA1603002-004	CA1603002-005
				Result	Result	Result	Result	Result
<b>EA005: pH</b>								
pH	---	0.01	pH Unit	6.90	7.28	4.76	6.39	7.12
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	---	2	µS/cm	---	---	---	---	---
<b>EA015: Total Dissolved Solids</b>								
Total Dissolved Solids	---	10	mg/L	336	238	226	248	22300
<b>EA025: Suspended Solids</b>								
Suspended Solids (SS)	---	2	mg/L	<2	10	---	---	---
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	0.1	mg/L N	6.4	0.3	---	---	<0.1
<b>EK059: Nitrite plus Nitrate as N (NOx)</b>								
Nitrite + Nitrate as N	---	0.05	mg/L N	18.4	5.19	---	---	---
<b>EK067: Total Phosphorus as P</b>								
Total Phosphorus as P	---	0.01	mg/L P	3.78	2.35	---	---	<0.01
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon (as NPOC)	---	1	mg/L	10	10	22	7	10
<b>EP020: Oil and Grease (O&amp;G)</b>								
Oil and Grease	---	1	mg/L	<1	---	---	---	---
<b>EP030: Biochemical Oxygen Demand (BOD)</b>								
Biochemical Oxygen Demand	---	2	mg/L	<2	5	---	---	<2
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	91-20-3	1	µg/L	---	---	<1.0	<1.0	---
Acenaphthylene	208-96-8	1	µg/L	---	---	<1.0	<1.0	---
Acenaphthene	83-32-9	1	µg/L	---	---	<1.0	<1.0	---
Fluorene	86-73-7	1	µg/L	---	---	<1.0	<1.0	---
Phenanthrene	85-01-8	1	µg/L	---	---	<1.0	<1.0	---
Anthracene	120-12-7	1	µg/L	---	---	<1.0	<1.0	---
Fluoranthene	206-44-0	1	µg/L	---	---	<1.0	<1.0	---
Pyrene	129-00-0	1	µg/L	---	---	<1.0	<1.0	---
Benz(a)anthracene	56-55-3	1	µg/L	---	---	<1.0	<1.0	---
Chrysene	218-01-9	1	µg/L	---	---	<1.0	<1.0	---
Benzo(b)fluoranthene	205-99-2	1	µg/L	---	---	<1.0	<1.0	---
Benzo(k)fluoranthene	207-08-9	1	µg/L	---	---	<1.0	<1.0	---



Page : 4 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV006 HMAS Creswell STP	JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	
Compound	CAS Number	LOR	Unit	CA1603002-001	CA1603002-002	CA1603002-003	CA1603002-004	CA1603002-005	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Benzo(a)pyrene	50-32-8	0.5	µg/L	---	---	<0.5	<0.5	---	
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	---	---	<1.0	<1.0	---	
Dibenz(a,h)anthracene	53-70-3	1	µg/L	---	---	<1.0	<1.0	---	
Benzo(g,h,i)perylene	191-24-2	1	µg/L	---	---	<1.0	<1.0	---	
Sum of polycyclic aromatic hydrocarbons	---	0.5	µg/L	---	---	<0.5	<0.5	---	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	---	20	µg/L	---	---	<20	<20	---	
C10 - C14 Fraction	---	50	µg/L	---	---	<50	<50	---	
C15 - C28 Fraction	---	100	µg/L	---	---	<100	<100	---	
C29 - C36 Fraction	---	50	µg/L	---	---	<50	<50	---	
C10 - C36 Fraction (sum)	---	50	µg/L	---	---	<50	<50	---	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	---	---	<1	<1	---	
Toluene	108-88-3	2	µg/L	---	---	<2	<2	---	
Ethylbenzene	100-41-4	2	µg/L	---	---	<2	<2	---	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	---	---	<2	<2	---	
ortho-Xylene	95-47-6	2	µg/L	---	---	<2	<2	---	
Total Xylenes	1330-20-7	2	µg/L	---	---	<2	<2	---	
Sum of BTEX	---	1	µg/L	---	---	<1	<1	---	
<b>EP231: Perfluorinated Compounds</b>									
PFOS	1763-23-1	0.02	µg/L	0.45	0.44	1.22	2.33	---	
PFOA	335-67-1	0.02	µg/L	<0.02	<0.02	<0.02	0.03	---	
6:2 Fluorotelomer sulfonate (6:2 Fts)	27619-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	---	
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	---	
<b>EP231: Perfluorinated Compounds Low Level</b>									
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	---	---	---	---	0.078	
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	---	---	---	---	<0.002	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.01	µg/L	---	---	---	---	<0.01	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.01	µg/L	---	---	---	---	<0.01	





Page : 5 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				JERV006 HMAS Creswell STP	JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]
Compound	CAS Number	LOR	Unit	CA1603002-001	CA1603002-002	CA1603002-003	CA1603002-004	CA1603002-005
				Result	Result	Result	Result	Result
<b>MW006: Thermotolerant Faecal Coliforms</b>								
Thermotolerant Faecal Coliforms (Presumptive)	---	1	CFU/100mL	38	10	---	---	---
Thermotolerant Faecal Coliforms (Confirmed)	---	1	CFU/100mL	38	8	---	---	---
<b>MW013: Faecal Streptococci</b>								
Faecal Streptococci (Presumptive)	---	1	CFU/100mL	---	---	---	---	---
Faecal Streptococci (Confirmed)	---	1	CFU/100mL	---	---	---	---	---





Page : 6 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV009 Springwater	JERV011 Christians Minde	JERV012 Kullindi	JERV015 Bay of Plenty	JERV014 RTBU
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	
Compound	CAS Number	LOR	Unit	CA1603002-006	CA1603002-007	CA1603002-008	CA1603002-009	CA1603002-010	
				Result	Result	Result	Result	Result	
<b>EA005: pH</b>									
pH	---	0.01	pH Unit	5.11	---	---	8.01	7.91	
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	---	2	µS/cm	---	---	---	6330	10400	
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids	---	10	mg/L	302	---	---	3890	6330	
<b>EA025: Suspended Solids</b>									
Suspended Solids (SS)	---	2	mg/L	---	---	---	---	---	
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	0.1	mg/L N	<0.1	---	---	---	---	
<b>EK059: Nitrite plus Nitrate as N (NOx)</b>									
Nitrite + Nitrate as N	---	0.05	mg/L N	0.07	---	---	1.43	1.07	
<b>EK067: Total Phosphorus as P</b>									
Total Phosphorus as P	---	0.01	mg/L P	<0.01	---	---	0.10	0.42	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon (as NPOC)	---	1	mg/L	3	---	---	6	5	
<b>EP020: Oil and Grease (O&amp;G)</b>									
Oil and Grease	---	1	mg/L	---	---	---	---	---	
<b>EP030: Biochemical Oxygen Demand (BOD)</b>									
Biochemical Oxygen Demand	---	2	mg/L	---	---	---	<2	<2	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1	µg/L	---	---	---	---	---	
Acenaphthylene	208-96-8	1	µg/L	---	---	---	---	---	
Acenaphthene	83-32-9	1	µg/L	---	---	---	---	---	
Fluorene	86-73-7	1	µg/L	---	---	---	---	---	
Phenanthrene	85-01-8	1	µg/L	---	---	---	---	---	
Anthracene	120-12-7	1	µg/L	---	---	---	---	---	
Fluoranthene	206-44-0	1	µg/L	---	---	---	---	---	
Pyrene	129-00-0	1	µg/L	---	---	---	---	---	
Benz(a)anthracene	56-55-3	1	µg/L	---	---	---	---	---	
Chrysene	218-01-9	1	µg/L	---	---	---	---	---	
Benzo(b)fluoranthene	205-99-2	1	µg/L	---	---	---	---	---	
Benzo(k)fluoranthene	207-08-9	1	µg/L	---	---	---	---	---	
Benzo(a)pyrene	50-32-8	0.5	µg/L	---	---	---	---	---	



Page : 7 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV009 Springwater	JERV011 Christians Minde	JERV012 Kullindi	JERV015 Bay of Plenty	JERV014 RTBU
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	
Compound	CAS Number	LOR	Unit	CA1603002-006	CA1603002-007	CA1603002-008	CA1603002-009	CA1603002-010	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	---	---	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	1	µg/L	---	---	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	1	µg/L	---	---	---	---	---	---
Sum of polycyclic aromatic hydrocarbons	---	0.5	µg/L	---	---	---	---	---	---
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	---	20	µg/L	---	---	---	---	---	---
C10 - C14 Fraction	---	50	µg/L	---	---	---	---	---	---
C15 - C28 Fraction	---	100	µg/L	---	---	---	---	---	---
C29 - C36 Fraction	---	50	µg/L	---	---	---	---	---	---
C10 - C36 Fraction (sum)	---	50	µg/L	---	---	---	---	---	---
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	---	---	---	---	---	---
Toluene	108-88-3	2	µg/L	---	---	---	---	---	---
Ethylbenzene	100-41-4	2	µg/L	---	---	---	---	---	---
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	---	---	---	---	---	---
ortho-Xylene	95-47-6	2	µg/L	---	---	---	---	---	---
Total Xylenes	1330-20-7	2	µg/L	---	---	---	---	---	---
Sum of BTEX	---	1	µg/L	---	---	---	---	---	---
<b>EP231: Perfluorinated Compounds</b>									
PFOS	1763-23-1	0.02	µg/L	0.18	<0.02	<0.02	---	---	---
PFOA	335-67-1	0.02	µg/L	<0.02	<0.02	<0.02	---	---	---
6:2 Fluorotelomer sulfonate (6:2 Fts)	27619-97-2	0.1	µg/L	<0.1	<0.1	<0.1	---	---	---
8:2 Fluorotelomer sulfonate	39108-34-4	0.1	µg/L	<0.1	<0.1	<0.1	---	---	---
<b>EP231: Perfluorinated Compounds Low Level</b>									
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	---	---	---	<0.002	<0.002	---
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	---	---	---	<0.002	<0.002	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.01	µg/L	---	---	---	<0.01	<0.01	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.01	µg/L	---	---	---	<0.01	<0.01	---
<b>MW006: Thermotolerant Faecal Coliforms</b>									





Page : 8 of 8  
 Work Order : CA1603002  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV009 Springwater	JERV011 Christians Minde	JERV012 Kullindi	JERV015 Bay of Plenty	JERV014 RTBU
Client sampling date / time				[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	[25-May-2016]	
Compound	CAS Number	LOR	Unit	CA1603002-006	CA1603002-007	CA1603002-008	CA1603002-009	CA1603002-010	
				Result	Result	Result	Result	Result	
<b>MW006: Thermotolerant Faecal Coliforms - Continued</b>									
Thermotolerant Faecal Coliforms (Presumptive)	---	1	CFU/100mL	<1	---	---	---	---	---
Thermotolerant Faecal Coliforms (Confirmed)	---	1	CFU/100mL	<1	---	---	---	---	---
<b>MW013: Faecal Streptococci</b>									
Faecal Streptococci (Presumptive)	---	1	CFU/100mL	---	---	---	<2	<2	<2
Faecal Streptococci (Confirmed)	---	1	CFU/100mL	---	---	---	<2	<2	<2



**White, Sarah-Jane (Health)**

---

**From:** [REDACTED]@infrastructure.gov.au>  
**Sent:** Thursday, 26 May 2016 3:04 PM  
**To:** Dale, Emm (Health)  
**Subject:** RE: Paul Kelly's e-mail address [SEC=UNCLASSIFIED]  
**Attachments:** FW: Routine - advising return email address for updated version of the slides from Thu 19 May - FW: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]

Thanks Emm

The reason I asked is that he was sent the attached request on Tuesday from my Director, as a follow-up from the meeting in the Jervis Bay Territory. Dr Kelly is usually prompt in responding, so we thought we may have got the addy wrong.

I understand he may be snowed under, but the Wreck Bay Aboriginal Council are requesting the data he undertook to provide them (apparently updated presentation slides) and we would like to get it to them.

Cheers

---

**From:** Dale, Emm (Health) [mailto:Emm.Dale@act.gov.au]  
**Sent:** Thursday, 26 May 2016 2:50 PM  
**To:** [REDACTED]  
**Subject:** RE: Paul Kelly's e-mail address [SEC=UNCLASSIFIED]

Hi [REDACTED]

That's correct ☺

---

**From:** [REDACTED]@infrastructure.gov.au]  
**Sent:** Thursday, 26 May 2016 2:46 PM  
**To:** Dale, Emm (Health)  
**Subject:** Paul Kelly's e-mail address [SEC=UNCLASSIFIED]

Hi Emm

Could you please confirm that Dr Kelly's e-mail address is [paul.kelly@act.gov.au](mailto:paul.kelly@act.gov.au)?

Thanks

[REDACTED]  
 [REDACTED]  
 Jervis Bay Territory Administration  
 Local Government, Mainland Territories & RDA Branch  
 Local Government and Territories Division  
 Department of Infrastructure & Regional Development  
 02 [REDACTED]  
 62 Northbourne Avenue | GPO Box 594 | Canberra ACT 2601  
 [REDACTED]@infrastructure.gov.au

Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.  
The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.

Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons

or entities other than the intended recipient is prohibited and may result in severe penalties.

If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

-----

-----

This email, and any attachments, may be confidential and also privileged. If you are not the intended recipient, please notify the sender and delete all copies of this transmission along with any attachments immediately. You should not copy or use it for any purpose, nor disclose its contents to any other person.

-----

-----

Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.

The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.

Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons

or entities other than the intended recipient is prohibited and may result in severe penalties.

