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APPENDIX 8

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APPENDIX 8-1

Table 1: Groundwater Analytical Results

Sample Identity			Groundwater Standards		Drinking Water Standards	PW1	MW1	MW3
Laboratory Report No.			Groundwater Regulations 2010 (S.I. No. 9 of 2010) as amended (S.I. No. 149 of 2012 and S.I. No. 366 of 2016)	EPA Interim Guideline Value (IGV) for Groundwater	Drinking Water Regulations 2014 (S.I. No. 122 of 2014) as amended (S.I. No. 464 of 2017, S.I. No. 286 of 2022 and S.I. No. 99 of 2023)	23/7113	23/8300	23/8300
Sample Date						04/05/2023	23/05/2023	23/05/2023
Parameters	Unit	MDL						
Field Measured Parameters								
pH	pH Units		-	≥6.5 and ≤9.5	≥6.5 and ≤9.5	-	7.39	7.82
Temperature	°C		-	25	-	-	21.77	20.04
Dissolved Oxygen	%		-	NAC	-	-	90.96	65.21
Electrical Conductivity (EC)	µS/cm		800 ¹ - 1875 ³	1000	2500	-	384.54	410.22
Oxidation/Reduction Potential (ORP)	mV				-	-	34.4	43.5
Colour	~		-	NAC	Acceptable to consumers and NAC	-	-	-
Odour	~		-	-	Acceptable to consumers and NAC	-	-	-
Taste	~		-	-	Acceptable to consumers and NAC	-	-	-
Turbidity	~		-	-	Acceptable to consumers and NAC	-	-	-
Lab Parameters								
Odour	~		-	-	Acceptable to consumers and NAC	Absent	Absent	Absent
Colour	mg/l PtCo	<15	-	NAC	Acceptable to consumers and NAC	57	3210 _{AA}	145
Electrical Conductivity (EC)	uS/cm	<2	800 ¹ - 1875 ³	1000	2500	306	425	501
pH	pH units	<0.01	-	≥6.5 and ≤9.5	≥6.5 and ≤9.5	6.56	8.01	8.16
Oxidation/Reduction Potential (ORP)	mV				-	195.15	350.88	282.92
Turbidity	NTU	<0.1	-	-	Acceptable to consumers and NAC	7.9	425	27.9
Indicators, Inorganics and Nutrients								
Ca Hardness (as CaCO ₃)	mg/l	<0.5	-	-	-	61.5	123.5	119.5
Mg Hardness (as CaCO ₃)	mg/l	<0.5	-	-	-	44.9	54.6	80.2
Total Hardness (as CaCO ₃)	mg/l	<1	-	200	-	106	178	200
Bromide	mg/l	<0.05	-	-	-	<0.05	<0.05	<0.05
Fluoride	mg/l	<0.3	-	1	1.5	<0.3	<0.3	0.5
Sulphate	mg/l	<0.5	187.5 ⁴	200	250	9.1	12.6	14.5
Chloride	mg/l	<0.3	24 ¹ - 187.5 ³	30	250	25.1	23.5	23.8
Nitrate as NO3	mg/l	<0.2	37.5 ^{3,4}	25	50	22.3	26.0	24.8
Nitrite as NO2	mg/l	<0.02	0.375 ⁴	0.1	0.5	<0.02	<0.02	1.06
Orthophosphate	mg/l	<0.06	-	0.03	-	<0.06	<0.06	<0.06
Total Ammonium (mg/l)	mg/l	<0.03	-	-	-	<0.03	<0.03	<0.03
Total Ammonium (mg N/l)	mg N/l	<0.03	0.065 ² - 0.175 ⁴	0.15	0.5	<0.03	<0.03	<0.03
Ammoniacal Nitrogen as NH4 ⁺	mg/l	<0.03				<0.03	<0.03	<0.03
Total Suspended Solids (TSS)	mg/l	<10	-	-	-	<10	347	28
Coliforms (Total)	cfu/100ml	0	-	0 counts per 100ml	0 counts per 100ml	4	15	1
Escherichia coli (E.coli)	cfu/100ml	0	-	-	0 counts per 100ml	4	15	1
Metals								
Dissolved Arsenic	µg/l	<2.5	7.5 ⁴	-	-	<2.5	<2.5	<2.5
Dissolved Boron	µg/l	<12	750	-	-	18	34	96
Dissolved Cadmium	µg/l	<0.5	3.75	-	-	<0.5	<0.5	<0.5
Dissolved Calcium	mg/l	<0.2	-	-	-	24.6	49.4	47.8
Total Dissolved Chromium	µg/l	<1.5	37.5 ⁴	-	-	<1.5	<1.5	<1.5
Dissolved Copper	µg/l	<7	1500	-	-	<7	<7	<7
Dissolved Iron	µg/l	<20	-	-	-	<20	<20	79
Dissolved Lead	µg/l	<5	7.5 ⁴	-	-	<5	<5	<5
Dissolved Magnesium	mg/l	<0.1	-	-	-	10.7	13.0	19.1
Dissolved Manganese	µg/l	<2			-	<2	8	15
Dissolved Mercury	µg/l	<1	0.75 ⁴	-	-	<1	<1	<1
Dissolved Nickel	µg/l	<2	15	-	-	<2	<2	<2
Dissolved Potassium	mg/l	<0.1	-	-	-	1.2	2.2	6.1
Dissolved Selenium	µg/l	<3	-	-	-	<3	<3	<3
Dissolved Sodium	mg/l	<0.1	150	-	-	15.8	16.1	25.9
Dissolved Zinc	µg/l	<3	75 ⁴	-	-	4	<3	19
Organics								
MTBE	ug/l	<0.1	10 ⁴	30	-	<0.1	<0.1	<0.1
Benzene	ug/l	<0.5	0.75 ⁴	1	1	<0.5	<0.5	<0.5
Toluene	ug/l	<5	525 ⁴	10	-	<5	<5	<5
Ethylbenzene	ug/l	<1	-	10	-	<1	<1	<1
m/p-Xylene	ug/l	<2	-	10	-	<2	<2	<2
o-Xylene	ug/l	<1	-	10	-	<1	<1	<1
Total Xylenes	ug/l	<3	-	10	-	<3	<3	<3

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Total Petroleum Hydrocarbons (TPH-CWG)								
Aliphatics								
>C5-C6	µg/l	<10	-	-	-	<10	<10	<10
>C6-C8	µg/l	<10	-	-	-	<10	<10	<10
>C8-C10	µg/l	<10	-	-	-	<10	<10	<10
>C10-C12	µg/l	<5	-	-	-	<5	<5	<5
>C12-C16	µg/l	<10	-	-	-	<10	<10	<10
>C16-C21	µg/l	<10	-	-	-	<10	<10	<10
>C21-C35	µg/l	<10	-	-	-	<10	<10	<10
>C35-C44	µg/l	<10	-	-	-	<10	<10	<10
Total aliphatics C5-44	µg/l	<10	-	-	-	<10	<10	<10
Aromatics								
>C5-EC7	µg/l	<10	-	-	-	<10	<10	<10
>EC7-EC8	µg/l	<10	-	-	-	<10	<10	<10
>EC8-EC10	µg/l	<10	-	-	-	<10	<10	<10
>EC10-EC12	µg/l	<5	-	-	-	<5	<5	<5
>EC12-EC16	µg/l	<10	-	-	-	<10	<10	<10
>EC16-EC21	µg/l	<10	-	-	-	<10	<10	<10
>EC21-EC35	µg/l	<10	-	-	-	<10	<10	<10
>EC35-EC44	µg/l	<10	-	-	-	<10	<10	<10
Total aromatics C5-44	µg/l	<10	-	-	-	<10	<10	<10
Total aliphatics and aromatics (C5-44)	µg/l	<10	7.5 ^{4,23}	10	-	<10	<10	<10
Semi-Volatile Organic Compounds (SVOC's)								
Phenols								
2-Chlorophenol	ug/l	-	-	200	-	<1	<1	<1
2-Methylphenol	ug/l	-	-	0.5	-	<0.5	<0.5	<0.5
2-Nitrophenol	ug/l	-	-	0.5	-	<0.5	<0.5	<0.5
2,4-Dichlorophenol	ug/l	-	-	0.5	-	<0.5	<0.5	<0.5
2,4-Dimethylphenol	ug/l	-	-	0.5	-	<1	<1	<1
2,4,5-Trichlorophenol	ug/l	-	-	0.5	-	<0.5	<0.5	<0.5
2,4,6-Trichlorophenol	ug/l	-	-	200	-	<1	<1	<1
4-Chloro-3-methylphenol	ug/l	-	-	0.5	-	<0.5	<0.5	<0.5
4-Methylphenol	ug/l	-	-	0.5	-	<1	<1	<1
4-Nitrophenol	ug/l	-	-	0.5	-	<10	<10	<10
Pentachlorophenol	ug/l	-	-	2	-	<1	<1	<1
Phenol	ug/l	-	-	-	-	<1	<1	<1
PAHs								
Naphthalene	ug/l	<0.1	-	1	-	<0.1	<0.1 ^{SV}	<0.1
Acenaphthylene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Acenaphthene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Fluorene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Phenanthrene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Anthracene	ug/l	<0.005	-	10000	-	<0.005	<0.005	<0.005
Fluoranthene	ug/l	<0.005	-	1	-	<0.005	<0.005	<0.005
Pyrene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Benzo(a)anthracene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Chrysene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Benzo(bk)fluoranthene	ug/l	<0.008	-	0.5 / 0.05	-	<0.008	<0.008	<0.008
Benzo(a)pyrene	ug/l	<0.005	0.0075 ⁴	0.01	0.01	<0.005	<0.005	<0.005
Indeno(123cd)pyrene	ug/l	<0.005	-	0.05	-	<0.005	<0.005	<0.005
Dibenzo(ah)anthracene	ug/l	<0.005	-	0.1	-	<0.005	<0.005	<0.005
Benzo(ghi)perylene	ug/l	<0.005	-	0.05	0.01	<0.005	<0.005	<0.005
Total Polycyclic Aromatic Hydrocarbons	ug/l	<0.173	0.075 ^{4,24}	0.1	0.1 ²⁵	<0.173	<0.173	<0.173
Benzo(b)fluoranthene	ug/l	<0.008	-	0.5	-	<0.008	<0.008	<0.008
Benzo(k)fluoranthene	ug/l	<0.008	-	0.05	-	<0.008	<0.008	<0.008
2-Chloronaphthalene	ug/l	<1				<1	<1	<1
2-Methylnaphthalene	ug/l	<1				<1	<1	<1
Phthalates								
Bis/Di (2-ethylhexyl) phthalate	ug/l		6	8	-	<5	<5	<5
Butylbenzyl phthalate	ug/l		-	-	-	<1	<1	<1
Di-n-butyl phthalate	ug/l		-	2	-	<1.5	<1.5	<1.5
Di-n-Octyl phthalate	ug/l		-	5	-	<1	<1	<1
Diethyl phthalate	ug/l		-	5	-	<1	<1	<1
Dimethyl phthalate	ug/l		-	5	-	<1	<1	<1
Additional SVOCs								
SVOC TICs (trace organics)	µg/l		-	-	-	-	-	-
1,2-Dichlorobenzene	µg/l		-	10	-	<1	<1	<1
1,2,4-Trichlorobenzene	µg/l		-	0.4	-	<1	<1	<1
1,3-Dichlorobenzene	µg/l		-	-	-	<1	<1	<1
1,4-Dichlorobenzene	µg/l		-	-	-	<1	<1	<1
2-Nitroaniline	µg/l		-	-	-	<1	<1	<1
2,4-Dinitrotoluene	µg/l		-	-	-	<0.5	<0.5	<0.5
2,6-Dinitrotoluene	µg/l		-	-	-	<1	<1	<1
3-Nitroaniline	µg/l		-	-	-	<1	<1	<1
4-Bromodiphenylether (4-Bromophenylphenylet	µg/l		-	-	-	<1	<1	<1
4-Chloroaniline	µg/l		-	-	-	<1	<1	<1
4-Chlorodiphenylether (4-Chlorophenylphenylet	µg/l		-	-	-	<1	<1	<1
4-Nitroaniline	µg/l		-	-	-	<0.5	<0.5	<0.5
Azobenzene	µg/l		-	-	-	<0.5	<0.5	<0.5
Bis(2-chloroethoxy)methane	µg/l		-	-	-	<0.5	<0.5	<0.5
Bis(2-chloroethyl)ether	µg/l		-	-	-	<1	<1	<1
Carbazole	µg/l		-	-	-	<0.5	<0.5	<0.5
Dibenzofuran	µg/l		-	-	-	<0.5	<0.5	<0.5
Hexachlorobenzene	µg/l		-	0.03	-	<1	<1	<1
Hexachlorobutadiene	µg/l		-	0.1	-	<1	<1	<1
Hexachlorocyclopentadiene	µg/l		-	-	-	<1	<1	<1
Hexachloroethane	µg/l		-	-	-	<1	<1	<1
Isophorone	µg/l		-	-	-	<0.5	<0.5	<0.5
N-nitrosodi-n-propylamine	µg/l		-	-	-	<0.5	<0.5	<0.5
Nitrobenzene	µg/l		-	10	-	<1	<1	<1
Tetrahydrofuran	µg/l		115 ⁴	-	-	-	-	-

