



Memorandum

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
>C34 - C40 Fraction (F4)	88	9	<100	100	370	370
>C10 - C40 (Sum of Total)	84	30	<50	100	6170	6170
Benzene	88	0	<0.1	ND	<0.2	ND
Toluene	88	1	<0.1	0.2	<0.5	0.2
Ethylbenzene	88	0	<0.1	ND	<0.5	ND
Xylene (o)	88	0	<0.1	ND	<0.5	ND
Xylene (m & p)	88	0	<0.2	ND	<0.5	ND
Xylene Total	88	0	<0.3	ND	<0.5	ND
Benzo(a)pyrene	88	2	<0.5	0.9	3.1	3.1
Naphthalene	88	0	<0.5	ND	<0.5	ND
Benzo(a)pyrene TEQ (zero) - Lab Calc	88	2	<0.5	1.1	4	4
Phenols	48	0	<0.5	ND	<0.5	ND
Acetone	3	1	<0.5	2	2	2
Endosulfan	48	1	<0.5	0.6	0.6	0.6
Dichloromethane	3	2	<0.5	0.7	0.8	0.8
1,4 Dioxane	30	0	<0.05	ND	<0.05	ND

Table 6 Summary of Non-PFAS results - Sediments

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
Total Organic Carbon	46	46	0.08	0.08	22.9	22.9
Arsenic	46	3	<2	7	11	11
Cadmium	46	0	<0.4	ND	<1	ND
Chromium (III+VI)	46	30	<2	2	28	28
Copper	46	11	<5	5	62	62
Lead	46	20	<5	6	48	48
Mercury	46	0	<0.1	ND	<0.1	ND
Nickel	46	8	<2	3	14	14
Zinc	46	18	<5	6	284	284
C6-C10 minus BTEX (F1)	46	0	<10	ND	<20	ND
C6 - C10 Fraction	46	0	<10	ND	<20	ND
>C10-C16 minus Naphthalene (F2)	46	1	<50	150	150	150
>C10 - C16 Fraction	46	1	<50	150	150	150



Memorandum

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
>C16 - C34 Fraction (F3)	46	13	<100	110	860	860
>C34 - C40 Fraction (F4)	46	11	<100	110	900	900
>C10 - C40 (Sum of Total)	45	13	<50	190	1760	1760
Benzene	46	0	<0.1	ND	<0.5	ND
Toluene	46	0	<0.1	ND	<0.5	ND
Ethylbenzene	46	0	<0.1	ND	<0.5	ND
Xylene (o)	46	0	<0.1	ND	<0.5	ND
Xylene (m & p)	46	0	<0.2	ND	<0.5	ND
Xylene Total	46	0	<0.3	ND	<0.5	ND
Benzo(a)pyrene	46	2	<0.5	0.6	6.3	6.3
Naphthalene	46	0	<0.5	ND	<1	ND
Benzo(a)pyrene TEQ (zero) - Lab Calc	46	2	<0.5	0.8	8.8	8.8
Phenols	16	0	<0.5	ND	<0.5	ND
1,4 Dioxane	8	0	<0.05	ND	<0.05	ND

Table 7 Summary of Non-PFAS results – Surface water

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration*	Maximum Detect
Arsenic	51	8	<0.001	0.001	0.002	0.002
Cadmium	51	0	<0.0001	ND	<0.0001	ND
Chromium (III+VI)	51	11	<0.001	0.001	0.002	0.002
Copper	51	18	<0.001	0.001	0.007	0.007
Lead	51	0	<0.001	ND	<0.001	ND
Mercury	51	0	<0.0001	ND	<0.0001	ND
Nickel	51	11	<0.001	0.001	0.003	0.003
Zinc	51	35	<0.005	0.006	0.427	0.427
C6-C10 minus BTEX (F1)	54	1	<20	80	<10000	80
C6 - C10 Fraction	54	1	<20	200	<10000	200
>C10-C16 minus Naphthalene (F2)	54	1	<50	210	<50000	210
>C10 - C16 Fraction	54	1	<50	210	<50000	210
>C16 - C34 Fraction (F3)	54	1	<100	7330	<100000	7330
>C34 - C40 Fraction (F4)	54	1	<100	1280	<100000	1280
>C10 - C40 (Sum of Total)	52	1	<100	8820	<50000	8820



Memorandum

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration*	Maximum Detect
Benzene	54	0	<1	ND	<200	ND
Toluene	54	1	<1	122	<500	122
Ethylbenzene	54	0	<1	ND	<500	ND
Xylene (o)	54	0	<1	ND	<500	ND
Xylene (m & p)	54	0	<2	ND	<500	ND
Xylene Total	54	0	<2	ND	<500	ND
Benzo(a)pyrene	54	0	<0.5	ND	<500	ND
Naphthalene	54	0	<1	ND	<500	ND
Benzo(a)pyrene TEQ (zero) - Lab Calc	52	0	<0.5	ND	<500	ND
Phenols	15	1	<2	6	6	6
1,4 Dioxane	12	1	<0.5	0.9	0.9	0.9

*inter-laboratory duplicate had an elevated LOR

Do not hesitate to contact the undersigned if you have any queries.