If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

-----

**White, Sarah-Jane (Health)**

---

**From:** [REDACTED] [REDACTED] [REDACTED]@infrastructure.gov.au>  
**Sent:** Thursday, 26 May 2016 2:35 PM  
**To:** [REDACTED]  
**Subject:** FW: Routine - advising return email address for updated version of the slides from Thu 19 May - FW: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]

**Importance:** High

---

**From:** [REDACTED] [REDACTED]  
**Sent:** Tuesday, 24 May 2016 10:40 AM  
**To:** 'paul.kelly@act.gov.au'  
**Subject:** Routine - advising return email address for updated version of the slides from Thu 19 May - FW: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]  
**Importance:** High

**Attn: Dr Paul Kelly**  
**ACT Chief Health Officer**

Good morning Paul

Thanks for your input to the Wreck Bay Aboriginal Community Council (WBACC) and the public information session on perfluronated chemicals last week.

As discussed, you wanted the WBACC attendees receive a copy of your presentation slides and prefer that they be provided with the updated (evening) version.

I am happy to arrange for that distribution if you could provide a copy by return email.

Kind regards, [REDACTED]

[REDACTED]  
[REDACTED], Jervis Bay Territory Administration Section  
Tel: (02) [REDACTED] [REDACTED]

Department of Infrastructure and Regional Development  
Location: Level 3 East, 62 Northbourne Avenue, Canberra ACT 2600  
Postal: GPO Box 594, Canberra ACT 2601



**White, Sarah-Jane (Health)**

---

**From:** Clapham, David  
**Sent:** Monday, 16 May 2016 9:16 AM  
**To:** Pengilley, Andrew (Health)  
**Cc:** Kelly, Paul (Health); Dale, Emm (Health)  
**Subject:** FW: JBT Community engagement: Updated Run sheet [SEC=UNCLASSIFIED]  
**Attachments:** Revised RUN SHEET for JBT Community Engagement.doc; MAP of JBT.JPG; SKM\_C3350160513174600.pdf

**From:** [REDACTED]  
**Sent:** Friday, 13 May 2016 18:31  
**To:** [REDACTED];  
 'David.Clapham@act.gov.au'; [REDACTED]  
 [REDACTED]@infrastructure.gov.au'  
**Cc:** [REDACTED]  
**Subject:** JBT Community engagement: Updated Run sheet [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hello all: Please find attached an **updated run sheet** for next Thursday 19 May. If things change I'll send another update next week.

Also attached is the **map** to the JBT Administration Office where you will convene at 12:00 to meet up with [REDACTED] and [REDACTED] from DIRD before travelling together to the WB Community Executive Board meeting for 1:00 pm.

Also attached is a copy of the **Community Bulletin** which advertised the event.

Collateral for the event will include the **enHealth and AHPPC fact sheets**. I'll be asking the base another favour in printing out some hard copies for the event. Cmdr Johnson, I'll be in contact with you separately next week about this.

[REDACTED] has/will be finalising the slide pack for you.

Regards

**IMPORTANT:** This email remains the property of the Department of Defence and is subject to the jurisdiction of section 70 of the Crimes Act 1914. If you have received this email in error, you are requested to contact the sender and delete the email.

**IMPORTANT:** This email remains the property of the Department of Defence and is subject to the jurisdiction of section 70 of the Crimes Act 1914. If you have received this email in error, you are requested to contact the sender and delete the email.

**RUN SHEET for JBT Community Engagement 19 May 2016****Pre-brief at JBT Administration Office – JB Village (See Map attached)**

DATE: 19 May 2016

TIME: **12:00-12:45pm**

VENUE: JBT Admin Office

(Defence to meet with [REDACTED] [REDACTED] [REDACTED])

**Travel to Wreck Bay Village together.****Presentation at WB Exec Board Meeting**

DATE: 19 May 2016

TIME: **1:00-2:00 pm** ([REDACTED] has confirmed this time)

VENUE: Wreck Bay Community Council office - WB Village

FORMAT: Round table and QA with Board members – no PPT

## Attendees:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- Dr Paul Kelly (ACT CHO) or Dr Andrew Pengilley (ACT Deputy CHO)
- ACT Govt Rep (tbc)

**Return to JBT Administration Office till set up for the community engagement.****Community Engagement**

DATE: 19 May 2016

TIME: **5:30pm-6:30pm**

VENUE: Jervis Bay School Hall ([REDACTED] [REDACTED] from Base organising venue; catering; PPT equipment etc)

## FORMAT:

- Theatrette style – informal seating
- PPT presentation if required. 30 mins for presentation, may include ACT Chief Health Officer, Dr Paul Kelly (or ACT Deputy CHO, Dr Andrew Pengilley) slides. Promote website and hotlines for further info
- Q&A
- People invited to refreshments.

**PRESENTERS:**

- MC – [REDACTED] (DIRD)
- [REDACTED]
- ACT Chief Health Officer or Deputy CHO.

**Defence/Govt Attendees:**

- [REDACTED]
- [REDACTED] (BSM)
- [REDACTED]
- ACT Govt Rep (tbc)

---

*Advertised:* Through JBT *Community Bulletin* (attached)

*Catering:* Tea, coffee, biscuits

*Collateral:*

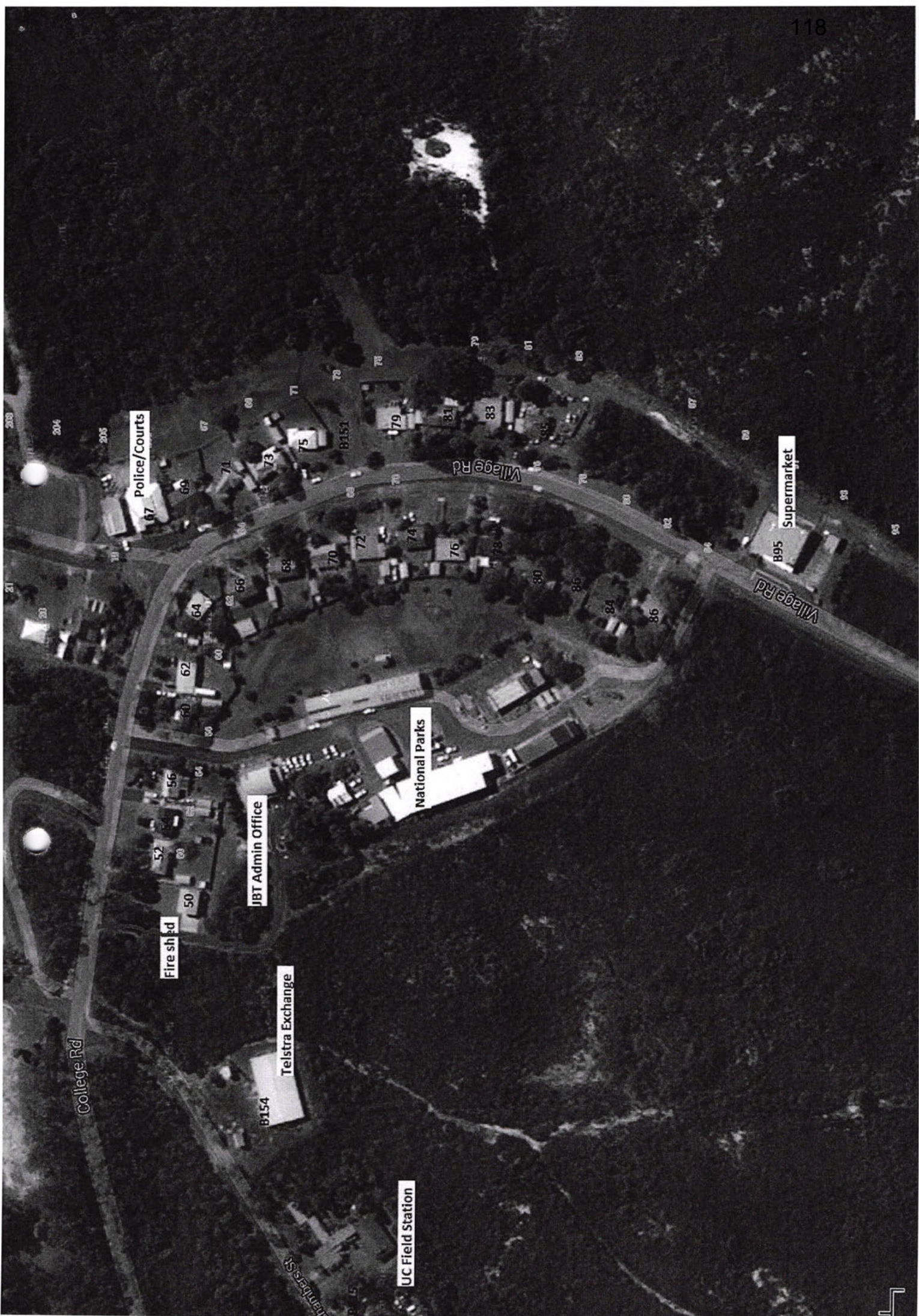
- enHealth and AHPPC fact sheets
- Preliminary Sampling Program fact sheet.

*Issues that may come up*

- Coffey Report
- Ongoing monitoring of carcinogenic contaminants
- Blood tests

Close down 6.30pm ([REDACTED] to lock up or have arranged someone to lock up).









Australian Government  
Department of Infrastructure  
and Regional Development

100  
Centenary 1915-2015

## Community Bulletin

### JERVIS BAY TERRITORY

**Number:** 2016/04

**Date:** 12 May 2016

**Relevant:** Jervis Bay Territory

**Topic:** Perfluorinated Chemicals – Public Meeting Thursday 19 May 2016

The Department of Defence has initiated a program to investigate the extent and levels of the chemicals, PFOS and PFOA on, and in the vicinity of, some of its bases around Australia.

Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were active ingredients in aqueous film forming foam (AFFF) used extensively worldwide, and within Australia, from the 1970s by both civilian and military authorities, due to its effectiveness in extinguishing liquid fuel fires.

Most people living in developed nations will have some level of PFOS and PFOA in their body as these chemicals were used in common household and industrial applications, such as in the manufacture of non-stick cookware, fabric, furniture and carpet stain protection applications, food packaging and in some industrial processes.

According to guidance statements issued in March 2016 by an expert committee, the national Environmental Health Standing Committee (enHealth), there is currently no consistent evidence that exposure to PFOS and PFOA causes adverse human health effects. However, because these chemicals can persist in humans and the environment, enHealth recommends that human exposure to these chemicals is minimised as a precaution.

As a result, Defence is conducting preliminary testing to determine the extent, if any, of PFOS and PFOA outside of the Jervis Bay Range Facility.

You are invited to a public meeting to hear more about the testing program:

**When:** Thursday 19 May 2016, 5:30pm to 6:30pm

**Where:** Jervis Bay School Hall

For further information on Defence's national activities, please refer to [www.defence.gov.au/id/PFOSPFOA/](http://www.defence.gov.au/id/PFOSPFOA/)



Local Government, Mainland Territories and RDA Branch

**White, Sarah-Jane (Health)**

---

**From:** [REDACTED]@infrastructure.gov.au>  
**Sent:** Monday, 20 June 2016 5:29 PM  
**To:** Dale, Emm (Health)  
**Subject:** RE: Invitation for Dr Kelly to attend a meeting [SEC=UNCLASSIFIED]

I should have just read the email trail first ☺

---

**From:** Dale, Emm (Health) [mailto:Emm.Dale@act.gov.au]  
**Sent:** Monday, 20 June 2016 5:00 PM  
**To:** [REDACTED]  
**Subject:** RE: Invitation for Dr Kelly to attend a meeting [SEC=UNCLASSIFIED]

Hey [REDACTED]  
 Paul's just going to walk up

---

**From:** [REDACTED]@infrastructure.gov.au]  
**Sent:** Monday, 20 June 2016 4:51 PM  
**To:** Dale, Emm (Health)  
**Subject:** RE: Invitation for Dr Kelly to attend a meeting [SEC=UNCLASSIFIED]

Hi Emm

Can you advise whether Dr Kelly requires car parking?

Cheers

---

**From:** Dale, Emm (Health) [mailto:Emm.Dale@act.gov.au]  
**Sent:** Thursday, 16 June 2016 3:48 PM  
**To:** [REDACTED]  
**Subject:** RE: Invitation for Dr Kelly to attend a meeting [SEC=UNCLASSIFIED]

Hi [REDACTED]  
 Paul is definitely available and would like to attend.

I have added it to his diary. Parking won't be necessary.

Ta  
 Emm

---

**From:** [REDACTED]@infrastructure.gov.au]  
**Sent:** Thursday, 16 June 2016 11:54 AM  
**To:** Dale, Emm (Health)  
**Subject:** Invitation for Dr Kelly to attend a meeting [SEC=UNCLASSIFIED]

Hi Emm

Could you advise whether Dr Kelly is available, and willing, to attend a meeting with the Department to discuss the results of environmental PFC testing in the Jervis Bay Territory conducted by ACT EPA?

Mark Heckenberg, ACT EPA, will be taking us through the results of testing. The results (attached) have been provided by the EPA to Lyndell Hudson (Health), and you may already have them.



The date and time is Wednesday, 22 June at 11:30 – 12:30 pm (unfortunately we have no flexibility with this time).  
The meeting will be held at our offices at 111 Alinga St Canberra City. Parking can be arranged.

If Dr Kelly cannot attend in person we can make teleconference arrangements.

We have also extended an invitation to Dept of Defence. These will probably be people Dr Kelly met when he visited the JBT recently.

Happy to discuss.

[Redacted]

[Redacted]

Jervis Bay Territory Administration  
Local Government, Mainland Territories & RDA Branch  
Local Government and Territories Division  
Department of Infrastructure & Regional Development

[Redacted]

62 Northbourne Avenue | GPO Box 594 | Canberra ACT 2601  
[Redacted]@infrastructure.gov.au

-----  
Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.  
The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.  
Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited and may result in severe penalties.  
If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

-----  
This email, and any attachments, may be confidential and also privileged. If you are not the intended recipient, please notify the sender and delete all copies of this transmission along with any attachments immediately. You should not copy or use it for any purpose, nor disclose its contents to any other person.

-----  
Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.  
The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.  
Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited and may result in severe penalties.  
If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

---

Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.  
The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.

Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons

or entities other than the intended recipient is prohibited and may result in severe penalties.