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VOCs								
VOCs TICs (trace organics)	µg/l		-	-	-	-	-	-
Dichlorodifluoromethane	µg/l		-	-	-	<2	<2	<2
Methyl Tertiary Butyl Ether	µg/l		-	-	-	<0.1	<0.1	<0.1
Chloromethane	µg/l		-	-	-	<3	<3	<3
Vinyl Chloride	µg/l		0.375 ⁴	-	0.5	<0.1	<0.1	<0.1
Bromomethane	µg/l		-	-	-	<1	<1	<1
Chloroethane	µg/l		-	-	-	<3	<3	<3
Trichlorofluoromethane	µg/l		-	-	-	<3	<3	<3
1,1-Dichloroethene	µg/l		-	-	-	<3	<3	<3
Dichloromethane	µg/l		15 ⁴	0.04	-	<3	<3	<3
trans-1-2-Dichloroethene	µg/l		-	-	-	<3	<3	<3
1,1-Dichloroethane	µg/l		-	-	-	<3	<3	<3
cis-1-2-Dichloroethene	µg/l		-	-	-	<3	<3	<3
2,2-Dichloropropane	µg/l		-	-	-	<1	<1	<1
Bromochloromethane	µg/l		-	-	-	<2	<2	<2
Chloroform	µg/l		-	12	-	<2	<2	<2
1,1,1-Trichloroethane	µg/l		-	500	-	<2	<2	<2
1,1-Dichloropropene	µg/l		-	-	-	<3	<3	<3
Carbon-tetrachloride/Tetrachloromethane	µg/l		-	2	-	<2	<2	<2
1,2-Dichloroethane	µg/l		2.25 ⁴	3	3	<2	<2	<2
Benzene	µg/l		0.75 ⁴	-	1	<0.5	<0.5	<0.5
Trichloroethene	µg/l		7.5 ⁴	10	-	<3	<3	<3
1,2-Dichloropropane	µg/l		-	-	-	<2	<2	<2
Dibromomethane	µg/l		-	-	-	<3	<3	<3
Bromodichloromethane	µg/l		-	-	-	<2	<2	<2
cis-1-3-Dichloropropene	µg/l		-	-	-	<2	<2	<2
Toluene	µg/l		525 ⁴	10	-	<5	<5	<5
trans-1-3-Dichloropropene	µg/l		-	-	-	<2	<2	<2
1,1,2-Trichloroethane	µg/l		-	-	-	<2	<2	<2
Tetrachloroethene	µg/l		7.5 ⁴	10	-	<3	<3	<3
1,3-Dichloropropane	µg/l		-	-	-	<2	<2	<2
Dibromochloromethane	µg/l		-	-	-	<2	<2	<2
1,2-Dibromoethane	µg/l		-	-	-	<2	<2	<2
Chlorobenzene	µg/l		-	1	-	<2	<2	<2
1,1,1,2-Tetrachloroethane	µg/l		-	-	-	<2	<2	<2
Ethylbenzene	µg/l		-	10	-	<1	<1	<1
p/m-Xylene	µg/l		-	10	-	<2	<2	<2
o-Xylene	µg/l		-	10	-	<1	<1	<1
Styrene	µg/l		-	-	-	<2	<2	<2
Bromoform	µg/l		-	-	-	<2	<2	<2
Isopropylbenzene	µg/l		-	-	-	<3	<3	<3
1,1,1,2,2-Tetrachloroethane	µg/l		-	-	-	44	44	44
Bromobenzene	µg/l		-	-	-	<2	<2	<2
1,2,3-Trichloropropane	µg/l		-	-	-	<3	<3	<3
Propylbenzene	µg/l		-	-	-	<3	<3	<3
2-Chlorotoluene	µg/l		-	-	-	<3	<3	<3
1,3,5-Trimethylbenzene	µg/l		-	-	-	<3	<3	<3
4-Chlorotoluene	µg/l		-	-	-	<3	<3	<3
tert-Butylbenzene	µg/l		-	-	-	<3	<3	<3
1,2,4-Trimethylbenzene	µg/l		-	-	-	<3	<3	<3
sec-Butylbenzene	µg/l		-	-	-	<3	<3	<3
4-Isopropyltoluene	µg/l		-	-	-	<3	<3	<3
1,3-Dichlorobenzene	µg/l		-	-	-	<3	<3	<3
1,4-Dichlorobenzene	µg/l		-	-	-	<3	<3	<3
n-Butylbenzene	µg/l		-	-	-	<3	<3	<3
1,2-Dichlorobenzene	µg/l		-	10	-	<3	<3	<3
1,2-Dibromo-3-chloropropane	µg/l		-	-	-	<2	<2	<2
1,2,4-Trichlorobenzene	µg/l		-	0.4	-	<3	<3	<3
Hexachlorobutadiene	µg/l		-	0.1	-	<3	<3	<3
Naphthalene	ug/l		-	1	-	<2	<2	<2
1,2,3-Trichlorobenzene	µg/l		-	0.4	-	<3	<3	<3

Notes:

¹: Test: Assessment for the presence of saline or other intrusions

²: Test: Assessment of adverse impacts of chemical inputs from groundwater on associated surface water bodies.

³: Test: Assessment of whether groundwater intended for human consumption in drinking water protected areas is impacted by pollutants and/or is showing a significant and sustained rise in pollutant levels.

⁴: Test: Assessment of the general quality of groundwater in a groundwater body in terms of whether its ability to support human uses has been significantly impaired by pollution.

²³: Sum of TPH including the VPH range and EPH range: hydrocarbons C2-C5 and hydrocarbons C6-C40 respectively.

²⁴: Sum of Total PAHs including; anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene, naphthalene.

²⁵: Sum of Total PAHs including; benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, indeno(1,2,3-cd)pyrene,.

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APPENDIX 8-2

Malone O'Regan
Ground Floor - Unit 3
Bracken Business Park
Bracken Road
Sandyford
Dublin 18
Ireland
D18 V4K6



4225



Attention : Nuria Manzanas
Date : 30th May, 2023
Your reference : E2077
Our reference : Test Report 23/7113 Batch 1
Location : Obriens Cement
Date samples received : 5th May, 2023
Status : Final Report
Issue : 1

One sample was received for analysis on 5th May, 2023 and was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Malone O'Regan
Reference: E2077
Location: Obriens Cement
Contact: Nuria Manzanas
EMT Job No: 23/7113

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Malone O'Regan
Reference: E2077
Location: Obriens Cement
Contact: Nuria Manzanar
EMT Job No: 23/7113

SVOC Report : Liquid

RECEIVED: 04/03/2024

EMT Sample No.	1-7												
Sample ID	PW1												
Depth													
COC No / misc													
Containers	V H H N P G												
Sample Date	04/05/2023												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	05/05/2023												
SVOC MS													
Phenols													
2-Chlorophenol #	<1										<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5										<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1										<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5										<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1										<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5										<0.5	ug/l	TM16/PM30
4-Methylphenol	<1										<1	ug/l	TM16/PM30
4-Nitrophenol	<10										<10	ug/l	TM16/PM30
Pentachlorophenol	<1										<1	ug/l	TM16/PM30
Phenol	<1										<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene #	<1										<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1										<1	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5										<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1										<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5										<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1										<1	ug/l	TM16/PM30
Diethyl phthalate #	<1										<1	ug/l	TM16/PM30
Dimethyl phthalate	<1										<1	ug/l	TM16/PM30
Other SVOCs													
1,2-Dichlorobenzene #	<1										<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1										<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1										<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1										<1	ug/l	TM16/PM30
2-Nitroaniline	<1										<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5										<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1										<1	ug/l	TM16/PM30
3-Nitroaniline	<1										<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1										<1	ug/l	TM16/PM30
4-Chloroaniline	<1										<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1										<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5										<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5										<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5										<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1										<1	ug/l	TM16/PM30
Carbazole #	<0.5										<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5										<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1										<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1										<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1										<1	ug/l	TM16/PM30
Hexachloroethane #	<1										<1	ug/l	TM16/PM30
Isophorone #	<0.5										<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5										<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1										<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	147 ^{SV}										<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	145 ^{SV}										<0	%	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E2077
Location: Obriens Cement
Contact: Nuria Manzanas
EMT Job No: 23/7113

Liquid

Please see attached notes for all abbreviations and acronyms

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Please see attached not
abbreviations and acro

Client Name: Malone O'Regan

Reference: E2077

Location: Obriens Cement

Contact: Nuria Manzanas

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/7113

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

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HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

RECEIVED: 01/03/2024

EMT Job No: 23/7113

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM27	Modified US EPA method 9056/EPA 0300.0 (1993) Determination of water soluble anions using Dionex (Ion-Chromatography).	PM0	No preparation is required.				