Kind Regards

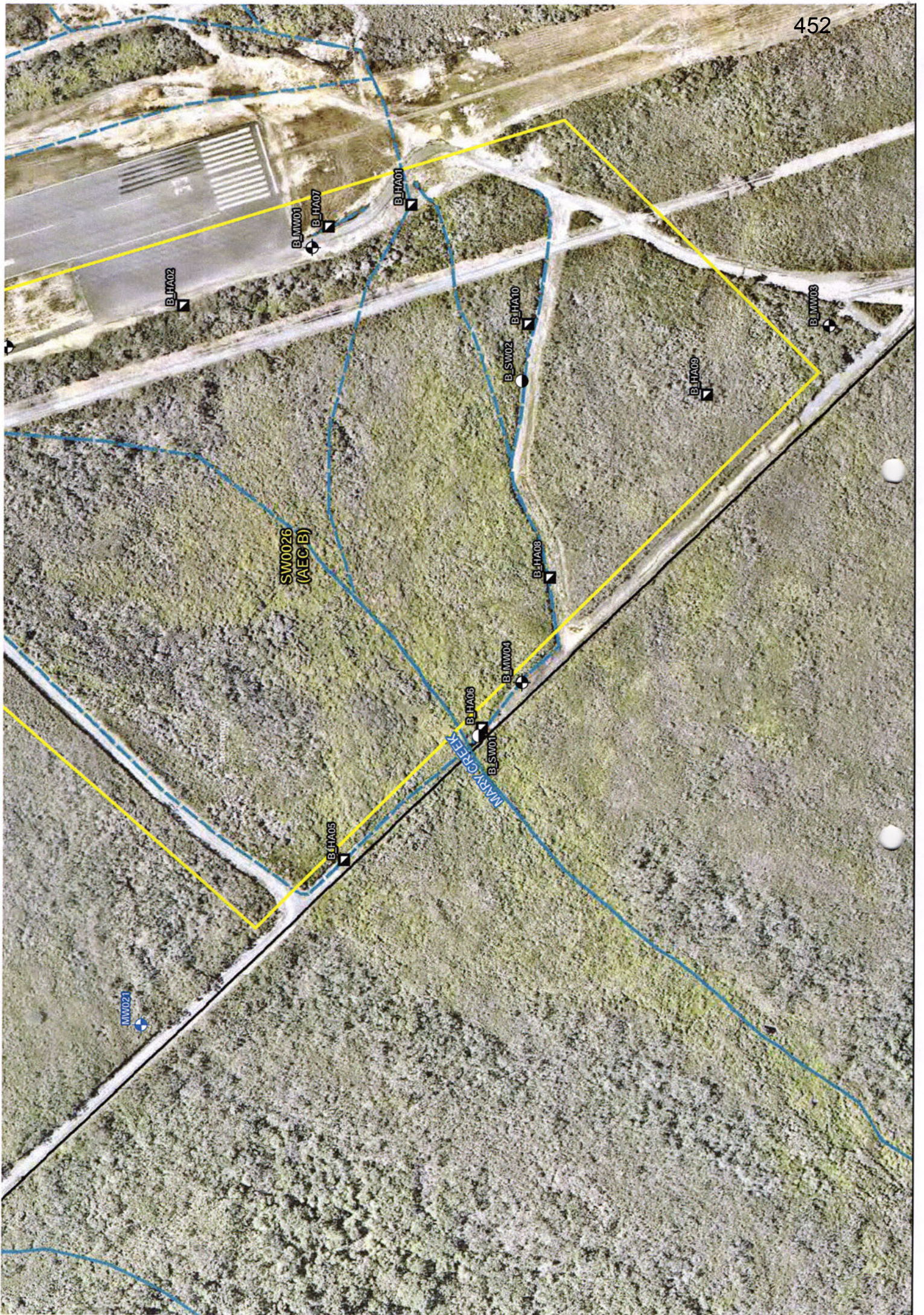
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Attachments: Summary Tables – soil, sediment and surface water (PFAS only)