If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

---

UNCLASSIFIED

**To:** Meegan Fitzharris MLA, Assistant Minister for Health

TRIM No.: MIN16/571

Date Rec'd Minister's Office .../.../...

**Cc:** Simon Corbell MLA, Minister for Health

**From:** Dr Paul Kelly, A/g Director-General ACT Health

**Subject:** Public Consultation Meeting Jervis Bay

**Critical Date:** 19 May 2016

**Critical Reason:** The public meeting will occur on this date.

#### Purpose

1. To advise of the Chief Health Officer's participation in a public consultation meeting between the Commonwealth and residents of Jervis Bay.

#### Background

2. Jervis Bay Territory (JBT) is a Commonwealth administered Territory on the coast of NSW near Nowra. A significant proportion of JBT is occupied by Department of Defence (DOD) facilities comprising the Australian Navy Base, HMAS Creswell, and the Jervis Bay Range Facility. The Wreck Bay Village is a largely indigenous community adjacent to DOD land.
3. JBT is administered by the Commonwealth Government through the Department of Infrastructure and Regional Development (DIRD), which provides a range of local and state Government-like services. An arrangement exists between ACT Government and DIRD to provide some services, including Public Health, to Jervis Bay.
4. The Department of Defence (DOD) has been involved in assessing the environmental impact toxins used on their sites at a number of locales across Australia, such as the Oakley Aviation School in Queensland and the Williamstown Airforce Base in NSW. The Jervis Bay sites have been included in this program.
5. On 19 May 2016 the DOD and DIRD will be holding a public consultation meeting in Jervis Bay regarding their proposed program of environmental testing. The local community has requested that JBT make this information available in a public forum.
6. DIRD and DOD have requested the ACT Government to provide Public Health expertise to support their consultation. The ACT Government (through CMTEDD) have requested that the Chief Health Officer (CHO) attend the meeting to provide this expertise.

#### Government Commitment – Other (and reason)

7. This does not bear on a Government Commitment, other than the administrative arrangement to provide public health services to DIRD.

UNCLASSIFIED



**Issues**

8. PerFluroOctanoic Acid (PFOA) and PerFluroOctaneSulfonic Acid (PFOS) are two environmental contaminants that have been of concern at DOD sites. These organic chemicals are a component of foam used by fire-fighters and can accumulate in food, water and soil. Sites where fire suppression training has occurred can have high levels of PFOA or PFOS in groundwater. These chemicals have been found in a closed system used for fire suppression training on the Jervis Bay DOD site.
9. PFOA and PFOS can be detected in the blood of most Australians and residents of other industrialised nations. This is due to exposure through food, water, dust or manufactured products containing these chemicals (carpet cleaners, non-stick cookware, and personal hygiene products).
10. In 2016 the Environmental Health subcommittee of the Australian Health Protection Principle Committee (AHPPC) developed national guidance on the health risks associated with PFOS and PFOA.
11. There is no consistent evidence of health problems associated with exposure to PFOA or PFOS. There is, however, a degree of public and occupational concern about unproven associations between PFOS and PFOA and a number of medical conditions including thyroid disease ,altered foetal development and cancer.
12. ACT Health tested the sources of drinking water at Jervis Bay in March 2016 and has found no PFOS or PFOA contamination. This indicates a low probability of human health risks from these chemicals at Jervis Bay.
13. The CHO will be attending the public consultation to provide public health advice about the health risks associated with PFOS and PFOA. The meeting will be chaired by DIRD and any questions about the planned testing program on DOD land, or future remediation of contamination, will be addressed by the Commonwealth.

**Financial Implications**

14. None

**Directorate Consultation**

15. Not Applicable. DIRD has requested the CHO's participation through CMTEDD.

**External Consultation**

16. ACT Health, DIRD, DOD and CMTEDD have had a teleconference to discuss the public consultation meeting and confirm the roles of each organisation.

**Benefits/Sensitivities**

17. The local community is likely to have some concerns about potential PFOS and PFOA contamination, but having ruled out contamination of the drinking water is likely to address these. There is limited relevance for ACT Government.

**Media Implications**

18. None. DIRD and DOD will address media enquiries, and ACT engagement will be administered through CMTEDD.

**Recommendation**

That you note the information contained in this brief.

**Noted / Please Discuss**

Meegan Fitzharris MLA..... /...../.....

Minister's Comments
---------------------

Signatory Name:	Dr Andrew Pengilley	Phone:	62070291
Title:	A/g Chief Health Officer		
Date:	May 2016		
Action Officer:	Dr Andrew Pengilley	Phone:	62070291

**2016-17 ACT GOVERNMENT JERVIS BAY TERRITORY SERVICE DELIVERY COST ESTIMATES**

Cost estimate for provision of: <i>Health Directorate - Water Sampling and Testing</i>		Comments
<i>Estimated Cost per Annum</i>		
<b>EMPLOYEE EXPENSES: (Insert line items as appropriate)</b>		
Salary: 132 hrs Admin, 287 hrs HP3, 191 hrs Management per year	39,745	
2		
3		
4		
<b>Sub Total</b>	<b>\$39,745</b>	
<b>ADMINISTRATIVE EXPENSES: (Insert line items as appropriate)</b>		
1. Travel Cost (9 trips)	4,333	
2. Accommodation (12 rooms)	2,281	
3. Costs of Laboratory Analysis (166 samples)	23,213	
4. Misc	1,412	
<b>Sub Total</b>	<b>\$31,239</b>	
<b>CORPORATE OVERHEADS (Insert line item as appropriate)</b>		
1		
2		
3		
4		
<b>Sub Total</b>	<b>\$0</b>	
<b>TOTAL COSTS</b>	<b>\$70,984</b>	

Directorate Contact Financial Matters:	Maggie Shao
Position:	Manager, Business Management Group
Phone:	6205 8705
email:	maggie.shao@act.gov.au

DESCRIPTION OF SERVICES	Estimated number of "service units"	Comments
<i>Trips to JBT</i>	<i>9 trips</i>	
Overnight accomodation	12 rooms	2 officers attend 3 trips (eg. training, meetings)
Laboratory sampling	166 samples	

Directorate Contact Operational matters:	Lyndell Hudson
Position:	Manager Environmental Health
Phone:	62050956
email:	lyndell.hudson@act.gov.au



**White, Sarah-Jane (Health)**

---

**From:** Feely, Nicole (Health)  
**Sent:** Friday, 2 September 2016 4:05 PM  
**To:** Kelly, Paul (Health)  
**Subject:** Emailing - 8 Brief signed by CM - GOVERNMENT RELATIONS - Advice - Brief to CM - updat.pdf [DLM=Sensitive]  
**Attachments:** 8 Brief signed by CM - GOVERNMENT RELATIONS - Advice - Brief to CM - updat.pdf  
**Importance:** High

Paul – may I please have your advice on the matters in this BN asap – the Head of Service needs to be briefed

Thanks - Nicole



**ACT**  
Government

Chief Minister, Treasury and  
Economic Development

To: Chief Minister

Copy Head of Service

**Subject: Update on perfluorinated compound contamination in Jervis Bay Territory**

**Critical date and reason**

1. Routine

**Recommendations**

2. That you note the information in the brief.

**NOTED/PLEASE DISCUSS**

Andrew Barr MLA ..... *Andrew Barr* ..... 9/18/16

Information required  
from Defence Dept:

- What is the proposed action?
- What information will be provided to residents and when?

I may need to write to Defence <sup>Minister</sup> if the answers are not satisfactory.

### Supporting Reasoning

3. The ACT Chief Health Officer (CHO) will soon provide advice to the Department of Infrastructure and Regional Development (DIRD) that waterways in Jervis Bay Territory (JBT) should be closed to the community as a result of perfluorinated compound (PFC) contamination, pending further testing.
4. You have previously been briefed on the results of water testing by ACT Health and the Environment Protection Authority (EPA) for PFC contamination in the JBT (CMTEDD2016/39).
5. On 25 May 2016, at the request of DIRD, the EPA undertook PFC testing at a number of water sites in the JBT. EPA and the CHO met with DIRD on 22 June to discuss the findings. A final report was subsequently provided to DIRD, revised to reflect the ongoing debate regarding Australian guidelines for testing and analysing PFOS levels. The results continue to indicate contamination at JBT above human health limits, particularly in Upper Mary Creek. The final EPA report is at Attachment A.
6. The EPA report recommends further discussions should be held with the Commonwealth Departments of Defence, Health and the Environment on the potential impact on human health and the environment from the identified PFC contamination. The report also recommended further testing in the JBT.
7. The CHO, as the lead official in the ACT's engagement with the Commonwealth and JBT on this issue, has raised a number of concerns internally regarding the results of the EPA testing.
8. The CHO recently attended the NSW CHO Environmental Health Expert Advisory Committee meeting where the Williamstown PFC contamination issue and response were discussed in great detail. This meeting underscored the significant level of resources and attention now being directed at PFC contamination in Williamstown. The CHO also noted that while there are a number of local differences between Williamstown and JBT, quantitatively the level of contamination is very similar, as is the population of the affected area.
9. Further, the CHO noted that the precautionary approach taken by Defence in Williamstown led to an early restriction of land and water usage after the initial testing results, pending more detailed analysis. This step has not been taken in JBT.
10. Advice from the CHO is that if Mary Creek flowed through the ACT, the ACT Government would already have closed this waterway to human contact, including swimming, drinking, foraging and fishing, enforced by signage and supported by communications directly with the community.
11. The ACT position is that Defence must take the lead, and that DIRD holds responsibility for decisions regarding waterway closure and communications with the community. CHO advice to DIRD will be that further testing of the environment is urgently needed and clear next steps, including possible waterway closures, must be agreed as a matter of priority.



12. Intergovernmental Relations in CMTEDD continue to engage DIRD and Defence on this issue and DIRD have undertaken to meet with EPA and the CHO as soon as possible. Further updates will be provided following this meeting.

#### **Consultation and Communication**

13. This brief was prepared in consultation with the EPA and ACT Health. Further discussion with Defence and DIRD will follow.
14. A decision to close waterways in JBT Bay will require considerable community communication in JBT, led by the Commonwealth. The ACT CHO will provide expert advice where appropriate.

#### **Financial**

15. ACT activities in the JBT regarding this issue are purchased by the Commonwealth at cost.

#### **Management of Other Risks**

16. The potential closure of waterways in JBT will have significant cultural impacts for members of the Wreck Bay Aboriginal community, including mental distress due to strong traditional and spiritual relationship with the land.
17. There is currently limited research and evidence of long term health affects due to PFC contamination. The appropriateness and accuracy of human criteria guidelines for PFCs are competing and are under debate in environmental and health agencies. The Commonwealth Government made an election commitment to an independent review of the enHealth guidelines – which impact PFC analysis criteria – to commence within 30 days of re-election. No further announcements have been made regarding this.
18. The PFC contamination in Williamstown has received significant community interest and media attention. Due to the similarities in terms of population size, there is potential for significant media attention in Jervis Bay, including litigation from affected community members and businesses. Most recently, the famous consumer advocate Erin Brokovich has brought new media attention ([Attachment B](#)) to the issue at Oakey in Queensland. Ms Brokovich's involvement and calls for the Australian Government to acknowledge the extent of the PFC issue, are likely to generate ongoing and significant media attention.

Executive Clearance: Geoffrey Rutledge

Date: August 2016

Action Officer: David Clapham

Phone: 57261

**White, Sarah-Jane (Health)**

---

**From:** Kelly, Paul (Health)  
**Sent:** Tuesday, 13 September 2016 6:37 PM  
**To:** Leigh, Kathy  
**Cc:** DGAHealth; Webster, Elizabeth (Health); Sek, Gabrielle (Health); Rutledge, Geoffrey; Bear, Jacqui; Pengilley, Andrew (Health)  
**Subject:** Re: Minute from Chief Health Officer [SEC=UNCLASSIFIED]

Hi Kathy,

Sorry if there was ambiguity in the advice.

To clarify:

1. I advise that, based on the environmental results collected to date, Mary Creek should be closed right now to all human contact, that is swimming, drinking and fishing, until such time as a detailed human health impact assessment (hhia) is conducted.
2. This will necessitate frank and open discussion with the community, including the plan and timing for the hhia which will need to be performed by an independent body in close cooperation with the community as we need detailed information about the nature, frequency and intensity of human interaction with the contaminated area. Polluter pays principle applies here.
3. The results of any hhia need to be shared with ACT gov (health and EPA) for our comment prior to becoming publicly available
4. Depending on the results of the hhia, Mary Creek may be able to be reopened, partially restricted or continued to be closed for a period to be determined at that time.

I hope that clarifies the advice. please call or email if any further detail is required.

Thanks so much for your communications with Commonwealth colleagues to date. Hopefully this will get things moving in the right direction now. I look forward to continuing to work with Geoffrey and EPA colleagues on this matter.

Regards

Paul

On Sep 13, 2016, at 6:00 PM, Leigh, Kathy <Kathy.Leigh@act.gov.au> wrote:

Paul

Thank you for your minute of Thursday 8 September and your earlier email of Friday 2 September. In your email to me of Friday 2 September you stated: "There is a contamination problem with [PFOS/PFOA] in Mary Creek ..." and "If this was in the ACT, let's say Lake Ginninderra, then with this knowledge we would have immediately (ie same day) closed the lake to recreational activity, pending further more detailed human health risk assessment."

Your minute of 8 September says that "a full exposure assessment of PFOS/PFOA at Wreck Bay should be conducted" and that "depending on the result of the exposure assessment it may be necessary to advise residents of Wreck Bay to restrict their access to Mary Creek".

I had understood from your email that your view was that Mary Creek should be closed to human activity immediately. Your minute seems to say that any action to restrict access should await further testing.

Could you please clarify?

Your minute recommends that I write to DIRD and Department of Defence expressing concern that the requested testing has not been conducted.

