Food & Water Testing

ANALYTICAL REPORT

REPORT CODE **AR-24-NC-026983-03 #** REPORT DATE **11/10/2024**

This amended report supersedes Analytical Report number AR-24-NC-026983-02, dated 12/09/2024.

Attention Veolia Water Services (ANZ) Pty Ltd
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Contact for your orders: James Thornton
Order code: EUNZCH-00187388
Contract: Shotover WWTP
Submission Reference: Shotover and Project Pure WWTP Sludge
Purchase Order Number: 7300390040
Comments: PFAS amended, Nickel result added

SAMPLE CODE **817-2024-00094105**

Sample Name Shotover WWTP Sludge
Reception Date & Time: 18/08/2024 13:17
Analysis Started on: 19/08/2024
Analysis Ending Date: 11/10/2024
Product Type Sludge
Sampled Date & Time 18/08/2024 00:00
Sampler(s) Rafael
Sampling Purpose Monitoring

		RESULTS		LOQ
②NW499	**Arsenic - Total**			
	Arsenic (As)	5.22	mg/kg	0.05
②NW504	**Cadmium - Total**			
	Cadmium (Cd)	0.36	mg/kg	0.01
②NW507	**Chromium - Total**			
	Chromium (Cr)	12.8	mg/kg	0.2
②NW509	**Copper - Total**			
	Copper (Cu)	192	mg/kg	0.3
③NU122	**Dry Matter (DM)**			
	Dry matter	19.0	%	0.1
③ZM0VI	**Enumeration (MPN) of Escherichia coli**			
	Escherichia coli	>1100	MPN/g	3
②NW510	**Iron - Total**			
	Iron (Fe)	3290	mg/kg	3
②NW511	**Lead - Total**			
	Lead (Pb)	4.8	mg/kg	0.1
②NW515	**Mercury - Total**			
	Mercury (Hg)	0.4	mg/kg	0.1
②NW517	**Nickel - Total**			
	Nickel (Ni)	9.0	mg/kg	0.2
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	13C2-10:2 FTSA (surr.)	88	%	N/A
	13C2-4:2 FTSA (surr.)	483	%	N/A
	13C2-6:2 FTSA (surr.)	535	%	N/A
	13C2-8:2 FTSA (surr.)	675	%	N/A

		RESULTS		LOQ
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	13C2-PFDoDA (surr.)	88	%	N/A
	13C2-PFTeDA (surr.)	43	%	N/A
	13C2-PFUnDA (surr.)	63	%	N/A
	13C3-PFBS (surr.)	99	%	N/A
	13C4-PFBA (surr.)	42	%	N/A
	13C4-PFHpA (surr.)	102	%	N/A
	13C5-PFHxA (surr.)	84	%	N/A
	13C5-PFNA (surr.)	140	%	N/A
	13C5-PFPeA (surr.)	32	%	N/A
	13C6-PFDA (surr.)	104	%	N/A
	13C8-FOSA (surr.)	74	%	N/A
	13C8-PFOA (surr.)	117	%	N/A
	13C8-PFOS (surr.)	76	%	N/A
	18O2-PFHxS (surr.)	109	%	N/A
	1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2FTSA) ***	<5	µg/kg	0.01
	1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2FTSA) ****	<5	µg/kg	0.01
	1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2FTSA) ***	<5	µg/kg	0.01
	1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2FTSA) ***	<5	µg/kg	0.05
	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE) ***	<5	µg/kg	0.05
	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE) ***	<5	µg/kg	0.05
	D3-N-MeFOSA (surr.)	38	%	N/A
	D3-N-MeFOSAA (surr.)	131	%	N/A
	D5-N-EtFOSA (surr.)	63	%	N/A
	D5-N-EtFOSAA (surr.)	216	%	N/A
	D7-N-MeFOSE (surr.)	45	%	N/A
	D9-N-EtFOSE (surr.)	47	%	N/A
	N-ethylperfluoro-1-octanesulfonamide (N-EtFOSA) ***	<5	µg/kg	0.05
	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA) **, ***	<5	µg/kg	0.05
	N-methylperfluoro-1-octanesulfonamide (N-MeFOSA) ***	<5	µg/kg	0.05
	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) **, ***	<5	µg/kg	0.05
	Perfluordecanoic acid (PFDA) ***	<5	µg/kg	0.01
	Perfluorheptanoic acid (PFHpA) ***	<5	µg/kg	0.01
	Perfluorhexanesulfonic acid (PFHxS) **, ***	<5	µg/kg	0.01
	Perfluorobutanesulfonic acid (PFBS) ***	<5	µg/kg	0.01
	Perfluorobutanoic acid (PFBA) ***	<5	µg/kg	0.05
	Perfluorodecanesulfonic acid (PFDS) ****	<5	µg/kg	0.01