Figures 7B to 7K

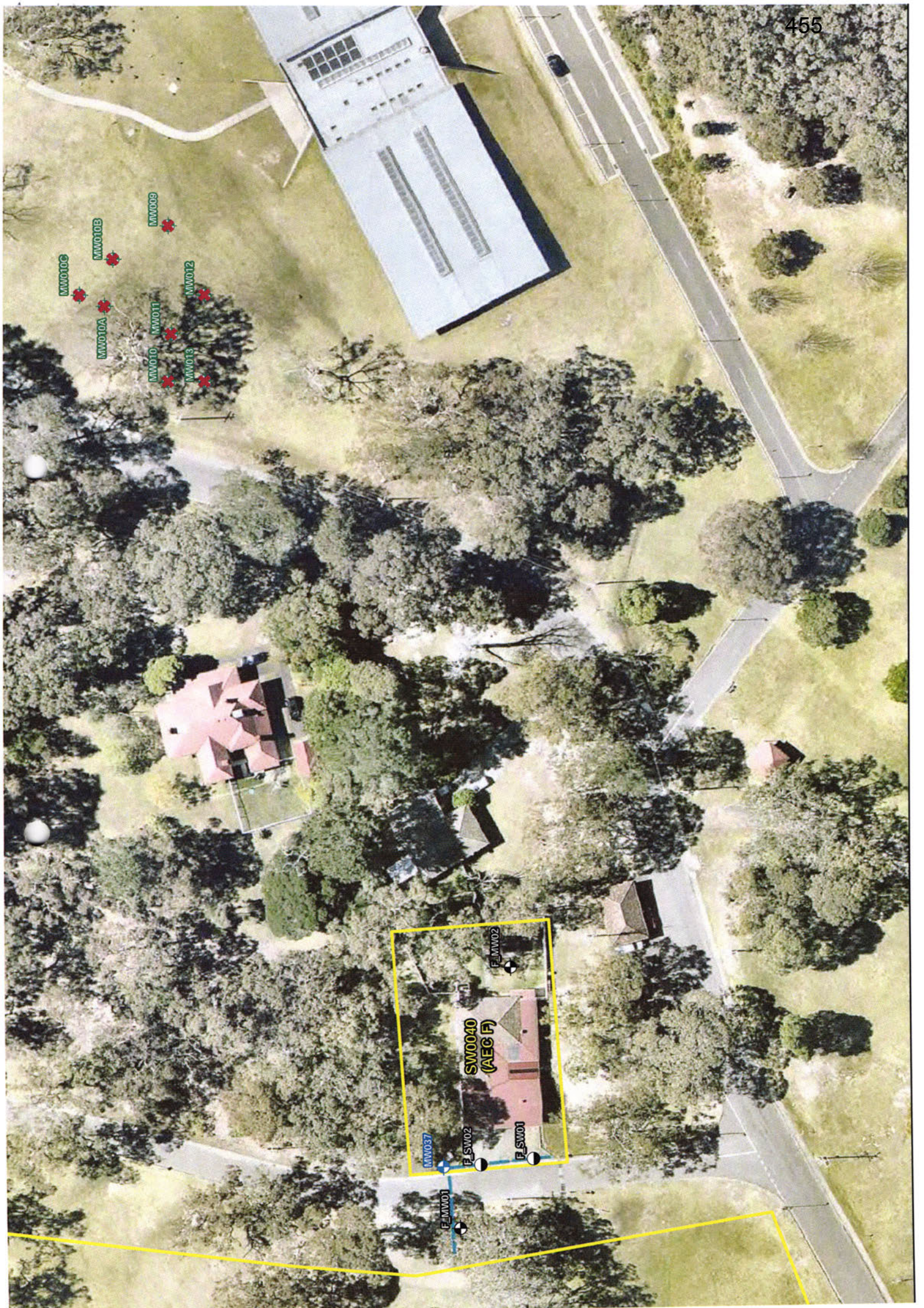
DRAFT – issued for information











MW010C

MW010B

MW009

MW010A

MW010

MW011

MW012

MW013

SW0040
(AEC F)