EMT Job No: 23/7113

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM34	Turbidity by 2100P Turbidity Meter. complies with EPA 180.1 1993	PM0	No preparation is required.				
TM35	True and apparent colour by Hach Lange DR3800 spectrophotometer. Apparent colour includes dissolved and suspended matter. True colour is determined after filtration of the sample.	PM0	No preparation is required.				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC-FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 100.2 (1993), EN612:2003 and APHA 521.2 (1971) and 2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5µm pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM72	Redox Potential is measured by HI98120 redox meter.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 23/7113

[illegible]

Malone O'Regan
Ground Floor - Unit 3
Bracken Business Park
Bracken Road
Sandyford
Dublin 18
Ireland
D18 V4K6



4225



Attention : Nuria Manzanias
Date : 8th June, 2023
Your reference : E2077
Our reference : Test Report 23/8300 Batch 1
Location : O'Briens Cement
Date samples received : 24th May, 2023
Status : Final Report
Issue : 1

Two samples were received for analysis on 24th May, 2023 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Malone O'Regan
Reference: E2077
Location: O'Briens Cement
Contact: Nuria Manzanar
EMT Job No: 23/8300

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HN₃

EMT Sample No.	1-7	8-14											
Sample ID	MW1	MW3											
Depth													
COC No / misc													
Containers	V H H N P G	V H H N P G											
Sample Date	23/05/2023	23/05/2023											
Sample Type	Ground Water	Ground Water											
Batch Number	1	1											
Date of Receipt	24/05/2023	24/05/2023											
											LOD/LOR	Units	Method No.
Odour	Absent	Absent										None	TM129/PM0
Odour Type	NONE	NONE										None	TM129/PM0
Dissolved Arsenic #	<2.5	<2.5									<2.5	ug/l	TM30/PM14
Dissolved Boron	34	96									<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Calcium #	49.4	47.8									<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7									<7	ug/l	TM30/PM14
Total Dissolved Iron #	<20	79									<20	ug/l	TM30/PM14
Dissolved Lead #	<5	<5									<5	ug/l	TM30/PM14
Dissolved Magnesium #	13.0	19.1									<0.1	mg/l	TM30/PM14
Dissolved Manganese #	8	15									<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1									<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2									<2	ug/l	TM30/PM14
Dissolved Potassium #	2.2	6.1									<0.1	mg/l	TM30/PM14
Dissolved Selenium #	<3	<3									<3	ug/l	TM30/PM14
Dissolved Sodium #	16.1	25.9									<0.1	mg/l	TM30/PM14
Dissolved Zinc #	<3	19									<3	ug/l	TM30/PM14
Calcium Hardness Dissolved (as CaCO3)	123.5	119.5									<0.5	mg/l	TM30/PM14
Magnesium Hardness Dissolved (as CaCO3)	54.6	80.2									<0.5	mg/l	TM30/PM14
Total Hardness Dissolved (as CaCO3)	178	200									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1 ^{SV}	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Fluorene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Phenanthrene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Anthracene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Fluoranthene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Pyrene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Chrysene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Benzo(k)fluoranthene #	<0.008 ^{SV}	<0.008									<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.005 ^{SV}	<0.005									<0.005	ug/l	TM4/PM30
PAH 16 Total #	<0.173 ^{SV}	<0.173									<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008 ^{SV}	<0.008									<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008 ^{SV}	<0.008									<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	68 ^{SV}	90									<0	%	TM4/PM30

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Malone O'Regan
Reference: E2077
Location: O'Briens Cement
Contact: Nuria Manzanar
EMT Job No: 23/8300

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HN₃

EMT Sample No.	1-7	8-14										
Sample ID	MW1	MW3										
Depth												
COC No / misc												
Containers	V H H N P G	V H H N P G										
Sample Date	23/05/2023	23/05/2023										
Sample Type	Ground Water	Ground Water										
Batch Number	1	1										
Date of Receipt	24/05/2023	24/05/2023										
										LOD/LOR	Units	Method No.
Methyl Tertiary Butyl Ether #	<0.1	<0.1								<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5								<0.5	ug/l	TM15/PM10
Toluene #	<5	<5								<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1								<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2								<2	ug/l	TM15/PM10
o-Xylene #	<1	<1								<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	103	100								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	98	97								<0	%	TM15/PM10
TPH CWG												
Aliphatics												
>C5-C6 #	<10	<10								<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10								<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10								<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5								<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>C35-C44	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-44	<10	<10								<10	ug/l	TM5/PM16/PM30
Aromatics												
>C5-EC7 #	<10	<10								<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10								<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10								<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5								<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10								<10	ug/l	TM5/PM16/PM30
>EC35-EC44	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aromatics C5-44	<10	<10								<10	ug/l	TM5/PM16/PM30
Total aliphatics and aromatics(C5-44)	<10	<10								<10	ug/l	TM5/PM16/PM30
Bromide	<0.05	<0.05								<0.05	mg/l	TM27/PM0
Fluoride	<0.3	0.5								<0.3	mg/l	TM173/PM0
Sulphate as SO ₄ #	12.6	14.5								<0.5	mg/l	TM38/PM0
Chloride #	23.5	23.8								<0.3	mg/l	TM38/PM0
Nitrate as NO ₃ #	26.0	24.8								<0.2	mg/l	TM38/PM0
Nitrite as NO ₂ #	<0.02	1.06								<0.02	mg/l	TM38/PM0
Ortho Phosphate as PO ₄ #	<0.06	<0.06								<0.06	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH ₄ #	<0.03	<0.03								<0.03	mg/l	TM38/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E2077
Location: O'Briens Cement
Contact: Nuria Manzanas
EMT Job No: 23/8300

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E2077
Location: O'Briens Cement
Contact: Nuria Manzanas
EMT Job No: 23/8300

SVOC Report : Liquid

EMT Sample No.	1-7	8-14								Please see attached notes for all abbreviations and acronyms
Sample ID	MW1	MW3								
Depth										
COC No / misc Containers	V H H N P G	V H H N P G								
Sample Date	23/05/2023	23/05/2023								
Sample Type	Ground Water	Ground Water								
Batch Number	1	1								
Date of Receipt	24/05/2023	24/05/2023								LOD/LOR
										Units
										Method No.
SVOC MS										
Phenols										
2-Chlorophenol #	<1	<1								<1 ug/l TM16/PM30
2-Methylphenol #	<0.5	<0.5								<0.5 ug/l TM16/PM30
2-Nitrophenol	<0.5	<0.5								<0.5 ug/l TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5								<0.5 ug/l TM16/PM30
2,4-Dimethylphenol	<1	<1								<1 ug/l TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5								<0.5 ug/l TM16/PM30
2,4,6-Trichlorophenol	<1	<1								<1 ug/l TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5								<0.5 ug/l TM16/PM30
4-Methylphenol	<1	<1								<1 ug/l TM16/PM30
4-Nitrophenol	<10	<10								<10 ug/l TM16/PM30
Pentachlorophenol	<1	<1								<1 ug/l TM16/PM30
Phenol	<1	<1								<1 ug/l TM16/PM30
PAHs										
2-Chloronaphthalene #	<1	<1								<1 ug/l TM16/PM30
2-Methylnaphthalene #	<1	<1								<1 ug/l TM16/PM30
Phthalates										
Bis(2-ethylhexyl) phthalate	<5	<5								<5 ug/l TM16/PM30
Butylbenzyl phthalate	<1	<1								<1 ug/l TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5								<1.5 ug/l TM16/PM30
Di-n-Octyl phthalate	<1	<1								<1 ug/l TM16/PM30
Diethyl phthalate #	<1	<1								<1 ug/l TM16/PM30
Dimethyl phthalate	<1	<1								<1 ug/l TM16/PM30
Other SVOCs										
1,2-Dichlorobenzene #	<1	<1								<1 ug/l TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1								<1 ug/l TM16/PM30
1,3-Dichlorobenzene #	<1	<1								<1 ug/l TM16/PM30
1,4-Dichlorobenzene #	<1	<1								<1 ug/l TM16/PM30
2-Nitroaniline	<1	<1								<1 ug/l TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5								<0.5 ug/l TM16/PM30
2,6-Dinitrotoluene	<1	<1								<1 ug/l TM16/PM30
3-Nitroaniline	<1	<1								<1 ug/l TM16/PM30
4-Bromophenylphenylether #	<1	<1								<1 ug/l TM16/PM30
4-Chloroaniline	<1	<1								<1 ug/l TM16/PM30
4-Chlorophenylphenylether #	<1	<1								<1 ug/l TM16/PM30
4-Nitroaniline	<0.5	<0.5								<0.5 ug/l TM16/PM30
Azobenzene #	<0.5	<0.5								<0.5 ug/l TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5								<0.5 ug/l TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1								<1 ug/l TM16/PM30
Carbazole #	<0.5	<0.5								<0.5 ug/l TM16/PM30
Dibenzofuran #	<0.5	<0.5								<0.5 ug/l TM16/PM30
Hexachlorobenzene #	<1	<1								<1 ug/l TM16/PM30
Hexachlorobutadiene #	<1	<1								<1 ug/l TM16/PM30
Hexachlorocyclopentadiene	<1	<1								<1 ug/l TM16/PM30
Hexachloroethane #	<1	<1								<1 ug/l TM16/PM30
Isophorone #	<0.5	<0.5								<0.5 ug/l TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5								<0.5 ug/l TM16/PM30
Nitrobenzene #	<1	<1								<1 ug/l TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	105	109								<0 % TM16/PM30
Surrogate Recovery p-Terphenyl-d14	118	114								<0 % TM16/PM30

Please see attached notes for all abbreviations and acronyms

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Please see attached not
abbreviations and acr

Client Name: Malone O'Regan
Reference: E2077
Location: O'Briens Cement
Contact: Nuria Manzanas
EMT Job No: 23/8300

Liquid

Please see attached notes for all abbreviations and acronyms

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Please see attached not
abbreviations and acro

Client Name: Malone O'Regan

Reference: E2077

Location: O'Briens Cement

Contact: Nuria Manzanas

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/8300

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution

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HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

RECEIVED: 01/03/2024

EMT Job No: 23/8300

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM27	Modified US EPA method 9056/EPA 0300.0 (1993) Determination of water soluble anions using Dionex (Ion-Chromatography).	PM0	No preparation is required.				