Following receipt of your email of 2 September (and your follow up email of 3 September in response to my query) I telephoned the Secretary of DIRD [REDACTED] on Monday 5 September to ensure that he was aware of our views. While I understood that you had raised these concerns with



officers of his Department I wanted to make sure that he was aware. He was not aware and undertook to follow up.

A brief was also provided to the Chief Minister to write to the Minister for Territories and a letter from the Chief Minister to the Minister for Territories (copied to the Minister for Defence and the Minister for Health and Aged Care) was sent on Thursday 8 September.

I am happy to follow up my telephone call with a letter but would like the above clarified first.

You also recommend that I nominate a CMTEDD lead to act as a focal point and coordinator for ACT Government involvement with the PFOS issue at JBT. I confirm that Geoffrey Rutledge continues to be the lead for dealing with the Commonwealth on JBT.

Thanks

Kathy

**Kathy Leigh | Head of Service and Director-General**

Phone: 02 6205 0246 | Email: [kathy.leigh@act.gov.au](mailto:kathy.leigh@act.gov.au)

**Chief Minister, Treasury and Economic Development Directorate | ACT Government**

Level 5 Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | [www.act.gov.au](http://www.act.gov.au)

**From:** Dale, Emm (Health) **On Behalf Of** Kelly, Paul (Health)

**Sent:** Thursday, 8 September 2016 4:54 PM

**To:** Leigh, Kathy

**Cc:** DGACTHealth; Webster, Elizabeth (Health); Sek, Gabrielle (Health); Rutledge, Geoffrey; Bear, Jacqui

**Subject:** Minute from Chief Health Officer [SEC=UNCLASSIFIED]

Good afternoon Kathy

Please see the attached minute from Dr Kelly regarding the management of PFOS and PFOA contamination at Jervis Bay.

Kind regards

**Emm Dale**

Executive Assistant - Chief Health Officer

Population Health Protection and Prevention

ACT Health

P: 02 62050883

*care excellence collaboration integrity*



**White, Sarah-Jane (Health)**

---

**From:** Rutledge, Geoffrey  
**Sent:** Wednesday, 14 September 2016 4:57 PM  
**To:** Pengilley, Andrew (Health)  
**Subject:** FW: Draft PFAS Water Analysis Report - September 2016 [SEC=UNCLASSIFIED]  
**Attachments:** PFAS\_Results\_Report\_Draft\_8Sept2016.doc; CA1604706\_0\_AU\_COA\_2\_A4\_ENV\_NATA.PDF

Andrew –

Paul got it last Thursday – see below

---

**From:** Clapham, David  
**Sent:** Thursday, 8 September 2016 3:25 PM  
**To:** Rutledge, Geoffrey  
**Subject:** FW: Draft PFAS Water Analysis Report - September 2016 [SEC=UNCLASSIFIED]

---


**From:** Heckenberg, Mark  
**Sent:** Thursday, 8 September 2016 2:56 PM  
**To:** Kelly, Paul (Health); Jones, Greg; Power, David; Gibb, Timothy; Dix, Rodney  
**Cc:** Clapham, David  
**Subject:** Draft PFAS Water Analysis Report - September 2016 [SEC=UNCLASSIFIED]

Dear Colleagues,

Please find attached Environmental Quality's draft report consolidating results from May and August 2016 sampling events for per- and poly-fluoroalkyl substances (PFAS) impacts to the waters of the Jervis Bay Territory.

I would appreciate your feedback on the report prior to it being sent to DIRD for their consideration.

Regards

 Mark Heckenberg | Manager, Contaminated Sites | Environmental Quality

Phone: 02 6207 2151 | Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Construction, Environment and Workplace Protection | Access Canberra | ACT Government

GPO Box 158 Canberra ACT 2601 | <http://www.act.gov.au/accesscbr>



[REDACTED]  
[REDACTED]

Jervis Bay Territory Administration  
Department of Infrastructure & Regional Development  
GPO Box 594  
Canberra ACT 2601

**RE: REPORT EPA ON PER- AND POLY-FLUORO-ALKYL SUBSTANCES WATER SAMPLING AND ANALYSIS**

Dear [REDACTED]

In accordance with your instructions ACT Environment Protection Authority (EPA) undertook additional discrete water sampling within the effluent, surface and ground waters of the Jervis Bay Territory on 24 August 2016. The purpose of the additional sampling was to verify the results of previous sampling undertaken by the EPA on 25 May 2016.

**This report consolidates the findings of the two above sampling events.**

Sampling was undertaken at the following 10 locations (see map below for details):

**HMAS Creswell – (effluent and surface water samples)**

1. Sewage Treatment Plant – treated effluent
2. Effluent Retention Dam – stored treated effluent
3. Spring water – surface water from natural spring adjacent to Effluent Retention Dam
4. Flat Rock Creek – tidal receiving waters adjacent to the HMAS Creswell Golf Course walk bridge.

**RAN School of Ship Survivability and Safety – (surface water samples)**

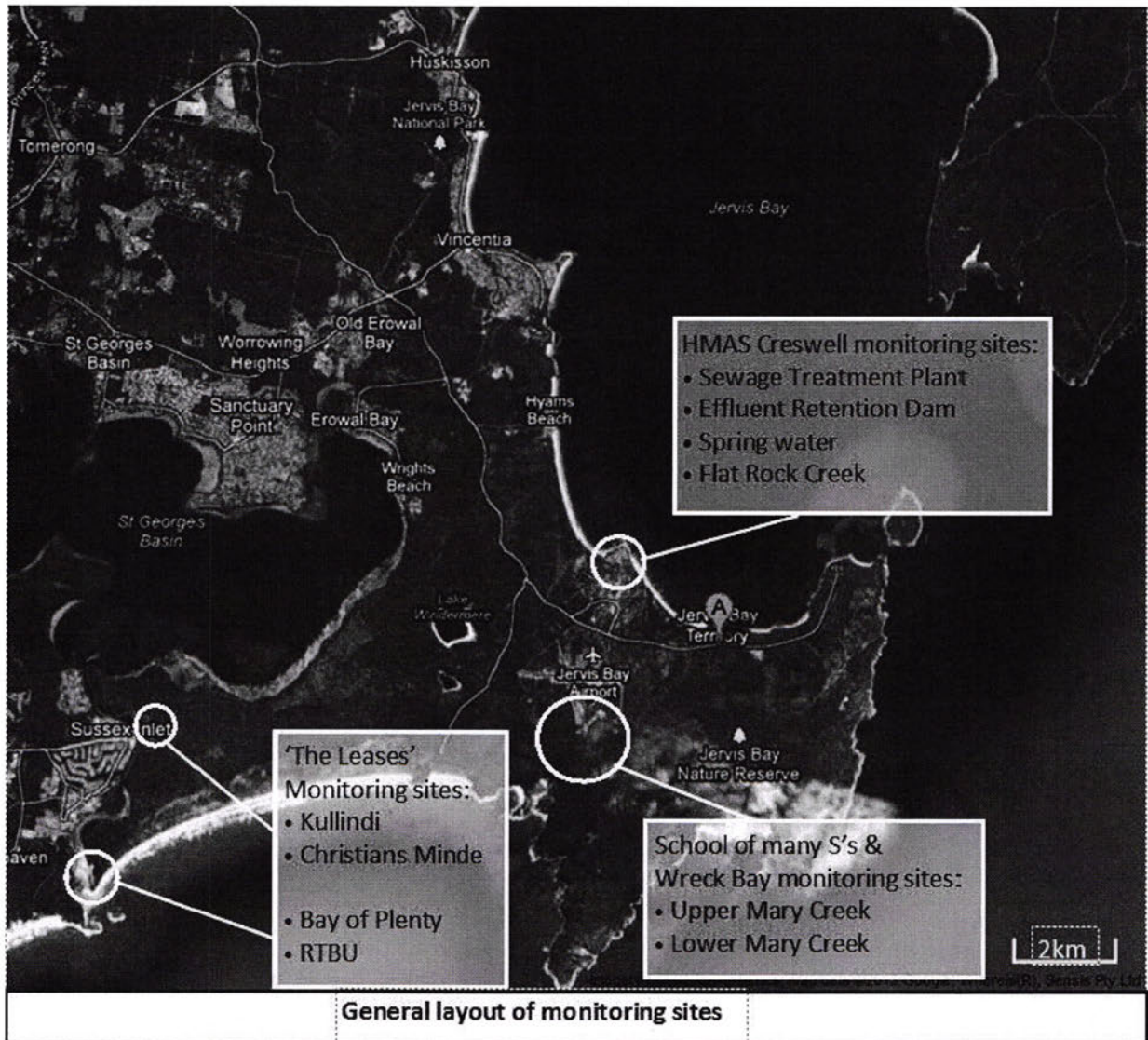
5. Upper Mary Creek – downstream of fire training facilities
6. Lower Mary Creek – off-site location adjacent to Boorarla Road crossing

**Leases – (groundwater samples)**

7. Christians Minde
8. Kullindi
9. RTBU
10. Bay of Plenty Cottages



**Map of Sampling Locations:**







## Methodology

Due to the potentially ubiquitous and persistent nature of per- and poly-fluoroalkyl substances (PFAS) pollutants sampling was again undertaken at all EPA sampling locations within the Jervis Bay Territory (JBT).

The following suite of PFAS pollutants were analysed and reported:

6:2 Fluorotelomer sulfonate (6:2 FtS)  
8:2 Fluorotelomer sulfonate (8:2 FtS)  
Perfluorohexane sulphonate (PFHxS)  
Perfluorooctanoic acid (PFOA)  
Perfluorooctane sulfonic acid (PFOS)

All samples were taken in accordance with ALS (Analytical testing laboratory) sampling requirements by an EPA Environment Protection Officer.

ALS laboratory method EP231-PFC was utilised for all non-saline water samples and method EP231-PFC-LL use for all saline water samples.

There are currently no ACT EPA or nationally adopted criteria for PFAS impacts to soil and water.

In the absence of this criteria the ACT EPA, following discussions with the Department of Infrastructure & Regional Development and other Government Stakeholders at a meeting on 22 June 2016, chose to adopt criteria from the following interim guidance documents:

- *“Defence Contamination Directive #8 Interim Screening Criteria Consistency of Toxicology or Ecotoxicology based Environmental Screening Levels for PFOS, PFOA, 6:2 FTS”*, Department of Defence 19 May 2015; and
- *“enHealth Statement: Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia”<sup>1</sup>*, Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, June 2016

<sup>1</sup> Whilst this guidance has not been formally released by the Commonwealth Department of Health advice has been issued that State and Territory jurisdictions should use this guidance as they see fit. (Paul Kelly, ACT Health, pers comm, 30 June 2016)

Table of Results – Defence Contamination Directive #8 PFAS Criteria

				Client sample ID				Effluent Retention Dam (ERD)		Lower Mary Creek		Upper Mary Creek		Flat Rock Creek		HMAS Creswell STP		Spring Water	
								JERV002		JERV003		JERV004		JERV005		JERV006		JERV009	
								Date of sampling											
Compound Lab Method	LOR	Unit	Interim Criteria <sup>a</sup>				Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
			C1	C2	C3	C4													
6:2 FtS EP231-PFC	0.005	µg/L	5	NC	0.0065	50	<0.1	<b>0.028</b>	<0.1	<0.010	<0.1	<0.010			<0.1	<b>0.055</b>	<0.1	<0.010	
8:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	NC	<0.1	<0.010	<0.1	<0.010	<0.1	<0.010			<0.1	<0.010	<0.1	<0.010	
PFOA EP231-PFC	0.002	µg/L	0.4	2900	0.3	4	<0.02	<b>0.018</b>	<0.02	<b>0.027</b>	<b>0.03</b>	<b>0.206</b>			<0.02	<b>0.015</b>	<0.02	<0.010	
PFOS EP231-PFC	<b>0.002</b>	µg/L	0.2	6.66	0.00065	2	<b>0.44</b>	<b>0.370</b>	<b>1.22</b>	<b>0.971</b>	<b>2.33</b>	<b>3.41</b>			<b>0.45</b>	<b>0.338</b>	<b>0.18</b>	<b>0.159</b>	
PFHxS EP231-PFC	0.002	µg/L	NC	NC	NC	NC	<b>0.58</b>	<b>0.374</b>	<b>1.54</b>	<b>0.793</b>	<b>3.80</b>	<b>3.80</b>			<b>0.48</b>	<b>0.359</b>	<b>0.45</b>	<b>0.322</b>	
6:2 FtS EP231-PFC-LL	0.005	µg/L	5	NC	0.0065	50							<0.01	<0.010					
8:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC	NC							<0.01	<0.010					
PFOA EP231-PFC-LL	0.002	µg/L	0.4	2900	0.3	4							<0.002	<0.010					
PFOS EP231-PFC-LL	<b>0.002</b>	µg/L	0.2	6.66	0.00065	2							<b>0.080</b>	<b>0.052</b>					
PFHxS EP231-PFC	0.002	µg/L	NC	NC	NC	NC							<b>0.060</b>	<b>0.048</b>					

**Legend**

Effluent based water sample

Surface water sample

NC – no criteria established

**Bold** – contaminant detected below criterion where established

**0.18** – exceeds Interim Surface water - Human health (consumption of fish) criteria

**1.22** – exceeds Interim Surface water - Human health (consumption of fish) and Interim Groundwater – Human health (drinking water) criteria

**2.33** – exceeds Interim Surface water - Human health (consumption of fish) and Interim Groundwater – Human health (drinking water) and Interim Surface Water - Recreational use criteria