F_SW02

F_SW01

MW037

F_JMW01

F_JMW02



CAPTAINS LAGOON

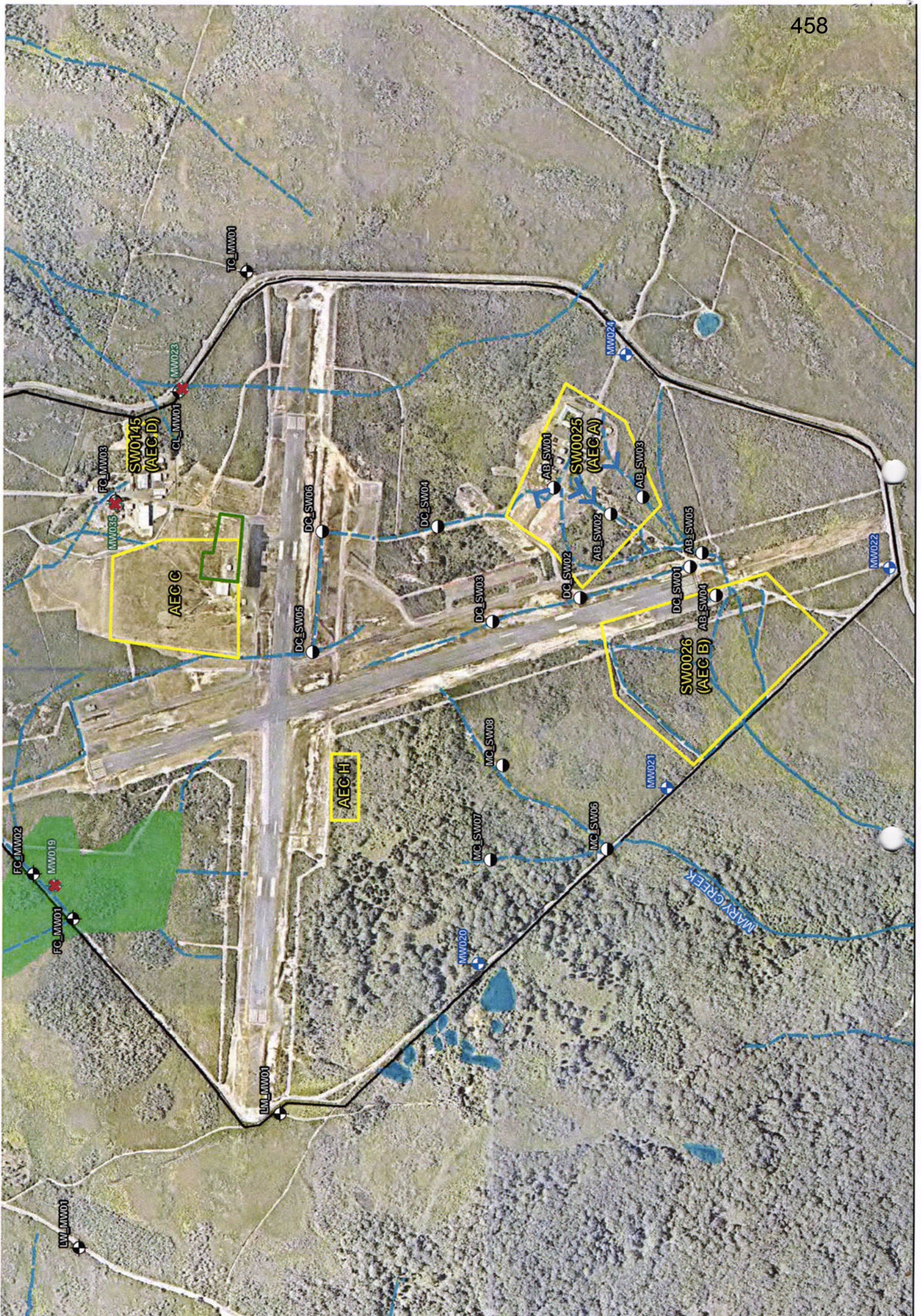
SW0226
(AEC G)
G-SW04

G-SW03

SW0217
(AEC G)
G-SW02

G-SW01









TELEGRAPH CREEK

MARY CREEK

COOP

CL_SW01
CL_SW02
CL_SW03
CL_SW04
CL_SW05
CL_SW06
CL_SW07
CL_MM01
CL_MM02
CL_MM03
CL_MM04
CL_MM05
MW015

SW0145 (AEGD)
AEGC
AEGD
AEGA (SW0025)
AECB (SW0026)
AEGH
CL_SW08
CL_SW09
CL_SW10
CL_SW11

Moroney, Rebecca (Health)

From: Krsteski, Radomir (Health)
Sent: Tuesday, 16 May 2017 11:59 AM
To: Clapham, David; Chester, Heath
Cc: Walters, Daniel; Barr, Conrad (Health); Burns, Sara
Subject: RE: JBT PFAS PCG [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Thanks David,

Depending the outcome we may need to raise the issue of sampling sites with DIRD, to ensure that there are no gaps. It would be a bad look if these sites were excluded from the comprehensive work that is about to commence.

Given the opportunity I will be more than happy to raise my concerns at today's teleconference.

Cheers
 Rad

**Radomir Krsteski**

A/g Manager | Environmental Health
 Health Protection Service | Population Health | ACT Health
 25 Mulley Street Holder ACT | Locked Bag 5005 Weston Creek ACT 2611
 T 02 62050956 | M Mobile [REDACTED] | E radomir.krsteski@act.gov.au | Website |

From: Clapham, David
Sent: Tuesday, 16 May 2017 11:38 AM
To: Chester, Heath; Krsteski, Radomir (Health)
Cc: Walters, Daniel; Barr, Conrad (Health); Burns, Sara
Subject: RE: JBT PFAS PCG [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Thanks for this Heath and Rad

Rad, I will pass these issues on to Defence GHD following the meeting today ,although you may want to raise them in the teleconference if appropriate.

If GHD won't/can't make changes to the plan to broaden the investigation area, the next questions from my point of view is, given that we are not currently testing for PFAS in our Environmental and Health testing regimes, will we need to? Not necessarily a conversation for today, but something we will need to raise with DIRD potentially? Keen for your advice.

Many 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



From: Chester, Heath
Sent: Tuesday, 16 May 2017 11:25 AM
To: Krsteski, Radomir (Health); Clapham, David
Cc: Walters, Daniel
Subject: RE: JBT PFAS PCG [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

David, Rad

No issues from my perspective – looks like GHD are doing plenty of on-site sampling and enough off-site sampling according to the current conceptual model

Cheers Heath

From: Krsteski, Radomir (Health)
Sent: Tuesday, 16 May 2017 11:01 AM
To: Clapham, David; Chester, Heath
Cc: Barr, Conrad (Health)
Subject: RE: JBT PFAS PCG [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]


Hi David,

I just have finished reviewing the sampling plan and the proposed investigation area. I am concerned that the investigation area is not inclusive of the whole of the Bherwerre Peninsula. While I am pleased that the proposed sampling plan captures Lake Windermere and the Wreck Bay community it excludes some of the approved lease sites within Booderee National Park such as the previously tested bore sites at Kullindi Homestead, Christian Minde, Bay of Plenty and Rail Bus Tram Union. It is also not clear if treated drinking water will be sampled. Considering the elevation mapping it would suggest that there is the potential for PFAS plumes to migrate into these bore sites. ACT Health would like to see these sites included in the proposed investigation by the Department of Defence.

Let me know if you need anything else.

Cheers
Rad

Radomir Krsteski

A/g Manager | Environmental Health
Health Protection Service | Population Health | ACT Health
25 Mulley Street Holder ACT | Locked Bag 5005 Weston Creek ACT 2611
T 02 62050956 | M Mobile [REDACTED] | E radomir.krsteski@act.gov.au | Website | 

From: Clapham, David
Sent: Friday, 12 May 2017 12:19 PM
To: Chester, Heath; Krsteski, Radomir (Health)
Subject: JBT PFAS PCG [SEC=UNCLASSIFIED, DLM=For-Official-Use-Only]

Dear Health and Rad

Just FYI, comments on the SAQP for JBT are due back with Defence 18 May. If you want me to collate your comments can I have them by Tuesday 16 May please? – ideally before the teleconference that we three are phoning into on that day.

Thanks – let me know of any issues.

Best

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



Stedman, Andrew (Health)

From: files@ghd.sendthisfile.com
Sent: Thursday, 25 May 2017 11:32 AM
To: Stedman, Andrew (Health)
Subject: GHD file(s) . . .



Sender: d[REDACTED]@ghd.com
Recipient: David.Clapham@act.gov.au heath.chester@act.gov.au radomir.krsteski@act.gov.au Andrew.Stedman@act.gov.au
Upload Date: 2017-05-24 20:31:23.0

Subject: GHD file(s) . . .

Message: Hi All,

I recieved notification that the email I sent to all JBRF PCG members was rejected by your server due to the 11MB size.
link below is to the second factual information memorandum based on date received post memo 1.