EMT Job No: 23/8300

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM34	Turbidity by 2100P Turbidity Meter. complies with EPA 180.1 1993	PM0	No preparation is required.				
TM35	True and apparent colour by Hach Lange DR3800 spectrophotometer. Apparent colour includes dissolved and suspended matter. True colour is determined after filtration of the sample.	PM0	No preparation is required.				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods - TSS: USEPA 100.2 (1993), EN612:2003 and APHA SM2540D:1999 22nd Edition; VSS: USEPA 1684 (Jan 2001), USEPA 160.4 (1971) and SMEWW 2540E:1999 22nd Edition. Gravimetric determination of Total Suspended Solids (TSS) and Volatile Suspended Solids (VSS). Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed at 105°C for TSS and 550°C for VSS	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM0	No preparation is required.	Yes			
TM72	Redox Potential is measured by HI98120 redox meter.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 23/8300

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM129	Odour of samples	PM0	No preparation is required.			AR	
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.				

MICROBIOLOGY TEST CERTIFICATE

Report Status: Final Report
Date of Issue: 07-May-2023
Report Number: 1593494
Project: 1-230504-02819
Page 1 of 2

Client: Malone O'Regan Environmental

Order Number:

Primary Contact:

Address: Ground Floor – Unit 3, Bracken Business Park, Bracken Road,,Sandyford, Dublin,Dublin 18, D18 V 32Y

Sample Number: ALT ID 3791321 **Date Received:** 04/05/2023 **Date Tested:** 04/05/2023

INAB P9 Classification: Water - Bacteriological condition of potable waters

Sample Description: PW1 OBriens cement

Test	Result	Unit(s)	Method	Standard Reference
Confirmed Coliforms	4	cfu/100mL	MTM025	MDW (2016)- Part 4
Confirmed Escherichia coli	0	cfu/100mL	MTM025	MDW (2016)- Part 4
Presumptive Coliforms	4	cfu/100mL	MTM025	MDW (2016)- Part 4
Presumptive Escherichia coli	4	cfu/100mL	MTM025	MDW (2016)- Part 4

The results in this report were authorised by:



Ana Raluca
Microbiologist

Samples tested at: ALT Biological Testing Laboratory, Unit 4 Newbridge
Industrial Estate, Newbridge, Co Kildare Ireland



MICROBIOLOGY TEST CERTIFICATE

Report Status: **Final Report**
Date of Issue: **07-May-2023**
Report Number: **1593494**
Project: **1-230504-02819**
Page 2 of 2
Order Number:

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Client: **Malone O'Regan Environmental**

Disclaimer(s)

Results in this report relate only to the items tested.

Reports may not be reproduced except in full, without the approval of **Advanced Laboratory Testing**.

Results reported as cfu/cm2 are calculated based on information supplied by the relevant customer regarding the specific area swabbed.

* beside the method or lack of INAB symbol signifies that **Advanced Laboratory Testing** are not INAB accredited for this method.

Samples are retained post analysis for a period of 10 days. Samples are stored frozen by default except in the case of RSA requirements.

Unless otherwise stated as a Test Certificate comment, samples were received in a satisfactory condition.

Sampling including the date and time swabs are taken at source and area swabbed is outside the activities of ALT-MxNS and Scope of INAB Accreditation.

Environmental swab samples should ideally be tested within 4 hours of being taken at source or within a maximum of 24 hours.

Swabs which are tested after 24 hours of being taken at source will result in a detrimental effect on results.

If the date and time which swabs are sampled is not referenced when submitting paperwork, ALT-MxNS will not be able to determine if swabs have been tested within the allocated 24 hour window nor the effect on results.

The results in this report were authorised by:



Ana Raluca
Microbiologist

Samples tested at: ALT Biological Testing Laboratory, Unit 4 Newbridge
Industrial Estate, Newbridge, Co.Kildare Ireland.



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APPENDIX 8-3

WELL ID: MW1

Local ID: MW1-Early Data

Date: #####

Time: 00:00

INPUT

Construction:	
Casing dia. (d_c)	0.15 Meter
Annulus dia. (d_w)	0.16 Meter
Screen Length (L)	30 Meter
Depths to:	
water level (DTW)	15.29 Meter
Top of Aquifer	15.29 Meter
Base of Aquifer	70 Meter
Annular Fill:	
across screen --	Gravel
above screen --	Bentonite
Aquifer Material -- Fractured Igneous and	
FLOW RATE	
504 m3/d	

COMPUTED

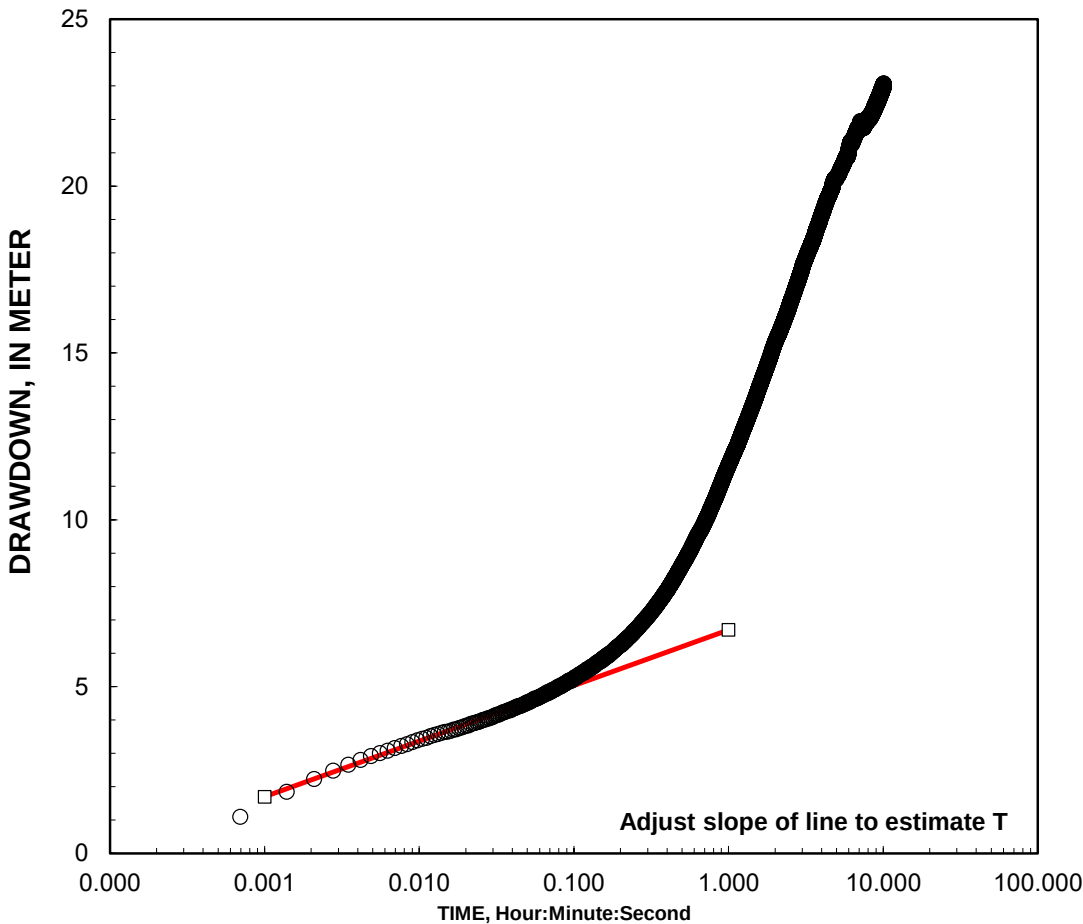
Aquifer thickness = 55 Meter

Slope = 0.508 Meter/log10

Input is consistent.

K = 1 Meter/Day

T = 55 Meter²/Day



REMARKS: Cooper-Jacob analysis of single-well aquifer test

Taking the average pumping from 02/05/23 (11:00am) to 12/05/2023 (13:15pm) - 14.62m3/hr from the Campions excel data sheet
Screen length is not known - I have used 30m as example
The monitoring wells were 150mm casing - annulus size is ramdon

Reduced Data							
		Time,	Water Level			Time,	Water Level
Entry	Date	Hr:Min:Sec	Meter	Entry	Date	Hr:Min:Sec	Meter
1	1/0/00	0:00:00	52.23	51	#N/A		#N/A
2	1/0/00	0:20:00	48.62	52	#N/A		#N/A
3	1/0/00	0:40:00	48.18	53	#N/A		#N/A
4	1/0/00	1:00:00	47.86	54	#N/A		#N/A
5	1/0/00	1:20:00	47.59	55	#N/A		#N/A
6	1/0/00	1:40:00	47.40	56	#N/A		#N/A
7	1/0/00	2:00:00	47.19	57	#N/A		#N/A
8	1/0/00	2:20:00	47.02	58	#N/A		#N/A
9	1/0/00	2:40:00	46.86	59	#N/A		#N/A
10	1/0/00	3:00:00	46.69	60	#N/A		#N/A
11	1/0/00	3:20:00	46.54	61	#N/A		#N/A
12	1/0/00	3:40:00	46.44	62	#N/A		#N/A
13	1/0/00	4:00:00	46.27	63	#N/A		#N/A
14	1/0/00	4:20:00	46.15	64	#N/A		#N/A
15	1/0/00	4:40:00	46.03	65	#N/A		#N/A
16	1/0/00	5:00:00	45.90	66	#N/A		#N/A
17	1/0/00	5:20:00	45.78	67	#N/A		#N/A
18	1/0/00	5:40:00	45.66	68	#N/A		#N/A
19	1/0/00	6:00:00	45.54	69	#N/A		#N/A
20	1/0/00	6:20:00	45.43	70	#N/A		#N/A
21	1/0/00	6:40:00	45.30	71	#N/A		#N/A
22	1/0/00	7:00:00	45.20	72	#N/A		#N/A
23	1/0/00	7:20:00	45.09	73	#N/A		#N/A
24	1/0/00	7:40:00	44.98	74	#N/A		#N/A
25	1/0/00	8:00:00	44.87	75	#N/A		#N/A
26	#N/A		#N/A	76	#N/A		#N/A
27	#N/A		#N/A	77	#N/A		#N/A
28	#N/A		#N/A	78	#N/A		#N/A
29	#N/A		#N/A	79	#N/A		#N/A
30	#N/A		#N/A	80	#N/A		#N/A
31	#N/A		#N/A	81	#N/A		#N/A
32	#N/A		#N/A	82	#N/A		#N/A
33	#N/A		#N/A	83	#N/A		#N/A
34	#N/A		#N/A	84	#N/A		#N/A
35	#N/A		#N/A	85	#N/A		#N/A
36	#N/A		#N/A	86	#N/A		#N/A
37	#N/A		#N/A	87	#N/A		#N/A
38	#N/A		#N/A	88	#N/A		#N/A
39	#N/A		#N/A	89	#N/A		#N/A
40	#N/A		#N/A	90	#N/A		#N/A
41	#N/A		#N/A	91	#N/A		#N/A
42	#N/A		#N/A	92	#N/A		#N/A
43	#N/A		#N/A	93	#N/A		#N/A
44	#N/A		#N/A	94	#N/A		#N/A
45	#N/A		#N/A	95	#N/A		#N/A
46	#N/A		#N/A	96	#N/A		#N/A
47	#N/A		#N/A	97	#N/A		#N/A
48	#N/A		#N/A	98	#N/A		#N/A
49	#N/A		#N/A	99	#N/A		#N/A
50	#N/A		#N/A	100	#N/A		#N/A