**Note** – LOR exceeds Interim Surface water - Human health (consumption of fish) criterion

**C1** – Interim Groundwater – Human health (drinking water) criteria

**C2** – Interim Surface water - Ecological (toxicity effects on aquatic organisms) criteria

**C3** – Interim Surface water - Human Health (consumption of fish) criteria

**C4** – Interim Surface Water - Recreational use criteria

**6:2 FtS** - 6:2 Fluorotelomer sulfonate

**8:2 FtS** - 8:2 Fluorotelomer sulfonate

**PFHxS** - Perfluorohexane sulphonate

**PFOA** - Perfluorooctanoic acid

**PFOS** - Perfluorooctane sulfonic acid

a – Interim criteria taken from “Defence Contamination Directive #8 Interim Screening Criteria Consistency of Toxicology or Ecotoxicology based Environmental Screening Levels for PFOS, PFOA, 6:2 FTS”, Department of Defence, 19 May 2015



Table of Results – Defence Contamination Directive #8 PFAS Criteria

			Client sample ID				Christians Minde		Kullindi		RTBU		Bay of Plenty	
			Date of sampling				JERV011		JERV012		JERV014		JERV015	
							25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016
Compound Lab Method	LOR	Unit	Interim Criteria <sup>a</sup>				Result	Result	Result	Result	Result	Result	Result	Result
			C1	C2	C3	C4								
6:2 FtS EP231-PFC	0.005	µg/L	5	NC	0.0065	50	<0.1	<0.010	<0.1	<0.010				
8:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	NC	<0.1	<0.010	<0.1	<0.010				
PFOA EP231-PFC	0.002	µg/L	0.4	2900	0.3	4	<0.02	<0.010	<0.02	<0.010				
PFOS EP231-PFC	0.002	µg/L	0.2	6.66	0.00065	2	<0.02	<0.010	<0.02	<0.010				
PFHxS EP231-PFC	0.002	µg/L	NC	NC	NC	NC	<0.02	<0.010	<0.02	<0.010				
6:2 FtS EP231-PFC-LL	0.005	µg/L	5	NC	0.0065	50				<0.01	<0.010	<0.01	<0.010	
8:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC	NC				<0.01	<0.010	<0.01	<0.010	
PFOA EP231-PFC-LL	0.002	µg/L	0.4	2900	0.3	4				<0.002	<0.010	<0.002	<0.010	
PFOS EP231-PFC-LL	0.002	µg/L	0.2	6.66	0.00065	2				<0.002	<0.010	<0.002	<0.010	
PFHxS EP231-PFC	0.002	µg/L	NC	NC	NC	NC				<0.002	<0.010	<0.002	<0.010	

**Legend**

Groundwater sample

NC – no criteria established

**Bold** – contaminant detected below criterion where established

**0.18** – exceeds Interim Surface water - Human health (consumption of fish) criteria

**1.22** – exceeds Interim Surface water - Human health (consumption of fish) and Interim Groundwater – Human health (drinking water) criteria

**2.33** – exceeds Interim Surface water - Human health (consumption of fish) and Interim Groundwater – Human health (drinking water) and Interim Surface Water - Recreational use criteria

**Note** – LOR exceeds Interim Surface water - Human health (consumption of fish) criterion

**C1** – Interim Groundwater – Human health (drinking water) criteria  
**C2** – Interim Surface water - Ecological (toxicity effects on aquatic organisms) criteria  
**C3** – Interim Surface water - Human Health (consumption of fish) criteria  
**C4** – Interim Surface Water - Recreational use criteria

**6:2 FtS** - 6:2 Fluorotelomer sulfonate  
**8:2 FtS** - 8:2 Fluorotelomer sulfonate  
**PFHxS** - Perfluorohexane sulphonate  
**PFOA** - Perfluorooctanoic acid  
**PFOS** - Perfluorooctane sulfonic acid

**a** – Interim criteria taken from “Defence Contamination Directive #8 Interim Screening Criteria Consistency of Toxicology or Ecotoxicology based Environmental Screening Levels for PFOS, PFOA, 6:2 FTS”, Department of Defence, 19 May 2015



Table of Results – enHealth Interim PFAS Criteria

		Client sample ID				Effluent Retention Dam (ERD)		Lower Mary Creek		Upper Mary Creek		Flat Rock Creek		HMAS Creswell STP		Spring Water	
						JERV002		JERV003		JERV004		JERV005		JERV006		JERV009	
		Date of sampling				25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016
Compound Lab Method	LOR	Unit	Interim Criteria <sup>b</sup>			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
			TDI <sup>1</sup>	DWQG	RWQG												
6:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	<0.1	<b>0.028</b>	<0.1	<0.010	<0.1	<0.010		<0.1	<b>0.055</b>	<0.1	<0.010	
8:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	<0.1	<0.010	<0.1	<0.010	<0.1	<0.010		<0.1	<0.010	<0.1	<0.010	
PFOA EP231-PFC	0.002	µg/L	<b>1.5</b>	5	50	<0.02	<b>0.018</b>	<0.02	<b>0.027</b>	<b>0.03</b>	<b>0.206</b>		<0.02	<b>0.015</b>	<0.02	<0.010	
PFOS EP231-PFC	0.002	µg/L															
PFHxS EP231-PFC	0.002	µg/L	<b>0.15</b>	0.5	5	<b>1.02</b>	<b>0.744</b>	<b>2.76</b>	<b>1.76</b>	<b>6.13</b>	<b>7.21</b>		<b>0.93</b>	<b>0.697</b>	<b>0.63</b>	<b>0.481</b>	
6:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC								<0.01	<0.010			
8:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC								<0.01	<0.010			
PFOA EP231-PFC-LL	0.002	µg/L	<b>1.5</b>	5	50								<0.002	<0.010			
PFOS EP231-PFC-LL	0.002	µg/L															
PFHxS EP231-PFC	0.002	µg/L	<b>0.15</b>	0.5	5								<b>0.140</b>	<b>0.100</b>			

**Legend**

Effluent based water sample

Surface water sample

NC – no criteria established

**TDI<sup>1</sup>** – cannot be applied without additional studies

**Bold** – contaminant detected below criterion where established

**0.18** – exceeds interim Drinking Water Quality Guideline criteria

**1.22** – exceeds interim Drinking Water Quality Guideline criteria and exceeds interim Recreational Water Quality Guideline criteria

**TDI<sup>1</sup>** – Interim Tolerable Daily Intake (µg/kg/d)

**DWQG** – Interim Drinking Water Quality Guideline criteria

**RWQG** – Interim Recreational Water Quality Guideline criteria

**6:2 FtS** – 6:2 Fluorotelomer sulfonate

**8:2 FtS** – 8:2 Fluorotelomer sulfonate

**PFHxS** – Perfluorohexane sulphonate

**PFOA** – Perfluorooctanoic acid

**PFOS** – Perfluorooctane sulfonic acid

**b** – Interim criteria taken from *enHealth Statement: Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*, Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, June 2016

Table of Results – enHealth Interim PFAS Criteria

			Client sample ID			Christians Minde		Kullindi		RTBU		Bay of Plenty	
			Date of sampling			JERV011		JERV012		JERV014		JERV015	
						25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016	25/05/2016	24/08/2016
Compound Lab Method	LOR	Unit	Interim Criteria <sup>b</sup>			Result	Result	Result	Result	Result	Result	Result	Result
			TDI <sup>1</sup>	DWQG	RWQG								
6:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	<0.1		<0.1					
8:2 FtS EP231-PFC	0.005	µg/L	NC	NC	NC	<0.1		<0.1					
PFOA EP231-PFC	0.002	µg/L	<b>1.5</b>	5	50	<0.02		<0.02					
PFOS EP231-PFC	0.002	µg/L											
PFHxS EP231-PFC	0.002	µg/L	<b>0.15</b>	0.5	5	<0.04		<0.04					
6:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC					<0.01		<0.01	
8:2 FtS EP231-PFC-LL	0.005	µg/L	NC	NC	NC					<0.01		<0.01	
PFOA EP231-PFC-LL	0.002	µg/L	<b>1.5</b>	5	50					<0.002		<0.002	
PFOS EP231-PFC-LL	0.002	µg/L											
PFHxS EP231-PFC	0.002	µg/L	<b>0.15</b>	0.5	5					<0.004		<0.004	

**Legend**

Groundwater sample

NC – no criteria established

**TDI <sup>1</sup>** – cannot be applied without additional studies

**Bold** – contaminant detected below criterion where established

**0.18** – exceeds interim Drinking Water Quality Guideline criteria

**1.22** – exceeds interim Drinking Water Quality Guideline criteria and exceeds interim Recreational Water Quality Guideline criteria

**TDI <sup>1</sup>** – Interim Tolerable Daily Intake (µg/kg/d)

**DWQG** – Interim Drinking Water Quality Guideline criteria

**RWQG** – Interim Recreational Water Quality Guideline criteria

**6:2 FtS** – 6:2 Fluorotelomer sulfonate

**8:2 FtS** – 8:2 Fluorotelomer sulfonate

**PFHxS** – Perfluorohexane sulphonate

**PFOA** – Perfluorooctanoic acid

**PFOS** – Perfluorooctane sulfonic acid

**b** – Interim criteria taken from *enHealth Statement: Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*, Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, June 2016





## Discussion of Results

In accordance with the recommendations of the EPA's "Report On Per- And Poly-Fluoro-Alkyl Substances Water Sampling and Analysis" dated 19 July 2016 the EPA undertook additional sampling and analysis of effluent, surface and ground waters of the Jervis Bay Territory for PFAS contamination on 24 August 2016.

Below is a discussion of results against the interim Defence and enHealth guidance criteria listed above.

### Notes:

*In the absence of Directive #8 Surface Water - Human health (drinking water) criterion for each PFAS compound the Groundwater – Human health (drinking water) criterion from this guidance has been applied to the relevant surface water samples.*

*The Tolerable Daily Intake criteria from the enHealth guidance could not be applied on the basis of the water sample results alone. Additional human and other studies would be required prior to the application of this criterion.*

Results were generally lower in this round of sampling compared to those from the May 2016 event with the notable exception of the Upper Mary Creek results. Please see below for site by site details.

### HMAS Creswell – (effluent and surface water samples)

Detections of PFOS and PFHxS were again recorded in each of water samples taken from the 4 HMAS Creswell sampling sites. Results showed a slight decrease in magnitude from the May 2016 sampling event for these pollutants at these sites.

All PFOS results again exceeded the Directive #8 Interim Surface water - Human health (consumption of fish) criterion of 0.00065g/L (0.65ng/L). Exceedences of the PFOS Directive #8 Interim Groundwater – Human health (drinking water) criterion were again also noted for the ERD and STP sites.

Detections of PFOA and 6:2 FtS were observed for the first time in both the ERD and STP samples during this round of sampling. Only 6:2 FtS results exceeded the Directive #8 Surface water - Human health (consumption of fish) criterion.

No exceedences of the enHealth Interim guidance were noted for either PFOA and 6:2 FtS pollutants.

PFOS/PFHxS were again detected above the laboratory limit of reporting but below all relevant enHealth criteria in the Flat Rock Creek sample.

Exceedences of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion were again recorded for the ERD, STP and Spring Water sites.



**RAN School of Ship Survivability and Safety – (surface water samples)**

The results for samples taken from the Upper and Lower Mary Creek sites were again below the laboratory limit of reporting for the 6:2 FtS and 8:2 FtS pollutants.

PFOA was detected above the laboratory limit of reporting but below criteria at both the Upper and Lower Mary Creek sites during this round of sampling. The Upper Mary Creek PFOA result, however, exhibiting nearly an order of magnitude increase since the May sampling event.

PFHxS was again detected above the laboratory limit of reporting in all of the Upper and Lower Mary Creek samples.

An exceedence of the PFOS Directive #8 Surface water - Human health (consumption of fish) **and** Groundwater – Human health (drinking water) criteria was again identified in the Lower Mary Creek sample. The August 2016 result showing a slight decrease in magnitude compared to the May 2016 result.

An exceedence of PFOS Directive #8 Surface water - Human health (consumption of fish) **and** Groundwater – Human health (drinking water) **and** Surface Water - Recreational use criteria was again identified in the Upper Mary Creek sample in August 2016. The Upper Mary Creek PFOS result showing nearly a 50% increase compared to the May 2016 sampling event result.

An exceedence of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion was again recorded for the Lower Mary Creek sample. The August 2016 result showing a slight decrease in magnitude compared to the May 2016 result for this pollutant combination.

An exceedence of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion **and** Interim Recreational Water Quality Guideline criterion was again also recorded for the Upper Mary Creek sample. This result was approximately a 10% increase from the May 2016 result.

**Leases – (groundwater samples)**

All results from the 4 lease sites continued to be below the laboratory limit of reporting and below the adopted Directive #8 groundwater criteria and enHealth criteria for all PFAS compounds analysed. Surface water criteria were not applied to these samples.

## Recommendations

- Investigations into the use of the impacted water bodies should be undertaken. Where the potential for human contact is identified restrictions to water access should be implemented until further information on potential human health risks becomes available.
- Further water sampling and analysis of PFAS pollutants should be undertaken on a biannual basis at the HMAS Creswell and Upper and Lower Mary Creek sites to better understand the temporal impacts of these pollutants. Sampling can be discontinued at the Lease sites;
- On the basis of the May and August 2016 results discussions should be held with the Commonwealth Department of Defence on the need for wider PFAS assessment of water, soil and sediment within HMAS Creswell, the RAN School of Ship Survivability and Safety and adjacent areas.
- A human health risk assessment (HHRA) into the impacts from PFAS pollutants should be considered in the identified areas of impact with an initial focus on the Lower Mary Creek area due to the potentially complete exposure pathways at this site;
- The findings of these and all future assessment works (including the HHRA) and including any remedial works should be independently audited by an EPA approved contaminated land auditor;
- Advice should be sought from the Commonwealth Departments of Defence, Health and the Environment on the potential impact on human health and the environment from the identified PFAS contamination;
- Following discussions and advice from with the Commonwealth Departments listed above DIRD should engage with local stakeholders.

Should you or your staff wish to discuss the technical aspects of the above findings please feel free to contact me on 02 6207 2151 or at [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au). For all other correspondence in relation ACT Government involvement in PFAS issues in the JBT please contact Mr Geoffrey Rutledge on 02 6207 8884 or [Geoffrey.Rutledge@act.gov.au](mailto:Geoffrey.Rutledge@act.gov.au).