See the following links to download your file(s).

<https://ghd.sendthisfile.com/cxqHrUuFvI4QbsNw9ZgTDv41>

Note: These files will expire in 10 days from the time this email was generated.



Australian Government
Department of Defence
Estate and Infrastructure Group

PFAS Environmental Investigation – Jervis Bay Range Facility
PROJECT CONTROL GROUP MEETING # 3

Administrative Details	
Date	Tuesday 16 May 2017
Time	11:00 am
Venue	Teleconference
Dial-in Details	Toll ----- [REDACTED] Toll-free ----- [REDACTED] Participant PIN: [REDACTED]
Chair	[REDACTED] Defence Project Director
Minutes	Taken by [REDACTED]

ATTENDEES	
Defence	
[REDACTED]	Project Director, Environmental Investigations
[REDACTED]	Project Manager
[REDACTED]	Assistant Director PFAS Environmental Management
[REDACTED]	Commanding Officer HMAS Creswell
Lead Contractor (LC), GHD	
[REDACTED]	Service Line Leader - Contamination Assessment & Remediation
[REDACTED] ([REDACTED])	Principal Environmental Consultant
[REDACTED] ([REDACTED])	Service Line Leader - Stakeholder Engagement
[REDACTED] ([REDACTED])	Project Manager
[REDACTED] ([REDACTED])	Principal - Stakeholder Engagement
Site Auditor (SA), AECOM	
[REDACTED]	Technical Director-Environment Defence appointed peer review
Agencies	
Mr David Clapham (DC2)	ACT Senior Policy Officer - Intergovernmental Relations
Mr [REDACTED] (TM)	Jervis Bay Territory Administration
Mr Heath Chester (HC)	ACT Construction, Environment and Workplace Protection
[REDACTED]	NSW EPA
Mr Andrew Stedman (AS)	ACT Health
Mr Radomir Krsteski (RK)	ACT Health
[REDACTED] ([REDACTED])	Booderee -Park Administrator

Spotless Shoalhaven Operations Officer	
Meeting Minutes	
Agenda Item	Summary
Welcome and Conduct of PCG Meetings	<p>Defence PFAS -Welcomed attendees to the JBRF PFAS Investigation meeting.</p>
Investigation Progress Detailed Site Investigation	<ol style="list-style-type: none"> 1. () GHD presented overview of site investigation to date. <ol style="list-style-type: none"> a. No risk conclusions available at this stage, as all sampling and investigation has been conducted on Defence sites (Source areas) with no sampling off site conducted. b. 170 soil samples, 46 Sediment and 55 surface water samples c. Results received to date are typical of what would be expected for fire training sites, with elevated levels of PFAS present. d. Elevated PFAS levels identified in soil, sediments and surface waters at the Fire training ground, Headwaters of Mary Creek. e. Elevated PFAS levels identified in soil, sediments and surface waters at the HMAS Creswell fire station and golf course and the water used to irrigate this area. f. Elevated PFAS levels identified in the influent and effluent of the sewerage treatment plant. g. Lower concentrations at former fire training ground located at parachute training ground. h. Additional results are expected to be received over the upcoming weeks with the factual summary of results (provided to the PCG) to be updated and distributed. i. Investigation is now awaiting sampling at off site areas and comparing data received to tolerable daily intakes to determine risks to human health or environment. 2. () Invited comments from PCG - received as follows: <ol style="list-style-type: none"> a. ACT health () SAQP does not include western leasehold land. Request to include these areas in current investigation to further define preliminary PFAS detect results received by ACT Health in bores in this area. (4 Sites with bore extraction with PFAS detect at Kullindi). () identified further discussion required and will formally contact (RK) when site details are provided. b. ACT health () Questioned testing of treated drinking water. () confirmed testing at the above ground storage locations. c. NSW EPA () Comment to SAQP Rev 1 have been formally provided.
SAQP and Conceptual Site Model	<ol style="list-style-type: none"> 3. GHD () Historical contamination reports have been issued to WBACC with SAQP Rev 1 scheduled for delivery this week. SAQP Rev 1 has been issued to Defence, Auditor and all agencies awaiting comments from all parties prior to 18 May 2017. .

Future Stages - Detailed Site Investigation	<p>4. () Milestone table update issued to PGC. Access to Aboriginal lands is dependent on permission from WBACC. This is dependent on engagement of an environmental scientist adviser to WBACC to review the SAQP. Permission has been provided to talk to the community and conduct the water use survey to understand the use of the land. This likely introduces a 3 month extension to the schedule.</p> <p>5. GHD () identified the schedule provided is totally dependent on access to the off site land and actual date of site access is assumed.</p> <p>6. GHD () Sampling and investigation is complete for all on site locations and essentially the investigation progress is on hold until access to the off site land is granted.</p>
Future Stages - Human Health and Ecological Risk Assessment (HHERA)	<p>7. GHD () With off site access, the next stage is to characterise the pathways of contamination, identify receptors including all types of media. This will feed into a risk assessment based on tolerable daily intakes. No conclusions have been made from the data available at this stage, awaiting data from the off site investigation.</p> <p>8. () Invited comments from PCG - received as follows:</p> <ol style="list-style-type: none"> a. NSW EPA () worth considering doing the HHERA in parallel with DSI. () conceptual site model will be generated in parallel, however risk assessment cannot be progressed until data is received. b. GHD () Biota SAQP will be developed using data received from water use survey.
Site Auditor Update	No Specific Comments. Amanda Lee will return on 22 May 2017.
Stakeholder Engagement	<p>9. () Historical contamination reports were requested by WBACC and have been provided 11 May 17. With delivery of SAQP Rev 1 scheduled 17 May 17.</p> <p>10. GHD () WBACC are talking with University of Wollongong to identify and engage an adviser.</p> <p>11. () The method to engage with WBACC and the community is required consideration and input requested from PCG.</p> <p>12. () Advertisement in WB community bulletin to identify GHD availability in early June to discuss water and biota use. Actual meeting place will be dictated by the community response and may include WBACC hall (with Permission) or in home visits if requested. GHD Stakeholder team will remain flexible to meet with the wider community as required.</p> <p>13. () Invited comments from PCG - received as follows:</p> <ol style="list-style-type: none"> a. JBTA () <ol style="list-style-type: none"> i. whole of government communication guidelines are currently being circulated for comment. ii. Identified JBTA to be contacted to facilitate access to western leasehold properties. iii. Requested copy of cover letter listing documents issued to WBACC. iv. Requested copy of water use survey data when collated. v. Identified every member of the Wreck Bay community is also a member of council and many members of the council live outside of Wreck Bay. b. Parks () Requested copy of cover letter listing documents issued to WBACC.
- Meetings and Briefs	
- Fact sheet	Preliminary Stage – Not specifically addressed