		RESULTS		LOQ
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	Perfluorododecanoic acid (PFDoDA) ***	<5	µg/kg	0.01
	Perfluoroheptanesulfonic acid (PFHpS) ****	<5	µg/kg	0.01
	Perfluorohexanoic acid (PFHxA) ***	<5	µg/kg	0.01
	Perfluorononanesulfonic acid (PFNS) ****	<5	µg/kg	0.01
	Perfluorononanoic acid (PFNA) ***	<5	µg/kg	0.01
	Perfluorooctane sulfonamide (FOSA) ***	<5	µg/kg	0.05
	Perfluorooctanesulfonic acid (PFOS) **, ***	<5	µg/kg	0.01
	Perfluorooctanoic acid (PFOA) ***	<5	µg/kg	0.01
	Perfluoropentanesulfonic acid (PFPeS) ****	<5	µg/kg	0.01
	Perfluoropentanoic acid (PFPeA) ***	<5	µg/kg	0.01
	Perfluoropropanesulfonic acid (PFPrS) ****	<5	µg/kg	0.01
	Perfluorotetradecanoic acid (PFTeDA) ***	<5	µg/kg	0.01
	Perfluorotridecanoic acid (PFTrDA) ****	<5	µg/kg	0.01
	Perfluoroundecanoic acid (PFUnDA) ***	<5	µg/kg	0.01
	Sum (PFHxS + PFOS)	<5	µg/kg	0.01
	Sum of PFASs	<5	µg/kg	0.01
	Sum of PFHxS + PFOS + PFOA	<5	µg/kg	0.01
	Sum of PFOS + PFOA	<5	µg/kg	0.01
③NU012	**pH**			
	pH	6.4		1
②NU266	**Phosphorus**			
	Phosphorus	0.5	%	0.1
②NU278	**Potassium**			
	Potassium	0.2	%	0.1
②NW519	**Potassium - Total**			
	Potassium (K)	7590	mg/kg	10
②NU361	**Total Nitrogen**			
	Total nitrogen	1.5	%	0.1
②NW330	**Volatile Solids**			
	Volatile Solids	15	%	1
②NW528	**Zinc - Total**			
	Zinc (Zn)	272	mg/kg	1

SAMPLE CODE	817-2024-00094106		
Sample Name	Project Pure WWTP Sludge		
Reception Date & Time:	18/08/2024 13:17		
Analysis Started on:	19/08/2024	**Analysis Ending Date:**	11/10/2024
Product Type	Sludge	**Sampled Date & Time**	18/08/2024 00:00
Sampler(s)	Jainie	**Sampling Purpose**	Monitoring