WELL ID: MW1

Local ID: MW1

Date: #####

Time: 00:00

INPUT

Construction:

Casing dia. (d_c) 0.15 MeterAnnulus dia. (d_w) 0.16 Meter

Screen Length (L) 30 Meter

Depths to:

water level (DTW) 15.29 Meter

Top of Aquifer 15.29 Meter

Base of Aquifer 70 Meter

Annular Fill:

across screen -- Gravel

above screen -- Bentonite

Aquifer Material -- Fractured Igneous and

FLOW RATE

264 m3/d

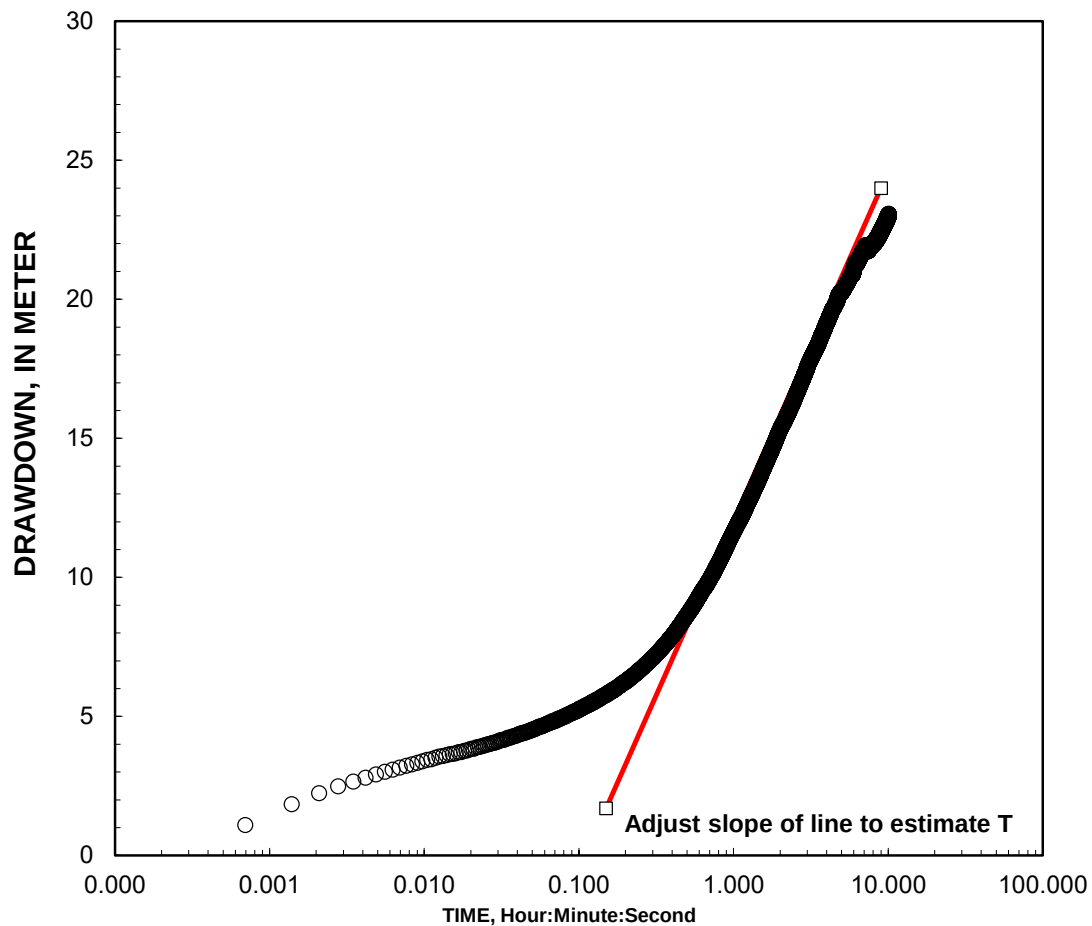
COMPUTED

Aquifer thickness = 55 Meter

Slope = 3.822532 Meter/log10

Input is consistent.

K = 0.071 Meter/Day

T = 3.9 Meter²/Day

REMARKS:

Cooper-Jacob analysis of single-well aquifer test

Taking the average pumping from 02/05/23 (11:00am) to 12/05/2023 (13:15pm) - 14.62m3/hr from the Campions excel data sheet

Screen length is not known - I have used 30m as example

The monitoring wells were 150mm casing - annulus size is ramdon

Reduced Data							
		Time,	Water Level			Time,	Water Level
Entry	Date	Hr:Min:Sec	Meter	Entry	Date	Hr:Min:Sec	Meter
1	1/0/00	0:00:00	52.23	51	#N/A		#N/A
2	1/0/00	0:20:00	48.62	52	#N/A		#N/A
3	1/0/00	0:40:00	48.18	53	#N/A		#N/A
4	1/0/00	1:00:00	47.86	54	#N/A		#N/A
5	1/0/00	1:20:00	47.59	55	#N/A		#N/A
6	1/0/00	1:40:00	47.40	56	#N/A		#N/A
7	1/0/00	2:00:00	47.19	57	#N/A		#N/A
8	1/0/00	2:20:00	47.02	58	#N/A		#N/A
9	1/0/00	2:40:00	46.86	59	#N/A		#N/A
10	1/0/00	3:00:00	46.69	60	#N/A		#N/A
11	1/0/00	3:20:00	46.54	61	#N/A		#N/A
12	1/0/00	3:40:00	46.44	62	#N/A		#N/A
13	1/0/00	4:00:00	46.27	63	#N/A		#N/A
14	1/0/00	4:20:00	46.15	64	#N/A		#N/A
15	1/0/00	4:40:00	46.03	65	#N/A		#N/A
16	1/0/00	5:00:00	45.90	66	#N/A		#N/A
17	1/0/00	5:20:00	45.78	67	#N/A		#N/A
18	1/0/00	5:40:00	45.66	68	#N/A		#N/A
19	1/0/00	6:00:00	45.54	69	#N/A		#N/A
20	1/0/00	6:20:00	45.43	70	#N/A		#N/A
21	1/0/00	6:40:00	45.30	71	#N/A		#N/A
22	1/0/00	7:00:00	45.20	72	#N/A		#N/A
23	1/0/00	7:20:00	45.09	73	#N/A		#N/A
24	1/0/00	7:40:00	44.98	74	#N/A		#N/A
25	1/0/00	8:00:00	44.87	75	#N/A		#N/A
26	#N/A		#N/A	76	#N/A		#N/A
27	#N/A		#N/A	77	#N/A		#N/A
28	#N/A		#N/A	78	#N/A		#N/A
29	#N/A		#N/A	79	#N/A		#N/A
30	#N/A		#N/A	80	#N/A		#N/A
31	#N/A		#N/A	81	#N/A		#N/A
32	#N/A		#N/A	82	#N/A		#N/A
33	#N/A		#N/A	83	#N/A		#N/A
34	#N/A		#N/A	84	#N/A		#N/A
35	#N/A		#N/A	85	#N/A		#N/A
36	#N/A		#N/A	86	#N/A		#N/A
37	#N/A		#N/A	87	#N/A		#N/A
38	#N/A		#N/A	88	#N/A		#N/A
39	#N/A		#N/A	89	#N/A		#N/A
40	#N/A		#N/A	90	#N/A		#N/A
41	#N/A		#N/A	91	#N/A		#N/A
42	#N/A		#N/A	92	#N/A		#N/A
43	#N/A		#N/A	93	#N/A		#N/A
44	#N/A		#N/A	94	#N/A		#N/A
45	#N/A		#N/A	95	#N/A		#N/A
46	#N/A		#N/A	96	#N/A		#N/A
47	#N/A		#N/A	97	#N/A		#N/A
48	#N/A		#N/A	98	#N/A		#N/A
49	#N/A		#N/A	99	#N/A		#N/A
50	#N/A		#N/A	100	#N/A		#N/A

WELL ID: PW1

Local ID: PW1

Date: #####

Time: 00:00

INPUT

Construction:	
Casing dia. (d_c)	0.2 Meter
Annulus dia. (d_w)	0.23 Meter
Screen Length (L)	30 Meter
Depths to:	
water level (DTW)	14.82 Meter
Top of Aquifer	14.82 Meter
Base of Aquifer	72 Meter
Annular Fill:	
across screen --	Gravel
above screen --	Bentonite
Aquifer Material -- Fractured Igneous and	
FLOW RATE	
264 m3/d	