- Community Engagement	14. () JBTA bulletin is more for general notices and recommended WBACC bulletin is perhaps a better media and suggested common branding of all media going forward to identify the project.
- Community Enquiries	No formal enquiries past month, informal conversations through local contacts only. All enquires are being
Risks and Issues	15. () Invited PCG to identify key risks with no further comments provided by the PCG
Other Business	Nil
Meeting Close	12:05 PM

Action Items			
Item #	Description	Owner	Due date
2a	() to discuss inclusion of western leasehold bores with ()	()	30/06/17
13.a	Issue Cover letter for WBACC documents to () and ()	()	30/05/17

Stedman, Andrew (Health)

From: [REDACTED]@ghd.com>
Sent: Tuesday, 6 June 2017 1:18 PM
To: [REDACTED];
 [REDACTED];
 [REDACTED];
 [REDACTED]; Clapham,
 David; Chester, Heath; Krsteski, Radomir (Health); [REDACTED];
 [REDACTED]; Stedman, Andrew (Health)
Cc: PFASIM Jervis Bay
Subject: JBRF Factual memorandum 3
Attachments: 212617102_MEM3_Rev1_29.05.17.pdf

Dear PCG

Please find attached a summary of the soil, sediment and surface water analytical data received as of 29 May 2017 for samples collected during the onsite investigations conducted between 20 April and 18 May 2017.

The data has been issued for factual information purposes only.

GHD will conduct a full assessment of the data upon completion of site investigations, and will screen the data against the published criteria presented in Section 5 of the GHD, Preliminary Site Investigation & Sampling, Analysis and Quality Plan (Rev1), April 2017.

Regards,

GHD

Level 2, 57 Granham Street (PO Box 621) Nowra NSW 2541 Australia | <http://www.ghd.com/>
[Water](#) | [Energy & Resources](#) | [Environment](#) | [Property & Buildings](#) | [Transportation](#)

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Memorandum

18 May 2017

To Department of Defence

Copy to File

From [REDACTED] Tel [REDACTED]

Subject Factual data - on site investigations – Issue 3 Job no. 212617102

Dear [REDACTED]

Factual information – Issue 3

Please find attached a summary of the soil, leachate and groundwater analytical data received between 19 May 2017 to 29 May 2017 for samples collected during the onsite investigations conducted between 20 April and 18 May 2017 and leachate results for soil and sediment samples collected on 18 to 21 April 2017.

The information relates to investigation locations referenced on the attached Figures 7B to 7K. GHD note that not all the investigation location listed on the attached figures have analytical results (as of 29 May 2017) as the investigation is ongoing. The data summarised herein relates to investigations conducted at the following locations.

Table 1 Summary of the investigation locations

Area of Environmental Concern (AEC)	Soils/Concrete	Leachate	Groundwater
Jervis Bay Range Facility (JBRF)			
AEC A – Royal Australian Navy School of Survivability and Ship Safety (RAN SSSS)	A_BH06 to A_BH16 A_MW02	A_BH01 to A_BH28 A_MW01 to A_MW06	A_MW07 to A_MW09
AEC A & B – Stormwater Drains	-	AB_SED01 to AB_SED03	-
AEC B – Headwaters of Mary Creek (onsite)	-	B_MW01 to B_MW04	-
AEC C – Former fire training area	C_HA11 to C_HA19	-	C_MW07
Drainage channels	-	DC_SED04	-
Boundary / Pathway wells	-	-	LM_MW01, MW001, MW018, MW022, MW024, TC_MW01
HMAS Creswell			
AEC E – Golf Course	-	E_MW01 to E_MW05	-
Captains Lagoon	-	CL_SED01 to CL_SED11	CL_MW01, CL_MW03



Memorandum

Area of Environmental Concern (AEC)	Soils/Concrete	Leachate	Groundwater
Flatrock Creek	-	FC_MW01, FC_MW02 FC_SED01 to FC_SED11	FC_MW01 to FC_MW03

No interpretation of the data has been made at this time, and the factual information should not be reviewed in isolation. The factual information present will be evaluated in context of the whole data set on completion of all field investigations. A summary of the PFAS in soil, leachate and groundwater results for the analytical results received between 19 May 2017 to 29 May 2017.