Yours sincerely

Mark Heckenberg  
 Manager, Contaminated Sites  
 Construction, Environment and Workplace Protection  
 Access Canberra

8 September 2016

Attachments – ALS Certificate of Analysis dated 02 September 2016





**CERTIFICATE OF ANALYSIS**

**Work Order** : CA1604706  
**Client** : Access Canberra  
**Contact** : [REDACTED]  
**Address** : 16 Challis Street  
 Dickson ACT 2602  
**Telephone** : 02 6207 5490  
**Project** : Jervis Bay  
**Order number** : ---  
**C-O-C number** : ---  
**Sampler** : [REDACTED]  
**Site** : ---  
**Quote number** : ---  
**No. of samples received** : 10  
**No. of samples analysed** : 10

**Page** : 1 of 10  
**Laboratory** : ALS Water Resources Group  
**Contact** : Client Services  
**Address** : 16B Lithgow Street Fyshwick ACT Australia 2609  
**Telephone** : +61 2 6202 5404  
**Date Samples Received** : 24-Aug-2016 13:23  
**Date Analysis Commenced** : 25-Aug-2016  
**Issue Date** : 02-Sep-2016 12:08



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

**Signatories**

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	Laboratory Technician	Inorganics, Fyshwick, ACT
[REDACTED]	Chemistry Teamleader	Inorganics, Fyshwick, ACT
[REDACTED]	Microbiology Teamleader	Microbiology / Biology, Fyshwick, ACT
[REDACTED]	Laboratory Manager	ALS Environmental, Fyshwick, ACT
[REDACTED]	Laboratory Technician	Inorganics, Fyshwick, ACT
[REDACTED]	Sample Admission Officer	Administration, Fyshwick, ACT
[REDACTED]	Sample Admission Officer	ALS Environmental, Fyshwick, ACT





Page : 2 of 10  
Work Order : CA1604706  
Client : Access Canberra  
Project : Jervis Bay

### **General Comments**

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- **For samples collected by ALS WRG, sampling was carried out in accordance with Procedure EN67**
- EP071 Performed at ALS Sydney
- EP075 (SIM) Performed at ALS Sydney
- EP080 Performed at ALS Sydney
- EP213X-LL Performed at ALS Sydney



Page : 3 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek	JERV006 HMAS Creswell STP
Client sampling date / time				[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	
Compound	CAS Number	LOR	Unit	CA1604706-001	CA1604706-002	CA1604706-003	CA1604706-004	CA1604706-005	
				Result	Result	Result	Result	Result	
<b>EA005: pH</b>									
pH	---	0.01	pH Unit	7.55	5.13	6.55	6.63	6.69	
<b>EA010: Conductivity</b>									
Electrical Conductivity @ 25°C	---	2	µS/cm	---	---	---	---	---	
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids	---	10	mg/L	190	141	165	5860	324	
<b>EA025: Suspended Solids</b>									
Suspended Solids (SS)	---	2	mg/L	8	---	---	---	2	
<b>EK055: Ammonia as N</b>									
Ammonia as N	7664-41-7	0.1	mg/L N	0.2	---	---	<0.1	6.0	
<b>EK059: Nitrite plus Nitrate as N (NOx)</b>									
Nitrite + Nitrate as N	---	0.05	mg/L N	6.11	---	---	---	15.1	
<b>EK067: Total Phosphorus as P</b>									
Total Phosphorus as P	---	0.01	mg/L P	2.06	---	---	<0.01	3.28	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon (as NPOC)	---	1	mg/L	11	11	8	9	11	
<b>EP020: Oil and Grease (O&amp;G)</b>									
Oil and Grease	---	1	mg/L	<1	---	---	---	<1	
<b>EP030: Biochemical Oxygen Demand (BOD)</b>									
Biochemical Oxygen Demand	---	2	mg/L	3	---	---	<2	<2	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1	µg/L	---	<1.0	<1.0	---	---	
Acenaphthylene	208-96-8	1	µg/L	---	<1.0	<1.0	---	---	
Acenaphthene	83-32-9	1	µg/L	---	<1.0	<1.0	---	---	
Fluorene	86-73-7	1	µg/L	---	<1.0	<1.0	---	---	
Phenanthrene	85-01-8	1	µg/L	---	<1.0	<1.0	---	---	
Anthracene	120-12-7	1	µg/L	---	<1.0	<1.0	---	---	
Fluoranthene	206-44-0	1	µg/L	---	<1.0	<1.0	---	---	
Pyrene	129-00-0	1	µg/L	---	<1.0	<1.0	---	---	
Benz(a)anthracene	56-55-3	1	µg/L	---	<1.0	<1.0	---	---	
Chrysene	218-01-9	1	µg/L	---	<1.0	<1.0	---	---	
Benzo(b)fluoranthene	205-99-2	1	µg/L	---	<1.0	<1.0	---	---	
Benzo(k)fluoranthene	207-08-9	1	µg/L	---	<1.0	<1.0	---	---	





Page : 4 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek	JERV006 HMAS Creswell STP
Client sampling date / time				[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]
Compound	CAS Number	LOR	Unit	CA1604706-001	CA1604706-002	CA1604706-003	CA1604706-004	CA1604706-005
				Result	Result	Result	Result	Result
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>								
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	----	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L	----	<1.0	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1	µg/L	----	<1.0	<1.0	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	<0.5	<0.5	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	----	20	µg/L	----	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	----	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	----	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	----	<50	<50	----	----
C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	<50	----	----
<b>EP080: BTEXN</b>								
Benzene	71-43-2	1	µg/L	----	<1	<1	----	----
Toluene	108-88-3	2	µg/L	----	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	----	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	<2	<2	----	----
Total Xylenes	1330-20-7	2	µg/L	----	<2	<2	----	----
Sum of BTEX	----	1	µg/L	----	<1	<1	----	----
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L	0.022	0.038	0.240	<0.010	0.022
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L	0.029	0.067	0.303	<0.010	0.031
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L	0.374	0.793	3.80	0.048	0.359
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L	0.018	0.045	0.192	<0.010	0.017
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	0.370	0.971	3.41	0.052	0.338
Perfluorodecane sulfonic acid (PFDS)	67906-42-7	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>								
Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01





Page : 5 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek	JERV006 HMAS Creswell STP
Client sampling date / time				[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]
Compound	CAS Number	LOR	Unit	CA1604706-001	CA1604706-002	CA1604706-003	CA1604706-004	CA1604706-005
				Result	Result	Result	Result	Result
<b>EP231B: Perfluoroalkyl Carboxylic Acids - Continued</b>								
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L	<0.010	<0.010	0.011	<0.010	<0.010
Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L	0.046	0.081	0.232	<0.010	0.045
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L	<0.010	<0.010	0.023	<0.010	<0.010
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	0.018	0.027	0.206	<0.010	0.015
Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.025	<0.025	<0.025	<0.025	<0.025
<b>EP231C: Perfluoroalkyl Sulfonamides</b>								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.025	<0.025	<0.025	<0.025	<0.025
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.025	<0.025	<0.025	<0.025	<0.025
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.005	µg/L	<0.025	<0.025	<0.025	<0.025	<0.025
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.025	<0.025	<0.025	<0.025	<0.025
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010



Page : 6 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				JERV002 Effluent Retention Dam	JERV003 Lower Mary's Creek	JERV004 Upper Mary's Creek	JERV005 Flat Rock Creek	JERV006 HMAS Creswell STP
Client sampling date / time				[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]
Compound	CAS Number	LOR	Unit	CA1604706-001	CA1604706-002	CA1604706-003	CA1604706-004	CA1604706-005
				Result	Result	Result	Result	Result
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued</b>								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	0.028	<0.010	<0.010	<0.010	0.055
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.010	<0.010	<0.010	<0.010	<0.010
<b>EP231P: PFAS Sums</b>								
Sum of PFAS	----	0.002	µg/L	0.916	2.03	8.42	0.113	0.893
Sum of PFAS (Swedish Water Quality Guideline plus 8:2-FTS)	----	0.002	µg/L	N/A	N/A	N/A	N/A	N/A
<b>MW006: Faecal coliforms &amp; E. coli by MF</b>								
Thermotolerant Faecal Coliforms (Presumptive)	----	1	CFU/100mL	4	----	----	----	28
Thermotolerant Faecal Coliforms (Confirmed)	----	1	CFU/100mL	4	----	----	----	28
E. coli (Confirmed)	----	1	CFU/100mL	4	----	----	----	28
<b>MW013: Faecal Streptococci</b>								
Faecal Streptococci (Presumptive)	----	1	CFU/100mL	----	----	----	----	----
Faecal Streptococci (Confirmed)	----	1	CFU/100mL	----	----	----	----	----





Page : 7 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				JERV009 Springwater	JERV011 Christians Minde	JERV012 Kulindi	JERV014 RBTU	JERV015 Bay of Plenty
Client sampling date / time				[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]
Compound	CAS Number	LOR	Unit	CA1604706-006	CA1604706-007	CA1604706-008	CA1604706-009	CA1604706-010
				Result	Result	Result	Result	Result
<b>EA005: pH</b>								
pH	---	0.01	pH Unit	5.41	---	---	7.83	7.93
<b>EA010: Conductivity</b>								
Electrical Conductivity @ 25°C	---	2	µS/cm	---	---	---	9660	2650
<b>EA015: Total Dissolved Solids</b>								
Total Dissolved Solids	---	10	mg/L	159	---	---	6050	1550
<b>EA025: Suspended Solids</b>								
Suspended Solids (SS)	---	2	mg/L	---	---	---	---	---
<b>EK055: Ammonia as N</b>								
Ammonia as N	7664-41-7	0.1	mg/L N	<0.1	---	---	---	---
<b>EK059: Nitrite plus Nitrate as N (NOx)</b>								
Nitrite + Nitrate as N	---	0.05	mg/L N	0.44	---	---	1.99	1.02
<b>EK067: Total Phosphorus as P</b>								
Total Phosphorus as P	---	0.01	mg/L P	<0.01	---	---	0.42	0.09
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon (as NPOC)	---	1	mg/L	3	---	---	5	6
<b>EP020: Oil and Grease (O&amp;G)</b>								
Oil and Grease	---	1	mg/L	---	---	---	---	---
<b>EP030: Biochemical Oxygen Demand (BOD)</b>								
Biochemical Oxygen Demand	---	2	mg/L	---	---	---	<2	<2
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>								
Naphthalene	91-20-3	1	µg/L	---	---	---	---	---
Acenaphthylene	208-96-8	1	µg/L	---	---	---	---	---
Acenaphthene	83-32-9	1	µg/L	---	---	---	---	---
Fluorene	86-73-7	1	µg/L	---	---	---	---	---
Phenanthrene	85-01-8	1	µg/L	---	---	---	---	---
Anthracene	120-12-7	1	µg/L	---	---	---	---	---
Fluoranthene	206-44-0	1	µg/L	---	---	---	---	---
Pyrene	129-00-0	1	µg/L	---	---	---	---	---
Benz(a)anthracene	56-55-3	1	µg/L	---	---	---	---	---
Chrysene	218-01-9	1	µg/L	---	---	---	---	---
Benzo(b)fluoranthene	205-99-2	1	µg/L	---	---	---	---	---
Benzo(k)fluoranthene	207-08-9	1	µg/L	---	---	---	---	---
Benzo(a)pyrene	50-32-8	0.5	µg/L	---	---	---	---	---











Page : 10 of 10  
 Work Order : CA1604706  
 Client : Access Canberra  
 Project : Jervis Bay

### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	JERV009 Springwater	JERV011 Christians Minde	JERV012 Kulindi	JERV014 RBTU	JERV015 Bay of Plenty
Client sampling date / time					[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]	[24-Aug-2016]
Compound	CAS Number	LOR	Unit		CA1604706-006	CA1604706-007	CA1604706-008	CA1604706-009	CA1604706-010
					Result	Result	Result	Result	Result
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued</b>									
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L		<0.010	<0.010	<0.010	<0.010	<0.010
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L		<0.010	<0.010	<0.010	<0.010	<0.010
<b>EP231P: PFAS Sums</b>									
Sum of PFAS	----	0.002	µg/L		0.623	<0.010	<0.010	<0.010	<0.010
Sum of PFAS (Swedish Water Quality Guideline plus 8:2-FTS)	----	0.002	µg/L		N/A	N/A	N/A	N/A	N/A
<b>MW006: Faecal coliforms &amp; E. coli by MF</b>									
Thermotolerant Faecal Coliforms (Presumptive)	----	1	CFU/100mL		<1	----	----	----	----
Thermotolerant Faecal Coliforms (Confirmed)	----	1	CFU/100mL		<1	----	----	----	----
E. coli (Confirmed)	----	1	CFU/100mL		<1	----	----	----	----
<b>MW013: Faecal Streptococci</b>									
Faecal Streptococci (Presumptive)	----	1	CFU/100mL		----	----	----	<1	<1
Faecal Streptococci (Confirmed)	----	1	CFU/100mL		----	----	----	<1	<1



**White, Sarah-Jane (Health)**

---

**From:** Pengilley, Andrew (Health)  
**Sent:** Tuesday, 4 October 2016 4:28 PM  
**To:** Kelly, Paul (Health)  
**Subject:** FW: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]  
**Attachments:** Kelly PFOS.PPTX

**Importance:** High

I knew I sent him something. The slides contain the results.

A

---

**From:** Pengilley, Andrew (Health)  
**Sent:** Wednesday, 18 May 2016 4:37 PM  
**To:** Clapham, David  
**Subject:** RE: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]  
**Importance:** High

Hi David,

Couldn't find PK, but I think the slides should be OK to send down. The water testing results are on slides 2 and 3. I am sure Paul will be happy to discuss in more detail tomorrow.