COMPUTED

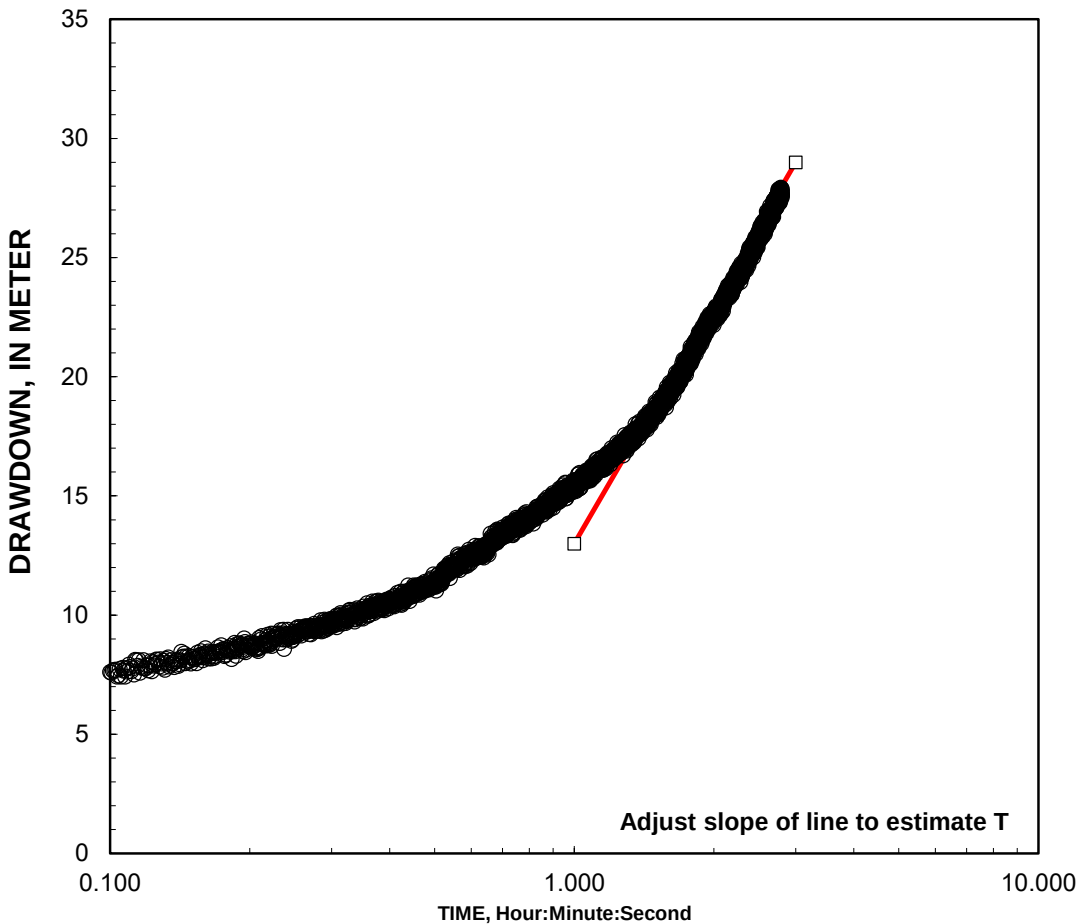
Aquifer thickness = 57 Meter

Slope = 10.2213 Meter/log10

Input is consistent.

K = 0.025 Meter/Day

T = 1.4 Meter²/Day



REMARKS: Cooper-Jacob analysis of single-well aquifer test

Average pumping 19.30m3/hr
Screen length is not known - I have used 30m as example but the production wells i do not think they were installed. The production wells were 200mm casing - annulus size is ramdon

Reduced Data							
		Time,	Water Level			Time,	Water Level
Entry	Date	Hr:Min:Sec	Meter	Entry	Date	Hr:Min:Sec	Meter
1	1/0/00	0:00:00	49.97	51		#N/A	#N/A
2	1/0/00	0:20:00	44.30	52		#N/A	#N/A
3	1/0/00	0:40:00	43.74	53		#N/A	#N/A
4	1/0/00	1:00:00	43.52	54		#N/A	#N/A
5	1/0/00	1:20:00	43.42	55		#N/A	#N/A
6	1/0/00	1:40:00	42.93	56		#N/A	#N/A
7	1/0/00	2:00:00	42.74	57		#N/A	#N/A
8	1/0/00	2:20:00	42.30	58		#N/A	#N/A
9	1/0/00	2:40:00	42.32	59		#N/A	#N/A
10	1/0/00	3:00:00	42.02	60		#N/A	#N/A
11	1/0/00	3:20:00	41.89	61		#N/A	#N/A
12	1/0/00	3:40:00	41.80	62		#N/A	#N/A
13	1/0/00	4:00:00	41.56	63		#N/A	#N/A
14	1/0/00	4:20:00	41.50	64		#N/A	#N/A
15	1/0/00	4:40:00	40.95	65		#N/A	#N/A
16	1/0/00	5:00:00	41.47	66		#N/A	#N/A
17	1/0/00	5:20:00	40.75	67		#N/A	#N/A
18	1/0/00	5:40:00	40.59	68		#N/A	#N/A
19	1/0/00	6:00:00	40.73	69		#N/A	#N/A
20	1/0/00	6:20:00	40.57	70		#N/A	#N/A
21	1/0/00	6:40:00	40.64	71		#N/A	#N/A
22	1/0/00	7:00:00	40.57	72		#N/A	#N/A
23	1/0/00	7:20:00	40.21	73		#N/A	#N/A
24	1/0/00	7:40:00	40.12	74		#N/A	#N/A
25	1/0/00	8:00:00	39.99	75		#N/A	#N/A
26		#N/A	#N/A	76		#N/A	#N/A
27		#N/A	#N/A	77		#N/A	#N/A
28		#N/A	#N/A	78		#N/A	#N/A
29		#N/A	#N/A	79		#N/A	#N/A
30		#N/A	#N/A	80		#N/A	#N/A
31		#N/A	#N/A	81		#N/A	#N/A
32		#N/A	#N/A	82		#N/A	#N/A
33		#N/A	#N/A	83		#N/A	#N/A
34		#N/A	#N/A	84		#N/A	#N/A
35		#N/A	#N/A	85		#N/A	#N/A
36		#N/A	#N/A	86		#N/A	#N/A
37		#N/A	#N/A	87		#N/A	#N/A
38		#N/A	#N/A	88		#N/A	#N/A
39		#N/A	#N/A	89		#N/A	#N/A
40		#N/A	#N/A	90		#N/A	#N/A
41		#N/A	#N/A	91		#N/A	#N/A
42		#N/A	#N/A	92		#N/A	#N/A
43		#N/A	#N/A	93		#N/A	#N/A
44		#N/A	#N/A	94		#N/A	#N/A
45		#N/A	#N/A	95		#N/A	#N/A
46		#N/A	#N/A	96		#N/A	#N/A
47		#N/A	#N/A	97		#N/A	#N/A
48		#N/A	#N/A	98		#N/A	#N/A
49		#N/A	#N/A	99		#N/A	#N/A
50		#N/A	#N/A	100		#N/A	#N/A

WELL ID: PW1

Local ID: PW1

Date: #####

Time: 00:00

INPUT

Construction:

Casing dia. (d_c) 0.2 MeterAnnulus dia. (d_w) 0.23 Meter

Screen Length (L) 30 Meter

Depths to:

water level (DTW) 14.82 Meter

Top of Aquifer 14.82 Meter

Base of Aquifer 72 Meter

Annular Fill:

across screen -- Gravel

above screen -- Bentonite

Aquifer Material -- Fractured Igneous and

FLOW RATE 504 m3/d

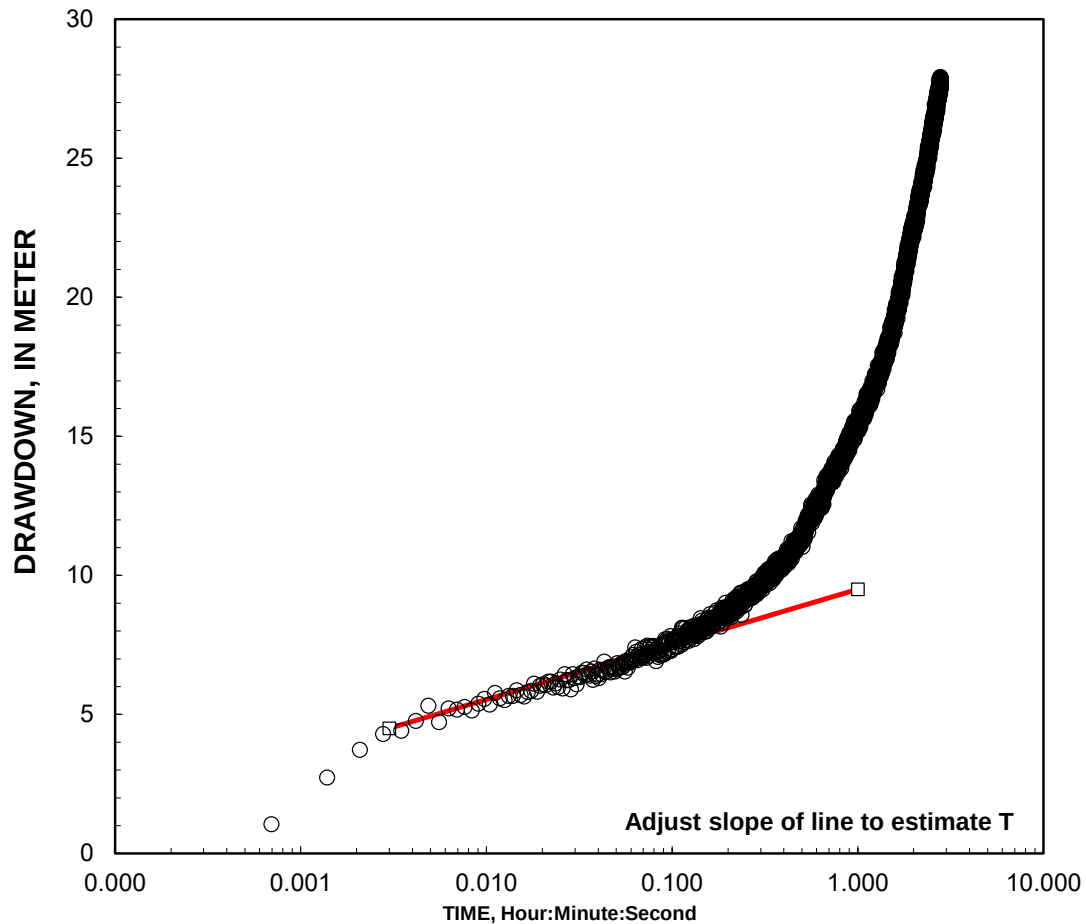
COMPUTED

Aquifer thickness = 57 Meter

Slope = 0.604072 Meter/log10

Input is consistent.