Table 2 Summary of the PFAS in soil and concrete results

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
N-Ethyl perfluorooctane sulfonamidoacetic acid	30	0	<0.0002	ND	<0.0002	ND
Perfluorodecanesulfonic acid (PFDS)	30	13	<0.0002	0.0003	0.0048	0.0048
Perfluoroheptane sulfonic acid	30	19	<0.0002	0.0002	0.0548	0.0548
10:2 Fluorotelomer sulfonic acid	30	0	<0.0005	ND	<0.0005	ND
4:2 Fluorotelomer sulfonic acid	30	0	<0.0005	ND	<0.0005	ND
N-Methyl perfluorooctane sulfonamidoacetic acid	30	0	<0.0002	ND	<0.0002	ND
PFHxS and PFOS (Sum of Total) - Lab Calc	30	30	0.0026	0.0026	3.44	3.44
Perfluorobutane sulfonic acid	30	14	<0.0002	0.0002	0.202	0.202
Perfluorohexane sulfonic acid (PFHxS)	30	30	0.0005	0.0005	2.39	2.39
Perfluoropentanoic acid	30	12	<0.0002	0.0009	0.164	0.164
8:2 Fluorotelomer sulfonic acid	30	0	<0.0005	ND	<0.0005	ND
N-Ethyl perfluorooctane sulfonamide	30	0	<0.0005	ND	<0.0005	ND
N-Ethyl perfluorooctane sulfonamidoethanol	30	0	<0.0005	ND	<0.0005	ND
N-Methyl perfluorooctane sulfonamide	30	0	<0.0005	ND	<0.0005	ND



Memorandum

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
N-Methyl perfluorooctane sulfonamidoethanol	30	0	<0.0005	ND	<0.0005	ND
6:2 Fluorotelomer Sulfonate (6:2 FTS)	30	5	<0.0005	0.0006	0.0022	0.0022
Perfluorooctanoic acid (PFOA)	30	22	<0.0002	0.0002	0.0824	0.0824
Perfluoropentane sulfonic acid	30	20	<0.0002	0.0002	0.7	0.7
Perfluorobutanoic acid	30	12	<0.001	0.001	0.026	0.026
Perfluorodecanoic acid	30	3	<0.0002	0.0003	0.0006	0.0006
Perfluorododecanoic acid	30	0	<0.0002	ND	<0.0002	ND
Perfluoroheptanoic acid	30	16	<0.0002	0.0003	0.243	0.243
Perfluorohexanoic acid (PFHxA)	30	27	<0.0002	0.0003	1.59	1.59
Perfluorononanoic acid	30	1	<0.0002	0.0003	0.0003	0.0003
Perfluorooctane sulfonic acid (PFOS)	30	29	<0.0002	0.0009	3.2	3.2
Perfluorooctane sulfonamide (FOSA)	30	9	<0.0002	0.0003	0.0024	0.0024
Perfluorotetradecanoic acid	30	0	<0.0005	ND	<0.0005	ND
Perfluorotridecanoic acid	30	0	<0.0002	ND	<0.0002	ND
Perfluoroundecanoic acid	30	0	<0.0002	ND	<0.0002	ND
PFAS (Sum of Total)	30	30	0.0029	0.0029	5.65	5.65
PFAS (Sum of Total)(WA DER List)	30	30	0.0029	0.0029	4.93	4.93

Table 3 Summary of the PFAS in leachate results (from soil and sediments)



Memorandum

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
N-Ethyl perfluorooctane sulfonamidoacetic acid	68	5	<0.0005	0.0007	0.0176	0.0176
Perfluorodecanesulfonic acid (PFDS)	68	19	<0.0005	0.0008	0.165	0.165
Perfluoroheptane sulfonic acid	68	59	<0.0005	0.0005	2.12	2.12
10:2 Fluorotelomer sulfonic acid	68	1	<0.001	0.002	0.002	0.002
4:2 Fluorotelomer sulfonic acid	68	0	<0.001	ND	<0.002	ND
N-Methyl perfluorooctane sulfonamidoacetic acid	68	5	<0.0005	0.0006	0.0426	0.0426
PFHxS and PFOS (Sum of Total) - Lab Calc	68	68	0.011	0.011	136	136
Perfluorobutane sulfonic acid	68	55	<0.0005	0.0005	0.131	0.131
Perfluorohexane sulfonic acid (PFHxS)	68	68	0.0017	0.0017	9.58	9.58
Perfluoropentanoic acid	68	41	<0.0005	0.0008	0.0504	0.0504
8:2 Fluorotelomer sulfonic acid	68	13	<0.001	0.001	0.028	0.028
N-Ethyl perfluorooctane sulfonamide	68	1	<0.001	0.001	<0.005	0.001
N-Ethyl perfluorooctane sulfonamidoethanol	68	1	<0.001	0.002	<0.005	0.002
N-Methyl perfluorooctane sulfonamide	68	0	<0.001	ND	<0.005	ND
N-Methyl perfluorooctane sulfonamidoethanol	68	1	<0.001	0.005	0.005	0.005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	68	19	<0.001	0.001	0.029	0.029
Perfluorooctanoic acid (PFOA)	68	60	<0.0005	0.0007	0.716	0.716
Perfluoropentane sulfonic acid	68	56	<0.0005	0.0006	0.254	0.254
Perfluorobutanoic acid	68	3	<0.002	0.014	0.02	0.02
Perfluorodecanoic acid	68	17	<0.0005	0.0005	0.0549	0.0549