		RESULTS		LOQ
②NW499	**Arsenic - Total**			
	Arsenic (As)	3.29	mg/kg	0.05
②NW504	**Cadmium - Total**			
	Cadmium (Cd)	0.59	mg/kg	0.01
②NW507	**Chromium - Total**			
	Chromium (Cr)	11.0	mg/kg	0.2
②NW509	**Copper - Total**			
	Copper (Cu)	155	mg/kg	0.3
③NU122	**Dry Matter (DM)**			
	Dry matter	20.1	%	0.1
③ZM0VI	**Enumeration (MPN) of Escherichia coli**			
	Escherichia coli	>1100	MPN/g	3
②NW510	**Iron - Total**			
	Iron (Fe)	2910	mg/kg	3
②NW511	**Lead - Total**			
	Lead (Pb)	12.0	mg/kg	0.1
②NW515	**Mercury - Total**			
	Mercury (Hg)	0.6	mg/kg	0.1
②NW517	**Nickel - Total**			
	Nickel (Ni)	8.1	mg/kg	0.2
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	13C2-10:2 FTSA (surr.)	98	%	N/A
	13C2-4:2 FTSA (surr.)	447	%	N/A
	13C2-6:2 FTSA (surr.)	553	%	N/A
	13C2-8:2 FTSA (surr.)	707	%	N/A
	13C2-PFDoDA (surr.)	98	%	N/A
	13C2-PFTeDA (surr.)	140	%	N/A
	13C2-PFUnDA (surr.)	64	%	N/A
	13C3-PFBS (surr.)	116	%	N/A
	13C4-PFBA (surr.)	56	%	N/A
	13C4-PFHpA (surr.)	139	%	N/A
	13C5-PFHxA (surr.)	98	%	N/A
	13C5-PFNA (surr.)	141	%	N/A
	13C5-PFPeA (surr.)	10	%	N/A
	13C6-PFDA (surr.)	101	%	N/A
	13C8-FOSA (surr.)	81	%	N/A
	13C8-PFOA (surr.)	145	%	N/A
	13C8-PFOS (surr.)	76	%	N/A
	18O2-PFHxS (surr.)	106	%	N/A
	1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2FTSA) ***	<5	µg/kg	0.01
	1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2FTSA) ****	<5	µg/kg	0.01

		RESULTS		LOQ
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2FTSA) ***	<5	µg/kg	0.01
	1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2FTSA) ***	<5	µg/kg	0.05
	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ***	<5	µg/kg	0.05
	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ***	<5	µg/kg	0.05
	D3-N-MeFOSA (surr.)	120	%	N/A
	D3-N-MeFOSAA (surr.)	121	%	N/A
	D5-N-EtFOSA (surr.)	198	%	N/A
	D5-N-EtFOSAA (surr.)	234	%	N/A
	D7-N-MeFOSE (surr.)	68	%	N/A
	D9-N-EtFOSE (surr.)	68	%	N/A
	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ***	<5	µg/kg	0.05
	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA) **, ***	<5	µg/kg	0.05
	N-methylperfluoro-1-octanesulfonamide (N-MeFOSA) ***	<5	µg/kg	0.05
	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) **, ***	<5	µg/kg	0.05
	Perfluordecanoic acid (PFDA) ***	<5	µg/kg	0.01
	Perfluorheptanoic acid (PFHpA) ***	<5	µg/kg	0.01
	Perfluorhexanesulfonic acid (PFHxS) **, ***	<5	µg/kg	0.01
	Perfluorobutanesulfonic acid (PFBS) ***	<5	µg/kg	0.01
	Perfluorobutanoic acid (PFBA) ***	<5	µg/kg	0.05
	Perfluorodecanesulfonic acid (PFDS) ****	<5	µg/kg	0.01
	Perfluorododecanoic acid (PFDoDA) ***	<5	µg/kg	0.01
	Perfluoroheptanesulfonic acid (PFHpS) ****	<5	µg/kg	0.01
	Perfluorohexanoic acid (PFHxA) ***	<5	µg/kg	0.01
	Perfluorononanesulfonic acid (PFNS) ****	<5	µg/kg	0.01
	Perfluorononanoic acid (PFNA) ***	<5	µg/kg	0.01
	Perfluorooctane sulfonamide (FOSA) ***	<5	µg/kg	0.05
	Perfluorooctanesulfonic acid (PFOS) **, ***	<5	µg/kg	0.01
	Perfluorooctanoic acid (PFOA) ***	<5	µg/kg	0.01
	Perfluoropentanesulfonic acid (PFPeS) ****	<5	µg/kg	0.01
	Perfluoropentanoic acid (PFPeA) ***	<5	µg/kg	0.01