K = 0.82 Meter/Day

T = 47 Meter²/Day

REMARKS:

Cooper-Jacob analysis of single-well aquifer test

Average pumping 19.30m3/hr

Screen length is not known - I have used 30m as example but the production wells i do not think they were installed. The production wells were 200mm casing - annulus size is ramdon

Reduced Data					
	Time,	Water Level		Time,	Water Level
Entry	Date Hr:Min:Sec	Meter	Entry	Date Hr:Min:Sec	Meter
1	1/0/00 0:00:00	49.97	51	#N/A	#N/A
2	1/0/00 0:20:00	44.30	52	#N/A	#N/A
3	1/0/00 0:40:00	43.74	53	#N/A	#N/A
4	1/0/00 1:00:00	43.52	54	#N/A	#N/A
5	1/0/00 1:20:00	43.42	55	#N/A	#N/A
6	1/0/00 1:40:00	42.93	56	#N/A	#N/A
7	1/0/00 2:00:00	42.74	57	#N/A	#N/A
8	1/0/00 2:20:00	42.30	58	#N/A	#N/A
9	1/0/00 2:40:00	42.32	59	#N/A	#N/A
10	1/0/00 3:00:00	42.02	60	#N/A	#N/A
11	1/0/00 3:20:00	41.89	61	#N/A	#N/A
12	1/0/00 3:40:00	41.80	62	#N/A	#N/A
13	1/0/00 4:00:00	41.56	63	#N/A	#N/A
14	1/0/00 4:20:00	41.50	64	#N/A	#N/A
15	1/0/00 4:40:00	40.95	65	#N/A	#N/A
16	1/0/00 5:00:00	41.47	66	#N/A	#N/A
17	1/0/00 5:20:00	40.75	67	#N/A	#N/A
18	1/0/00 5:40:00	40.59	68	#N/A	#N/A
19	1/0/00 6:00:00	40.73	69	#N/A	#N/A
20	1/0/00 6:20:00	40.57	70	#N/A	#N/A
21	1/0/00 6:40:00	40.64	71	#N/A	#N/A
22	1/0/00 7:00:00	40.57	72	#N/A	#N/A
23	1/0/00 7:20:00	40.21	73	#N/A	#N/A
24	1/0/00 7:40:00	40.12	74	#N/A	#N/A
25	1/0/00 8:00:00	39.99	75	#N/A	#N/A
26	#N/A	#N/A	76	#N/A	#N/A
27	#N/A	#N/A	77	#N/A	#N/A
28	#N/A	#N/A	78	#N/A	#N/A
29	#N/A	#N/A	79	#N/A	#N/A
30	#N/A	#N/A	80	#N/A	#N/A
31	#N/A	#N/A	81	#N/A	#N/A
32	#N/A	#N/A	82	#N/A	#N/A
33	#N/A	#N/A	83	#N/A	#N/A
34	#N/A	#N/A	84	#N/A	#N/A
35	#N/A	#N/A	85	#N/A	#N/A
36	#N/A	#N/A	86	#N/A	#N/A
37	#N/A	#N/A	87	#N/A	#N/A
38	#N/A	#N/A	88	#N/A	#N/A
39	#N/A	#N/A	89	#N/A	#N/A
40	#N/A	#N/A	90	#N/A	#N/A
41	#N/A	#N/A	91	#N/A	#N/A
42	#N/A	#N/A	92	#N/A	#N/A
43	#N/A	#N/A	93	#N/A	#N/A
44	#N/A	#N/A	94	#N/A	#N/A
45	#N/A	#N/A	95	#N/A	#N/A
46	#N/A	#N/A	96	#N/A	#N/A
47	#N/A	#N/A	97	#N/A	#N/A
48	#N/A	#N/A	98	#N/A	#N/A
49	#N/A	#N/A	99	#N/A	#N/A
50	#N/A	#N/A	100	#N/A	#N/A

RECEIVED: 01/03/2024

WELL ID: MW1 - Recovery

Local ID: MW1 - Recovery

Date: #####

Time: 00:00

INPUT

Construction:

Casing dia. (d_c) 0.15 MeterAnnulus dia. (d_w) 0.16 Meter

Screen Length (L) 30 Meter

Depths to:

water level (DTW) 15.29 Meter

Top of Aquifer 15.29 Meter

Base of Aquifer 70 Meter

Annular Fill:

across screen -- Gravel

above screen -- Bentonite

Aquifer Material -- Fractured Igneous and

FLOW RATE 350.88 m3/d

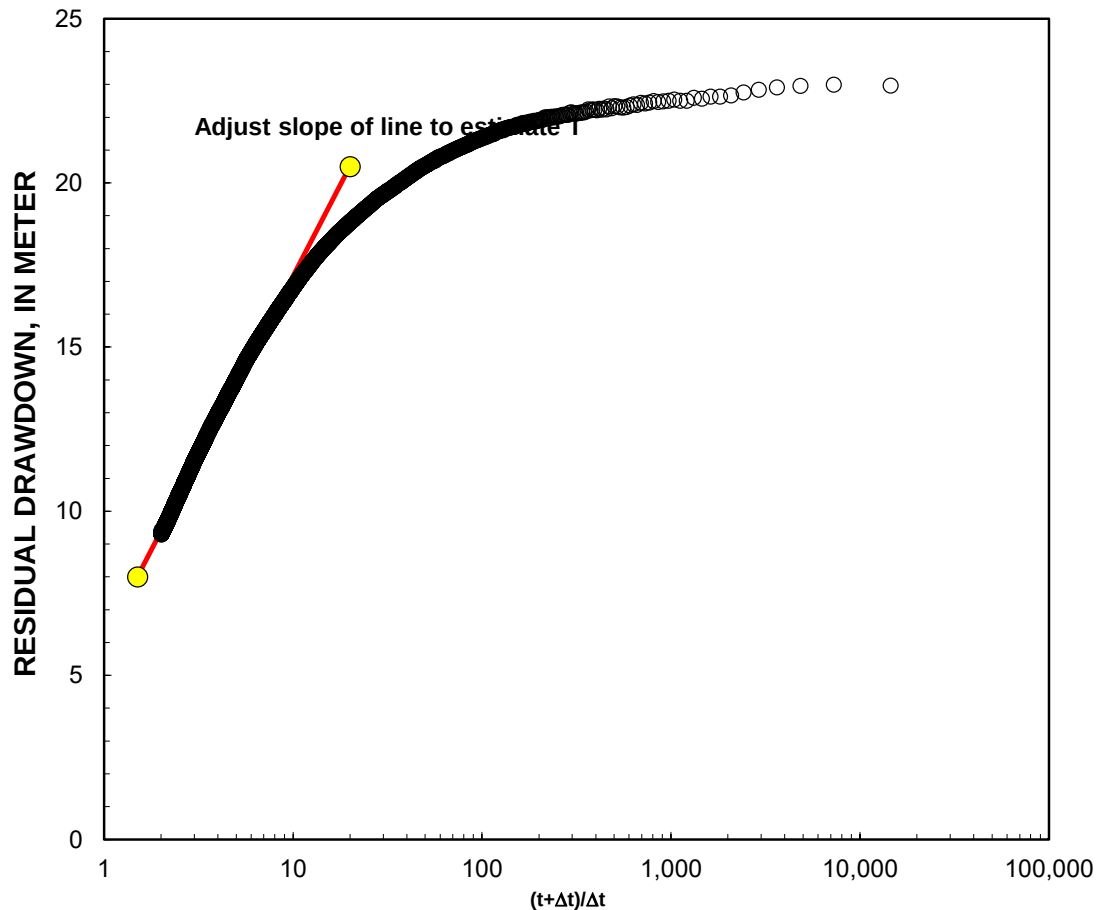
COMPUTED

Aquifer thickness = 55 Meter

Slope = 3.386851 Meter/log10

Input is consistent.

K = 0.11 Meter/Day

T = 5.8 Meter²/Day

REMARKS:

Cooper-Jacob recovery analysis of single-well aquifer test

Taking the average pumping from 02/05/23 (11:00am) to 12/05/2023 (13:15pm) - 14.62m3/hr from the Campions excel data sheet
Screen lenght is not known - I have used 30m as example

Reduced Data					
	Time,	Water Level		Time,	Water Level
Entry	Date Hr:Min:Sec	Meter	Entry	Date Hr:Min:Sec	Meter
1	1/0/00 0:00:00	52.23	51	#N/A	#N/A
2	1/10/00 2:32:00	29.79	52	#N/A	#N/A
3	1/10/00 2:52:00	30.02	53	#N/A	#N/A
4	1/10/00 3:12:00	30.21	54	#N/A	#N/A
5	1/10/00 3:32:00	30.36	55	#N/A	#N/A
6	1/10/00 3:52:00	30.53	56	#N/A	#N/A
7	1/10/00 4:12:00	30.65	57	#N/A	#N/A
8	1/10/00 4:32:00	30.81	58	#N/A	#N/A
9	1/10/00 4:52:00	30.94	59	#N/A	#N/A
10	1/10/00 5:12:00	31.08	60	#N/A	#N/A
11	1/10/00 5:32:00	31.19	61	#N/A	#N/A
12	1/10/00 5:52:00	31.30	62	#N/A	#N/A
13	1/10/00 6:12:00	31.42	63	#N/A	#N/A
14	1/10/00 6:32:00	31.52	64	#N/A	#N/A
15	1/10/00 6:52:00	31.61	65	#N/A	#N/A
16	1/10/00 7:12:00	31.72	66	#N/A	#N/A
17	1/10/00 7:32:00	31.82	67	#N/A	#N/A
18	1/10/00 7:52:00	31.91	68	#N/A	#N/A
19	1/10/00 8:12:00	32.02	69	#N/A	#N/A
20	1/10/00 8:32:00	32.10	70	#N/A	#N/A
21	1/10/00 8:52:00	32.20	71	#N/A	#N/A
22	1/10/00 9:12:00	32.28	72	#N/A	#N/A
23	1/10/00 9:32:00	32.36	73	#N/A	#N/A
24	1/10/00 9:52:00	32.44	74	#N/A	#N/A
25	1/10/00 10:12:00	32.50	75	#N/A	#N/A
26	#N/A	#N/A	76	#N/A	#N/A
27	#N/A	#N/A	77	#N/A	#N/A
28	#N/A	#N/A	78	#N/A	#N/A
29	#N/A	#N/A	79	#N/A	#N/A
30	#N/A	#N/A	80	#N/A	#N/A
31	#N/A	#N/A	81	#N/A	#N/A
32	#N/A	#N/A	82	#N/A	#N/A
33	#N/A	#N/A	83	#N/A	#N/A
34	#N/A	#N/A	84	#N/A	#N/A
35	#N/A	#N/A	85	#N/A	#N/A
36	#N/A	#N/A	86	#N/A	#N/A
37	#N/A	#N/A	87	#N/A	#N/A
38	#N/A	#N/A	88	#N/A	#N/A
39	#N/A	#N/A	89	#N/A	#N/A
40	#N/A	#N/A	90	#N/A	#N/A
41	#N/A	#N/A	91	#N/A	#N/A
42	#N/A	#N/A	92	#N/A	#N/A
43	#N/A	#N/A	93	#N/A	#N/A
44	#N/A	#N/A	94	#N/A	#N/A
45	#N/A	#N/A	95	#N/A	#N/A
46	#N/A	#N/A	96	#N/A	#N/A
47	#N/A	#N/A	97	#N/A	#N/A
48	#N/A	#N/A	98	#N/A	#N/A
49	#N/A	#N/A	99	#N/A	#N/A
50	#N/A	#N/A	100	#N/A	#N/A