Memorandum

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
Perfluorododecanoic acid	68	1	<0.0005	0.0019	<0.002	0.0019
Perfluoroheptanoic acid	68	51	<0.0005	0.0005	0.053	0.053
Perfluorohexanoic acid (PFHxA)	68	63	<0.0005	0.0007	0.286	0.286
Perfluorononanoic acid	68	13	<0.0005	0.0006	0.0326	0.0326
Perfluorooctane sulfonic acid (PFOS)	68	68	0.0064	0.0064	126	126
Perfluorooctane sulfonamide (FOSA)	68	27	<0.0005	0.0007	0.118	0.118
Perfluorotetradecanoic acid	68	0	<0.0005	ND	<0.005	ND
Perfluorotridecanoic acid	68	0	<0.0005	ND	<0.002	ND
Perfluoroundecanoic acid	68	7	<0.0005	0.0005	0.0364	0.0364
PFAS (Sum of Total)	68	68	0.011	0.011	139	139
PFAS (Sum of Total)(WA DER List)	68	68	0.011	0.011	137	137

Table 4 Summary of the PFAS in groundwater results

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
N-Ethyl perfluorooctane sulfonamidoacetic acid	15	0	<0.0005	ND	<0.0005	ND
Perfluorodecanesulfonic acid (PFDS)	15	0	<0.0005	ND	<0.0005	ND
Perfluoroheptane sulfonic acid	15	10	<0.0005	0.0026	0.156	0.156
10:2 Fluorotelomer sulfonic acid	15	0	<0.001	ND	<0.001	ND
4:2 Fluorotelomer sulfonic acid	15	0	<0.001	ND	<0.001	ND
N-Methyl perfluorooctane sulfonamidoacetic acid	15	0	<0.0005	ND	<0.0005	ND



Memorandum

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
PFHxS and PFOS (Sum of Total) - Lab Calc	15	15	0.0004	0.0004	4.96	4.96
Perfluorobutane sulfonic acid	15	13	<0.0005	0.0009	0.358	0.358
Perfluorohexane sulfonic acid (PFHxS)	15	14	<0.0005	0.0028	4.8	4.8
Perfluoropentanoic acid	15	10	<0.0005	0.0006	0.305	0.305
8:2 Fluorotelomer sulfonic acid	15	0	<0.001	ND	<0.001	ND
N-Ethyl perfluorooctane sulfonamide	15	0	<0.001	ND	<0.001	ND
N-Ethyl perfluorooctane sulfonamidoethanol	15	0	<0.001	ND	<0.001	ND
N-Methyl perfluorooctane sulfonamide	15	0	<0.001	ND	<0.001	ND
N-Methyl perfluorooctane sulfonamidoethanol	15	0	<0.001	ND	<0.001	ND
6:2 Fluorotelomer Sulfonate (6:2 FTS)	15	1	<0.001	0.003	0.003	0.003
Perfluorooctanoic acid (PFOA)	15	10	<0.0005	0.0012	0.105	0.105
Perfluoropentane sulfonic acid	15	13	<0.0005	0.0008	0.486	0.486
Perfluorobutanoic acid	15	0	<0.002	ND	<0.002	ND
Perfluorodecanoic acid	15	1	<0.0005	0.0006	0.0006	0.0006
Perfluorododecanoic acid	15	0	<0.0005	ND	<0.0005	ND
Perfluoroheptanoic acid	15	9	<0.0005	0.0009	0.0946	0.0946
Perfluorohexanoic acid (PFHxA)	15	10	<0.0005	0.0019	1.04	1.04
Perfluorononanoic acid	15	2	<0.0005	0.0007	0.0042	0.0042
Perfluorooctane sulfonic acid (PFOS)	15	15	0.0004	0.0004	1.21	1.21
Perfluorooctane sulfonamide (FOSA)	15	1	<0.0005	0.0008	0.0008	0.0008
Perfluorotetradecanoic acid	15	0	<0.0005	ND	<0.0005	ND



Memorandum

Analyte (µg/L)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
Perfluorotridecanoic acid	15	0	<0.0005	ND	<0.0005	ND
Perfluoroundecanoic acid	15	0	<0.0005	ND	<0.0005	ND
PFAS (Sum of Total)	15	15	0.0004	0.0004	7.02	7.02
PFAS (Sum of Total)(WA DER List)	15	15	0.0004	0.0004	6.59	6.59

Tables 5 and 6 below provides a summary of the non-PFAS results received between 6 May 2017 to 18 May 2017. We note that other analytes such as VOC, SVOC, phenol, OC pesticides, OP Pesticides have been analysed on selected samples and were all below the relevant laboratory limit of detection.

Table 5 Summary of Non-PFAS results - Soils

Analyte (mg/kg)	Number of Samples analysed	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect
Total Organic Carbon	18	18	0.42	0.42	3.81	3.81
Arsenic	9	3	<5	5	6	6
Cadmium	9	0	<1	ND	<1	ND
Chromium (III+VI)	9	6	<2	3	17	17
Copper	9	5	<5	6	53	53
Lead	9	6	<5	9	40	40
Mercury	9	0	<0.1	ND	<0.1	ND
Nickel	9	1	<2	4	4	4
Zinc	9	4	<5	40	174	174
C6-C10 minus BTEX (F1)	9	1	<10	115	115	115
C6 - C10 Fraction	9	1	<10	115	115	115
>C10-C16 minus Naphthalene (F2)	9	1	<50	290	290	290
>C10 - C16 Fraction	9	1	<50	290	290	290
>C16 - C34 Fraction (F3)	9	0	<100	ND	<100	ND
>C34 - C40 Fraction (F4)	9	0	<100	ND	<100	ND