		RESULTS		LOQ
③NW07P	**Per- and Polyfluoroalkyl Substances (PFAS)**			
	Perfluoropropanesulfonic acid (PFPrS) ****	<5	µg/kg	0.01
	Perfluorotetradecanoic acid (PFTeDA) ***	<5	µg/kg	0.01
	Perfluorotridecanoic acid (PFTrDA) ****	<5	µg/kg	0.01
	Perfluoroundecanoic acid (PFUnDA) ***	<5	µg/kg	0.01
	Sum (PFHxS + PFOS)	<5	µg/kg	0.01
	Sum of PFASs	<5	µg/kg	0.01
	Sum of PFHxS + PFOS + PFOA	<5	µg/kg	0.01
	Sum of PFOS + PFOA	<5	µg/kg	0.01
③NU012	**pH**			
	pH	6.8		1
②NU266	**Phosphorus**			
	Phosphorus	0.3	%	0.1
②NU278	**Potassium**			
	Potassium	0.1	%	0.1
②NW519	**Potassium - Total**			
	Potassium (K)	5610	mg/kg	10
②NU361	**Total Nitrogen**			
	Total nitrogen	1.5	%	0.1
②NW330	**Volatile Solids**			
	Volatile Solids	17	%	1
②NW528	**Zinc - Total**			
	Zinc (Zn)	309	mg/kg	1

REPORT INFORMATION

PFAS note:
** Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
*** Isotope dilution is used for calibration of each native compound for which an extract labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
**** Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

LIST OF METHODS

NU012	**pH:** Internal Method, Electrometry [pH Electrode]	NU122	**Dry Matter (DM):** Internal Method, Gravimetry [Dried at 105°C]
NU266	**Phosphorus:** Internal Method, ICP-OES [Microwave digestion]	NU278	**Potassium:** Internal Method, ICP-OES [Microwave digestion]
NU361	**Total Nitrogen:** Internal Method, Combustion [Combustion elemental analyser: Thermal conductivity detection]	NW07P	**Per- and Polyfluoroalkyl Substances (PFAS):** Internal Method, LC-MS/MS
NW330	**Volatile Solids:** APHA Online Edition 2540 G	NW499	**Arsenic - Total:** APHA Online Edition 3125 B mod.
NW504	**Cadmium - Total:** APHA Online Edition 3125 B mod.	NW507	**Chromium - Total:** APHA Online Edition 3125 B mod.
NW509	**Copper - Total:** APHA Online Edition 3125 B mod.	NW510	**Iron - Total:** APHA Online Edition 3125 B mod.
NW511	**Lead - Total:** APHA Online Edition 3125 B mod.	NW515	**Mercury - Total:** APHA Online Edition 3125 B mod.
NW517	**Nickel - Total:** APHA Online Edition 3125 B mod.	NW519	**Potassium - Total:** APHA Online Edition 3125 B mod.
NW528	**Zinc - Total:** APHA Online Edition 3125 B mod.	ZM0VI	**Escherichia coli E (Sludge) [NZ] <3 >1 100 /MPN/g (1-3) LTB Broth-M:** US-EPA 1680 mod.

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Signature

David Hoekendijk Team Lead KTP

EXPLANATORY NOTE

①Test is not accredited
②Test is subcontracted within Eurofins group and is accredited
③Test is subcontracted within Eurofins group and is not accredited
④Test is subcontracted outside Eurofins group and is accredited
⑤Test is subcontracted outside Eurofins group and is not accredited
⑥Test result is provided by the customer and is not accredited
⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
⑩Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

END OF REPORT