RECEIVED: 01/03/2024

WELL ID: PW1-Recovery

INPUT

Construction:	
Casing dia. (d_c)	0.2 Meter
Annulus dia. (d_w)	0.23 Meter
Screen Length (L)	30 Meter
Depths to:	
water level (DTW)	14.82 Meter
Top of Aquifer	14.82 Meter
Base of Aquifer	72 Meter
Annular Fill:	
across screen --	Gravel
above screen --	Bentonite
Aquifer Material --	
Fractured Igneous and	
FLOW RATE	350.88 m ³ /d

Local ID: PW1

Date: #####

Time: 00:00

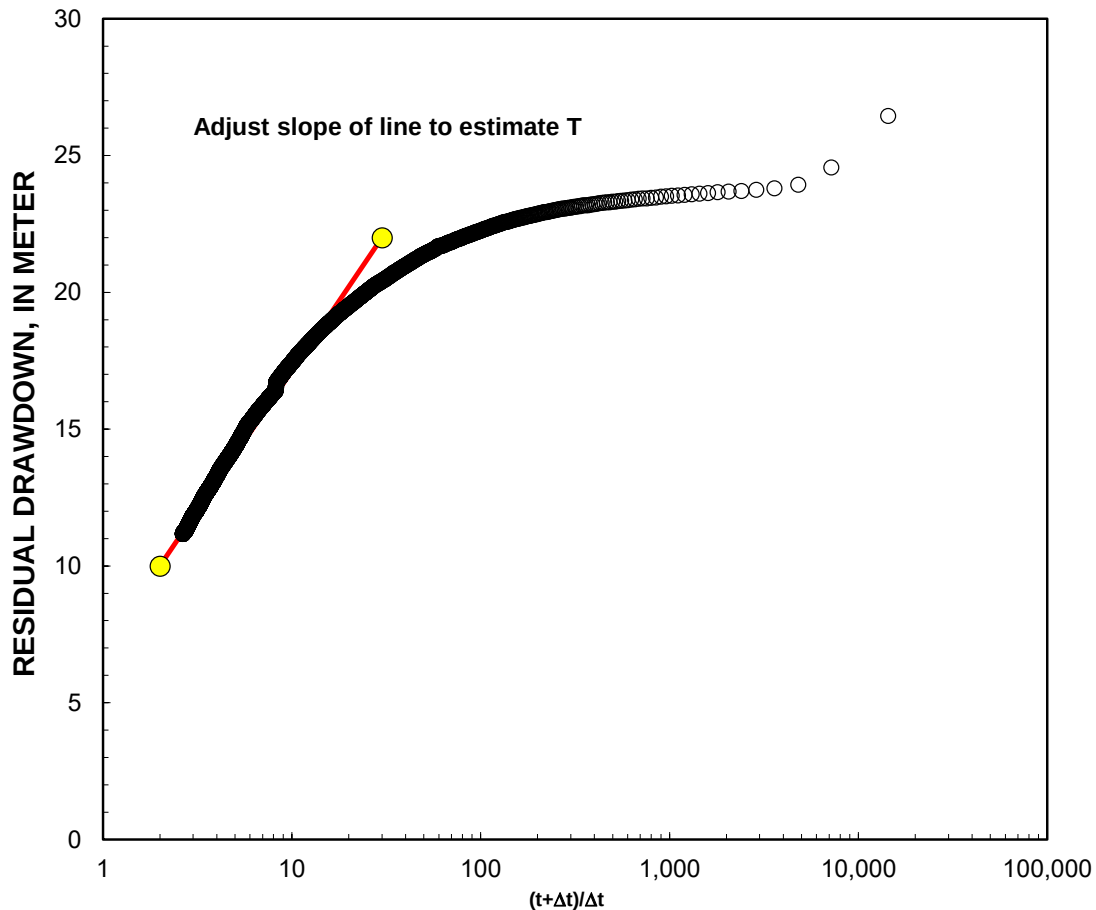
COMPUTED

Aquifer thickness = 57 Meter

Slope = 3.109963 Meter/log10

Input is consistent.

K =	0.11 Meter/Day
T =	6.3 Meter ² /Day



REMARKS:

Cooper-Jacob recovery analysis of single-well aquifer test

Average pumping 19.30m³/hr

Screen length is not known - I have used 30m as example but the production wells i do not think they were installed. The production wells were 200mm casing - annulus size is ramdon

Reduced Data					
Entry	Time,	Water Level	Entry	Time,	Water Level
	Date Hr:Min:Sec	Meter		Date Hr:Min:Sec	Meter
1	1/0/00 0:00:00	49.98	51	#N/A	#N/A
2	1/10/00 0:06:00	26.54	52	#N/A	#N/A
3	1/10/00 0:26:00	26.79	53	#N/A	#N/A
4	1/10/00 0:46:00	26.98	54	#N/A	#N/A
5	1/10/00 1:06:00	27.18	55	#N/A	#N/A
6	1/10/00 1:26:00	27.34	56	#N/A	#N/A
7	1/10/00 1:46:00	27.50	57	#N/A	#N/A
8	1/10/00 2:06:00	27.67	58	#N/A	#N/A
9	1/10/00 2:26:00	27.82	59	#N/A	#N/A
10	1/10/00 2:46:00	27.95	60	#N/A	#N/A
11	1/10/00 3:06:00	28.07	61	#N/A	#N/A
12	1/10/00 3:26:00	28.18	62	#N/A	#N/A
13	1/10/00 3:46:00	28.28	63	#N/A	#N/A
14	1/10/00 4:06:00	28.41	64	#N/A	#N/A
15	1/10/00 4:26:00	28.52	65	#N/A	#N/A
16	1/10/00 4:46:00	28.62	66	#N/A	#N/A
17	1/10/00 5:06:00	28.74	67	#N/A	#N/A
18	1/10/00 5:26:00	28.85	68	#N/A	#N/A
19	1/10/00 5:46:00	28.95	69	#N/A	#N/A
20	1/10/00 6:06:00	29.05	70	#N/A	#N/A
21	1/10/00 6:26:00	29.14	71	#N/A	#N/A
22	1/10/00 6:46:00	29.24	72	#N/A	#N/A
23	1/10/00 7:06:00	29.32	73	#N/A	#N/A
24	1/10/00 7:26:00	29.41	74	#N/A	#N/A
25	1/10/00 7:46:00	29.50	75	#N/A	#N/A
26	#N/A	#N/A	76	#N/A	#N/A
27	#N/A	#N/A	77	#N/A	#N/A
28	#N/A	#N/A	78	#N/A	#N/A
29	#N/A	#N/A	79	#N/A	#N/A
30	#N/A	#N/A	80	#N/A	#N/A
31	#N/A	#N/A	81	#N/A	#N/A
32	#N/A	#N/A	82	#N/A	#N/A
33	#N/A	#N/A	83	#N/A	#N/A
34	#N/A	#N/A	84	#N/A	#N/A
35	#N/A	#N/A	85	#N/A	#N/A
36	#N/A	#N/A	86	#N/A	#N/A
37	#N/A	#N/A	87	#N/A	#N/A
38	#N/A	#N/A	88	#N/A	#N/A
39	#N/A	#N/A	89	#N/A	#N/A
40	#N/A	#N/A	90	#N/A	#N/A
41	#N/A	#N/A	91	#N/A	#N/A
42	#N/A	#N/A	92	#N/A	#N/A
43	#N/A	#N/A	93	#N/A	#N/A
44	#N/A	#N/A	94	#N/A	#N/A
45	#N/A	#N/A	95	#N/A	#N/A
46	#N/A	#N/A	96	#N/A	#N/A
47	#N/A	#N/A	97	#N/A	#N/A
48	#N/A	#N/A	98	#N/A	#N/A
49	#N/A	#N/A	99	#N/A	#N/A
50	#N/A	#N/A	100	#N/A	#N/A

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RECEIVED: 01/03/2024

APPENDIX 8-4

Past Flood Event Local Area Summary Report

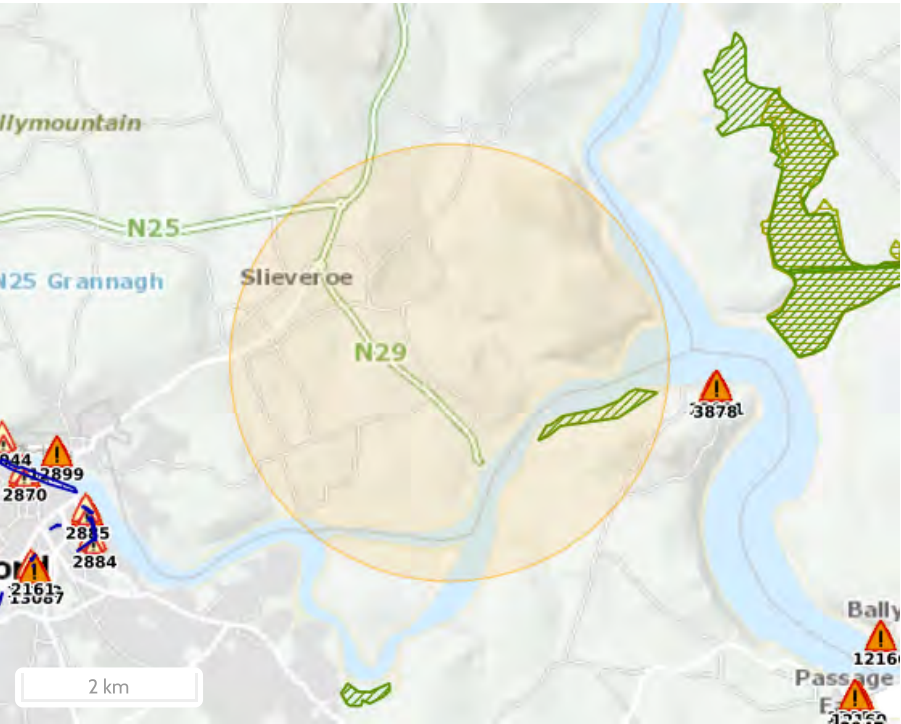


OPW Oifig na nOibreacha Poiblí
Office of Public Works

Report Produced: 13/2/2024 16:27

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

0 Results

Name (Flood_ID)	Start Date	Event Location
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