Thanks  
 Andrew

---

**From:** Clapham, David  
**Sent:** Wednesday, 18 May 2016 4:22 PM  
**To:** Pengilley, Andrew (Health)  
**Subject:** FW: PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]

Dear Andrew

I understand Emm is not at work today – please see the email below from [REDACTED], DIRD. He is after two things:

- The slides for tomorrow's presentation and
- Detail on the results of the testing.

Are you please able to assist or direct me?

Thanks

David

**David Clapham** | Senior Policy Officer - Intergovernmental Relations | **Policy & Cabinet Division**  
 ☎ 02 6205 7261 | **Chief Minister, Treasury & Economic Development Directorate** | ACT Government  
 Level 4, Canberra Nara Centre | GPO Box 158 Canberra ACT 2601 | [www.act.gov.au](http://www.act.gov.au)



---

**From:** [REDACTED] [REDACTED] [REDACTED]@infrastructure.gov.au]  
**Sent:** Wednesday, 18 May 2016 3:33 PM  
**To:** Dale, Emm (Health)  
**Cc:** Clapham, David; KLAFER Sheryl  
**Subject:** PFC slides for meeting tomorrow [SEC=UNCLASSIFIED]

Hi Emm

Will we be receiving the slides to be used at tomorrow's meeting today? The General Manager is keen to see the test results prior to the meeting, and he is departing at 9am tomorrow.

Cheers

[REDACTED]

[REDACTED]  
[REDACTED]

Jervis Bay Territory Administration  
Local Government, Mainland Territories & RDA Branch  
Local Government and Territories Division  
Department of Infrastructure & Regional Development  
**02 6274 7874**  
62 Northbourne Avenue | GPO Box 594 | Canberra ACT 2601  
[REDACTED] [REDACTED]@infrastructure.gov.au

---

Disclaimer

This message has been issued by the Department of Infrastructure and Regional Development.  
The information transmitted is for the use of the intended recipient only and may contain confidential and/or legally privileged material.

Any review, re-transmission, disclosure, dissemination or other use of, or taking of any action in reliance upon, this information by persons

or entities other than the intended recipient is prohibited and may result in severe penalties.

If you have received this e-mail in error, please notify the Department on (02) 6274-7111 and delete all copies of this transmission together with any attachments.

---



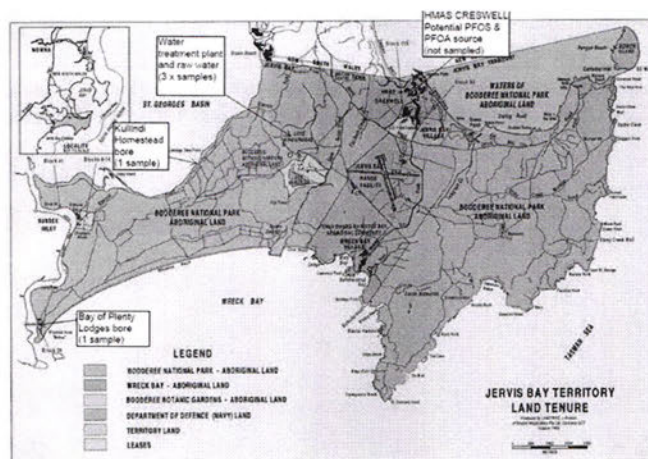
# Perfluorinated Chemicals

Dr Paul Kelly  
ACT Chief Health Officer

## Summary of health effects

- PFOS and PFOA are organic chemicals widely used since the 1950s in carpets, low-stick coatings, packaging and foams.
- These chemicals break down slowly in the environment and have been distributed worldwide in water, air, dust and manufactured products.
- Most Australians have some levels of PFOS and PFOA in their bodies, mostly ingested in food. This is the situation in other industrialised countries.
- The amount of PFOS and PFOA in people's tissues can be higher in those exposed through workplaces or where there localised contamination of soil or water.
- There is no consistent evidence linking PFOS or PFOA to health problems.
- Because PFOS and PFOA are found in most people, and there is no link between blood levels of these chemicals and particular diseases, testing for levels of PFOA does not predict the risk of an individual developing health problems.
- ACT Health has conducted sampling of water around Jervis Bay in March this year to determine if there is significant contamination of drinking water.

## Water sampling March 2016 (5 samples)



## Results of water sampling March 2016

### Analytical Results

Sub-Matrix: WATER  
(Matrix: WATER)

Client sample ID

Compound	CAS Number	LDR	Unit	1	2	3	4	5
				Client sampling date / time	Client sampling date / time	Client sampling date / time	Client sampling date / time	Client sampling date / time
				Lake Windermere	Jervis Bay Outflow	Jervis Bay Water Treatment Inflow	Main	Bay of Plenty
				22-Mar-2016 09:35	22-Mar-2016 09:05	22-Mar-2016 09:00	21-Mar-2016 14:50	21-Mar-2016 14:00
				CA1602496-001	CA1602496-002	CA1602496-003	CA1602496-004	CA1602496-005
				Result	Result	Result	Result	Result
<b>EP231: Perfluorinated Compounds</b>								
PFOS	1763-23-1	0.02	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
PFOA	335-07-1	0.02	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 Fluorotelomer sulfonate (S-2 FS)	27919-07-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
8:2 Fluorotelomer sulfonate	38108-34-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

**White, Sarah-Jane (Health)**

---

**From:** Kelly, Paul (Health)  
**Sent:** Tuesday, 4 October 2016 4:56 PM  
**To:** Pengilley, Andrew (Health)  
**Subject:** FW: Next steps for JBT PFOS [SEC=UNCLASSIFIED]  
**Attachments:** PFAS\_Results\_Report\_Final\_27Sept2016.pdf; PFAS\_Results\_Report\_Final\_27Sept2016\_Cover\_Letter.pdf

Andrew, please check the below and comment/amend as you think appropriate.:

**Issues for the email to Geoffrey Rutledge**


1. ACT EPA has now finalised the report on PFAS in JBT.
  2. Repeat testing has confirmed the presence of PFAS in Mary Creek, which are above the recommended levels for drinking water according to the enHealth interim national guidance document. For upper Mary Creek, the level also exceeds the recreational water guideline.
  3. ACT Health advice is that the following series of tasks should be coordinated by the authority responsible for the administration of the Jervis Bay Territory:
    - i. these results need to be urgently, transparently and carefully communicated to the community
    - ii. Mary Creek should be closed to human use as a precautionary measure until
    - iii. a detailed human health risk assessment (HHRA) be conducted to assess the nature, frequency and intensity of use of Mary Creek by Wreck Bay community members. This should particularly, but not exclusively, consider the use of the Creek by children
    - iv. The HHRA should be organised and paid for by Defence, preferably by an independent body
    - v. whilst it would be useful to refer to a similar assessment already commissioned by Department of Defence in Williamstown, this cannot substitute for a detailed HHRA specifically performed in JBT.
    - v. the HHRA report should be provided to ACT EPA and Health prior to results being made public, with a reasonable timeframe to allow us to assess the findings and assist in formulating an appropriate risk communications strategy
- DIRD should be responsible for the contact with the Wreck Bay council throughout, with ACT Government officials (health and EPA) providing technical advice where requested, on the usual cost-recovery basis.

**Dr Paul Kelly**

ACT Chief Health Officer & Deputy Director-General |

Population Health | ACT Health Directorate

PH 02 6205 2108 | E [paul.kelly@act.gov.au](mailto:paul.kelly@act.gov.au)

 Paul Kelly - ACT CHO (@PKelly\_ACTCHO) on Twitter

<http://www.health.act.gov.au/healthy-living/population-health>



**ACT**  
Government  
Health




---

**From:** Heckenberg, Mark

**Sent:** Thursday, 29 September 2016 9:32 AM

**To:** Rutledge, Geoffrey; Kelly, Paul (Health)

**Cc:** Clapham, David; ACT IGR; Pengilley, Andrew (Health); Harper, Emily (Health); Jones, Greg; Power, David

**Subject:** RE: Next steps for JBT PFOS [SEC=UNCLASSIFIED]



Good morning All,

Please find attached a copy of the EPA's finalised report and cover letter for your records. The report was forwarded to DIRD on Tuesday this week.

Regards

Mark Heckenberg | Manager, Contaminated Sites | Environmental Quality

Phone: 02 6207 2151 | Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Construction, Environment and Workplace Protection | Access Canberra | ACT Government

GPO Box 158 Canberra ACT 2601 | <http://www.act.gov.au/accesscbr>

---

**From:** Rutledge, Geoffrey

**Sent:** Thursday, 29 September 2016 8:58 AM

**To:** Kelly, Paul (Health) <[Paul.Kelly@act.gov.au](mailto:Paul.Kelly@act.gov.au)>

**Cc:** Clapham, David <[David.Clapham@act.gov.au](mailto:David.Clapham@act.gov.au)>; ACT IGR <[CMDACTIGR@act.gov.au](mailto:CMDACTIGR@act.gov.au)>; Heckenberg, Mark <[Mark.Heckenberg@act.gov.au](mailto:Mark.Heckenberg@act.gov.au)>; Pengilley, Andrew (Health) <[Andrew.Pengilley@act.gov.au](mailto:Andrew.Pengilley@act.gov.au)>; Harper, Emily (Health) <[Emily.Harper@act.gov.au](mailto:Emily.Harper@act.gov.au)>

**Subject:** RE: Next steps for JBT PFOS

Paul,

On Thursday 22 September, DIRD, Defence, [REDACTED] from Cwllth Health PFAS Coordination Unit and I met to receive an update on JBT.

Defence informed us that

- JBT was on the list for the roll out of community engagement and detailed human health assessment and said they were looking for this to start in October 2016.
- And for the approach to be similar to that in the other sites.

DIRD had asked us to finalise our EPA results and health advice.

EPA has finalised their report (attached and transmittal email below) but contain no recommendations for further action.

Can I ask that you provide a short minute of recommendations (possibly a cut and paste from you minute to HoS) that we can provide to DIRD.

[REDACTED] (6289 1961) said that you could contact her if you wanted to discuss the matter or for further details.

Regards

Geoffrey Rutledge | Deputy Director-General, Policy and Cabinet

Phone: +61 2 6207 8884 | Mobile: [REDACTED]

Chief Minister, Treasury and Economic Development Directorate | ACT Government

GPO Box 158 Canberra 2601 | [www.act.gov.au](http://www.act.gov.au)

**From:** Heckenberg, Mark

**Sent:** Thursday, 22 September 2016 3:26 PM

**To:** [REDACTED]@infrastructure.gov.au

**Cc:** Power, David <DAVID.POWER@act.gov.au>; Clapham, David <David.Clapham@act.gov.au>; [REDACTED] [REDACTED]@infrastructure.gov.au; Rutledge, Geoffrey <Geoffrey.Rutledge@act.gov.au>

**Subject:** RE: JBT PFAS Contamination [SEC=UNCLASSIFIED]

Dear Mr [REDACTED]

Following discussions between [REDACTED] and David Power earlier this week please find attached a copy of the EPA's final draft report and covering letter for your information.

The report and cover letter is with the EPA for their consideration prior to it being finalised and signed.

Regards

Mark Heckenberg | Manager, Contaminated Sites | Environmental Quality

Phone: 02 6207 2151 | Email: [mark.heckenberg@act.gov.au](mailto:mark.heckenberg@act.gov.au)

Construction, Environment and Workplace Protection | Access Canberra | ACT Government

GPO Box 158 Canberra ACT 2601 | <http://www.act.gov.au/accesscbr>

**From:** Rutledge, Geoffrey

**Sent:** Wednesday, 14 September 2016 3:51 PM

**To:** Kelly, Paul (Health) <Paul.Kelly@act.gov.au>; Pengilley, Andrew (Health) <Andrew.Pengilley@act.gov.au>; Heckenberg, Mark <Mark.Heckenberg@act.gov.au>

**Cc:** Clapham, David <David.Clapham@act.gov.au>; ACT IGR <CMDACTIGR@act.gov.au>

**Subject:** Next steps for JBT PFOS

Dear Paul and Mark

Following a conversation this morning with [REDACTED] [REDACTED] responsible for Territories in the Department of Infrastructure and Regional Development (DIRD), there are several next steps on JBT PFC that will require EPA and Health input and agreement.

#### EPA report

[REDACTED] [REDACTED] provided comments on the draft EPA report of 8 September. [REDACTED] will forward written comments, but the substantial feedback was as follows:

- DIRD will shortly forward Defence reports on PFC contamination in Oakey and Williamtown, and requested that analysis and advice in the report be made with consideration of these reports, particularly in regard to level of contamination and response in these comparison sites.
- To aid clear understanding and given the recent release of the Review of enHealth's interim reference values for PFAS, can the analysis in the report reflect the results of this review, and present results only against the enHealth guidelines (not Defence Contamination Directive #8).
- It would be useful if the recommendations that close the report were numbered with regard to priority – both by importance and sequencing, including timeframes.

DIRD discussed making the final report public – I'd appreciate your views on whether the full report is appropriate for release (as is DIRD's preference), whether any changes are required or whether a "public version" should be drafted.

#### Formal ACT advice

Further to the request regarding recommendations, and following conversations between the Head of Service and Secretary of DIRD, DIRD is seeking formal advice from CHO as ACT expert on this issue, consistent with recommendations in the final EPA report, on the response to PFC in JBT and recommended actions. Given that the EPA report makes recommendations with regard to human health, and the seeming difference between the sequence of actions in the report and the CHO's recent minute to Head of Service, can I request formal advice, agreed by EPA and Health and consistent with the final EPA report that can be provided to DIRD, consisting of recommendations and prioritised actions.

Happy to meet in person or by phone Thursday or Friday to discuss. Mr [REDACTED] has undertaken to arrange a meeting with ACT, Defence and Infrastructure next week to consider the ACT advice and agree steps regarding the commissioning of a Human Health Impact Assessment and communications with the JBT community. A final report and formal advice for discussion at this meeting would be ideal.

Geoffrey Rutledge | Deputy Director-General, Policy and Cabinet

Phone: +61 2 6207 8884 | Mobile: [REDACTED]

Chief Minister, Treasury and Economic Development Directorate | ACT Government

GPO Box 158 Canberra 2601 | [www.act.gov.au](http://www.act.gov.au)



**ACT**

Government

Chief Minister, Treasury and  
Economic Development

## REPORT ON PER- AND POLY-FLUORO-ALKYL SUBSTANCES WATER SAMPLE ANALYSIS – JERVIS BAY TERRITORY AUGUST 2016

### Sampling Locations

Sampling was undertaken at the following 10 locations (see map below for details):

#### **HMAS Creswell** – (effluent and surface water samples)

1. Sewage Treatment Plant – treated effluent
2. Effluent Retention Dam – stored treated effluent
3. Spring water – surface water from natural spring adjacent to Effluent Retention Dam
4. Flat Rock Creek – tidal receiving waters adjacent to the HMAS Creswell Golf Course walk bridge.

#### **RAN School of Ship Survivability and Safety** – (surface water samples)

5. Upper Mary Creek – downstream of fire training facilities
6. Lower Mary Creek – off-site location adjacent to Boorarla Road crossing

#### **Leases** – (groundwater samples)

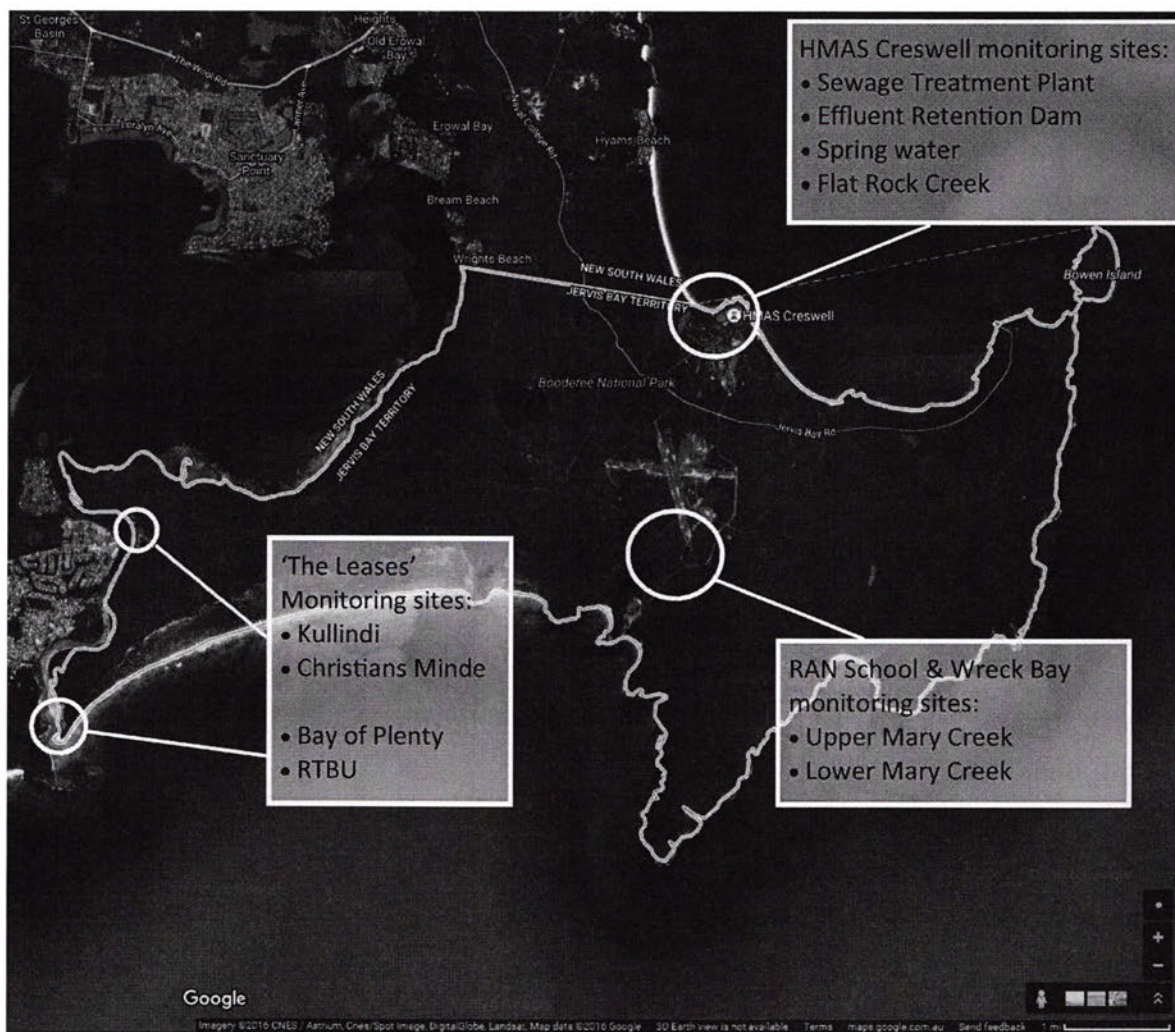
7. Christians Minde
8. Kullindi
9. RTBU
10. Bay of Plenty Cottages



**ACT**  
Government

Chief Minister, Treasury and  
Economic Development

### Map of Sampling Locations:



**General layout of monitoring sites**

Map source:

Goggle Maps. (2016). Jervis Bay Village. Retrieved from:

<https://www.google.com/maps/place/Jervis+Bay+JBT,+Australia/@-35.1351665,150.5604384,32906m/data=!3m1!1e3!4m5!3m4!1s0x6b148c164f92a489:0x41d0c9d6f170d0f2!8m2!3d-35.149092!4d150.6961154>

**ACT**  
GovernmentChief Minister, Treasury and  
Economic Development

## Methodology

Due to the potentially ubiquitous and persistent nature of per- and poly-fluoroalkyl substances (PFAS) pollutants sampling was again undertaken at all EPA sampling locations within the Jervis Bay Territory (JBT).

The following suite of PFAS pollutants were analysed and reported:

Perfluorohexane sulphonate (PFHxS)  
Perfluorooctanoic acid (PFOA)  
Perfluorooctane sulfonic acid (PFOS)

All samples were taken in accordance with ALS (Analytical testing laboratory) sampling requirements by an EPA Environment Protection Officer.

ALS laboratory method EP231-PFC was utilised for all non-saline water samples and method EP231-PFC-LL use for all saline water samples.

In the absence of ACT EPA or nationally adopted criteria for PFAS impacts to soil and water, and at the request of the Department of Infrastructure & Regional Development (DIRD), the ACT EPA has compared the results of analysis to the following interim guidance document:

- *“enHealth Statement: Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia”*, Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, June 2016





Table of Results – enHealth Interim PFAS Criteria

Compound <i>Lab Method</i>	LOR	Unit	Interim Criteria			Effluent Retention Dam (ERD)		Lower Mary Creek		Upper Mary Creek		Flat Rock Creek		HMAS Creswell STP		Spring Water	
			TDI	DWQG	RWQG	JERV002		JERV003		JERV004		JERV005		JERV006		JERV009	
			Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	
PFOA <i>EP231-PFC</i>	0.002	µg/L	1.5	5	50	<0.02	0.018	<0.02	0.027	0.03	0.206			<0.02	0.015	<0.02	<0.010
PFOS <i>EP231-PFC</i>	0.002	µg/L	0.15	0.5	5	1.02	0.744	2.76	1.76	6.13	7.21			0.93	0.697	0.63	0.481
PFHxS <i>EP231-PFC</i>	0.002	µg/L	0.15	0.5	5												
PFOA <i>EP231-PFC-LL</i>	0.002	µg/L	1.5	5	50							<0.002	<0.010				
PFOS <i>EP231-PFC-LL</i>	0.002	µg/L	0.15	0.5	5							0.140	0.100				
PFHxS <i>EP231-PFC</i>	0.002	µg/L	0.15	0.5	5												

Legend

Effluent based water sample  
Surface water sample

NC – no criteria established

**TDI** – cannot be applied without additional studies

**Bold** – contaminant detected below criterion where established

**0.18** – exceeds interim Drinking Water Quality Guideline criteria

**1.22** – exceeds interim Drinking Water Quality Guideline criteria and exceeds interim Recreational Water Quality Guideline criteria

**TDI** – Interim Tolerable Daily Intake (µg/kg/d)

**DWQG** – Interim Drinking Water Quality Guideline criteria

**RWQG** – Interim Recreational Water Quality Guideline criteria

**PFHxS** – Perfluorohexane sulphonate

**PFOA** – Perfluorooctanoic acid

**PFOS** – Perfluorooctane sulfonic acid



Table of Results – enHealth Interim PFAS Criteria

Compound Lab Method	LOR	Unit	Interim Criteria			Christians Minde		Kullindi		RTBU		Bay of Plenty	
			TDL	DWQG	RWQG	JERV011		JERV012		JERV014		JERV015	
						Result	Result	Result	Result	Result	Result	Result	Result
PFOA EP231-PFC	0.002	µg/L	<b>1.5</b>	5	50	<0.02		<0.02					
PFOS EP231-PFC	0.002	µg/L	<b>0.15</b>	0.5	5	<0.04		<0.04					
PFHxS EP231-PFC	0.002	µg/L	<b>1.5</b>	5	50					<0.002		<0.002	
PFOA EP231-PFC-LL	0.002	µg/L	<b>1.5</b>	5	50					<0.004		<0.004	
PFOS EP231-PFC-LL	0.002	µg/L	<b>0.15</b>	0.5	5					<0.004		<0.004	
PFHxS EP231-PFC	0.002	µg/L	<b>1.5</b>	5	50								

## Legend

Groundwater sample

NC – no criteria established

**TDL** – cannot be applied without additional studies**Bold** – contaminant detected below criterion where established**0.18** – exceeds interim Drinking Water Quality Guideline criteria**1.22** – exceeds interim Drinking Water Quality Guideline criteria **and**  
exceeds interim Recreational Water Quality Guideline criteria**TDL** – Interim Tolerable Daily Intake (µg/kg/d)**DWQG** – Interim Drinking Water Quality Guideline criteria**RWQG** – Interim Recreational Water Quality Guideline criteria**PFHxS** – Perfluorohexane sulphonate**PFOA** – Perfluorooctanoic acid**PFOS** – Perfluorooctane sulfonic acid

**ACT**  
GovernmentChief Minister, Treasury and  
Economic Development

### Discussion of Results

Below is a discussion of results against the interim enHealth guidance criteria listed above.

**Notes:**

*The Tolerable Daily Intake criteria from the enHealth guidance could not be applied on the basis of the water sample results alone. Additional human and other studies would be required prior to the application of this criterion.*

Results were generally lower in this round of sampling compared to those from the May 2016 event with the notable exception of the Upper Mary Creek results. Please see below for site by site details.

**HMAS Creswell** – (effluent and surface water samples)

PFOA was detected above the laboratory limit of reporting at the ERD and STP sites, however, all results were below the enHealth Interim guidance criteria for this pollutant.

Detections of PFOS/PFHxS were again recorded in each of the water samples taken from the 4 HMAS Creswell sampling sites. Results showed a slight decrease in magnitude when compared to the May 2016 analysis results for these pollutants.

PFOS/PFHxS levels were detected above the laboratory limit of reporting but below all relevant enHealth criteria in the Flat Rock Creek sample.

Exceedences of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion were again recorded for the ERD, STP and Spring Water sites.



**RAN School of Ship Survivability and Safety** – (surface water samples)

PFOA was detected above the laboratory limit of reporting but below enHealth criteria at both the Upper and Lower Mary Creek sites during this round of sampling. The Upper Mary Creek PFOA result exhibited nearly an order of magnitude increase when compared to the May 2016 analysis results.

An exceedence of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion was again recorded at the Lower Mary Creek sample. The August 2016 result showing a slight decrease in magnitude when compared to the May 2016 result for this pollutant combination.

An exceedence of the enHealth PFOS/PFHxS Interim Drinking Water Quality Guideline criterion **and** Interim Recreational Water Quality Guideline criterion was again also recorded for the Upper Mary Creek sample. This result was approximately a 10% increase from the May 2016 result.

**Leases** – (groundwater samples)

All results from the 4 lease sites continued to be below the laboratory limit of reporting and below the adopted enHealth criteria for all PFAS compounds analysed.

Attachments – ALS Certificate of Analysis dated 02 September 2016

**ACT**  
GovernmentChief Minister, Treasury and  
Economic Development

File Ref: 10/2761

[REDACTED]  
[REDACTED]  
Jervis Bay Territory Administration  
Department of Infrastructure & Regional Development  
GPO Box 594  
Canberra ACT 2601

**RE: REPORT EPA ON PER- AND POLY-FLUORO-ALKYL SUBSTANCES WATER SAMPLING AND ANALYSIS**

Dear [REDACTED],

Please find attached the ACT Environment Protection Authority's (EPA) findings of the analysis of per- and poly-fluoro-alkyl substances in effluent, surface and groundwater samples taken in the Jervis Bay Territory on 24 August 2016.

This sampling was undertaken in accordance with your instructions and was for the purpose of verifying the results of previous sampling undertaken by the EPA on 25 May 2016.

This report consolidates the findings of the above two sampling events.

In the absence of ACT endorsed criteria for PFAS, and consistent with your request, the results of analysis have been compared to criteria from the "*enHealth Statement: Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*", Health Standing Committee (enHealth) of the Australian Health Protection Principal Committee, June 2016

Given the ACT EPA is yet to formalise its policy position on criteria for these pollutants from a contamination and water pollution perspective we have chosen not to make recommendations on the attached findings at this time. It is important to note, however, that consistent with the nationally adopted approach on assessment of potentially contaminated sites any assessment of these pollutants should be undertaken in accordance with the National Environment Protection Council, *Assessment of Site Contamination National Environment Protection Measure*, December 1999 as amended 2013.