

LEGEND:

- MW103 — Groundwater Well Installation (Superficial Perched Groundwater)
- MW101 — Groundwater Well Installation (Pennine Middle Coal Measures Formation)
- VP101 — Vapour Well Installation
- MW105A — Shallow Borehole to investigate superficial deposits, no installation
- 45.07 — Groundwater elevation (mAOD)
- mAOD — Metres Above Ordnance Datum

REV	DATE	DESCRIPTION	BY	CHD.	APR.
B	14.03.22	SECOND ISSUE	AS	ML	ML
A	03.08.21	FIRST ISSUE	HD	ML	ML

Dimensions	Projection	Scale	Orig Size
m		AS SHOWN	A3

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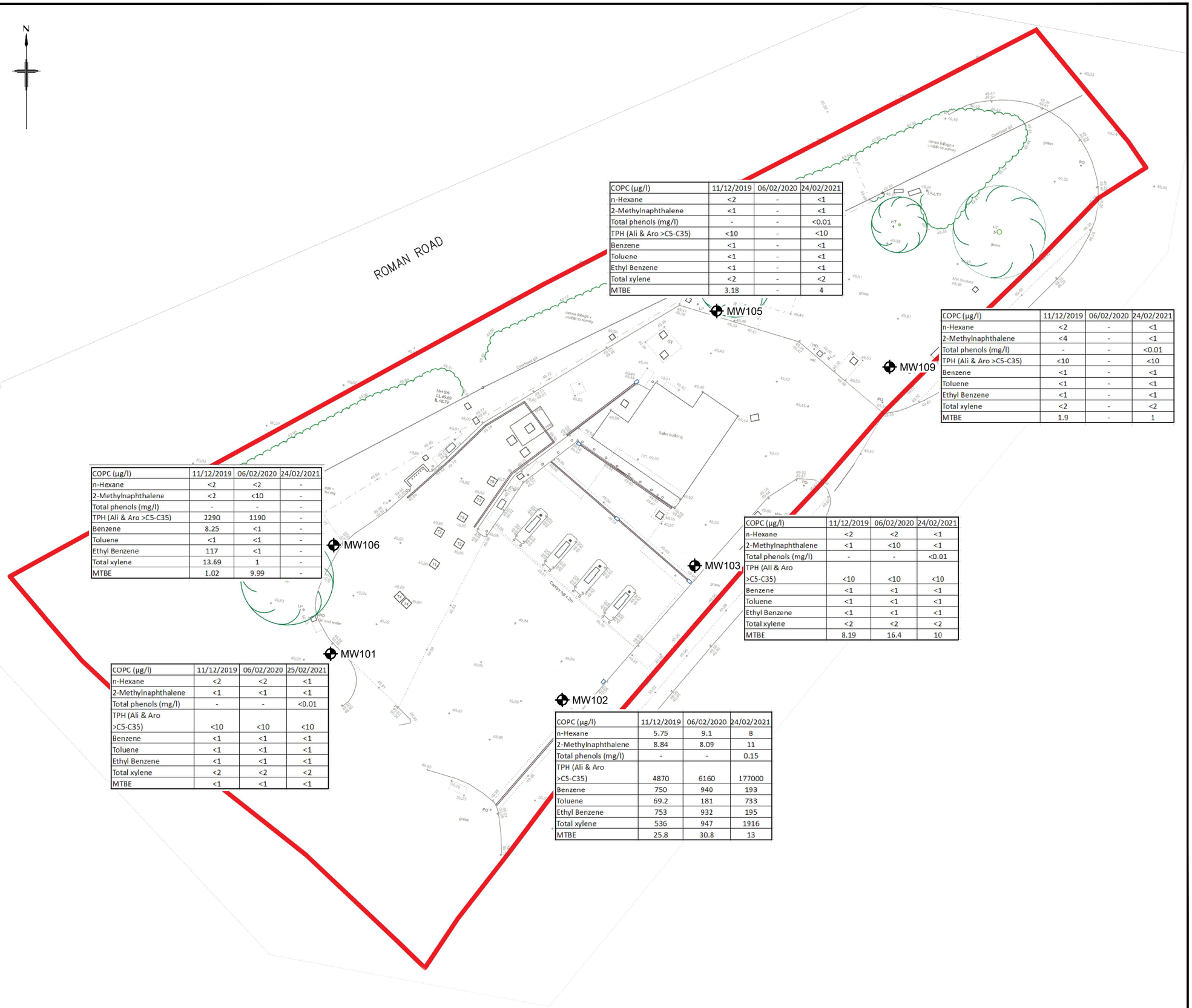
CLIENT
SHELL UK OIL PRODUCTS LIMITES

PROJECT
SHELL WHITEMARE POOL

TITLE
GROUNDWATER ELEVATION PLOT
24th JUNE 2021

JOB No.:	DRAWING FILE:
355390	355390-R01(00)D002fB

BY:	DATE:	CONTRACT NO.		REV:
AS	14.03.22		FIGURE 2f	B



COPC (µg/l)	11/12/2019	06/02/2020	24/02/2021
n-Hexane	<2	-	<1
2-Methylnaphthalene	<1	-	<1
Total phenols (mg/l)	-	-	<0.01
TPH (Ali & Aro >C5-C35)	<10	-	<10
Benzene	<1	-	<1
Toluene	<1	-	<1
Ethyl Benzene	<1	-	<1
Total xylene	<2	-	<2
MTBE	3.18	-	4

COPC (µg/l)	11/12/2019	06/02/2020	24/02/2021
n-Hexane	<2	-	<1
2-Methylnaphthalene	<4	-	<1
Total phenols (mg/l)	-	-	<0.01
TPH (Ali & Aro >C5-C35)	<10	-	<10
Benzene	<1	-	<1
Toluene	<1	-	<1
Ethyl Benzene	<1	-	<1
Total xylene	<2	-	<2
MTBE	1.9	-	1

COPC (µg/l)	11/12/2019	06/02/2020	24/02/2021
n-Hexane	<2	<2	-
2-Methylnaphthalene	<2	<10	-
Total phenols (mg/l)	-	-	-
TPH (Ali & Aro >C5-C35)	2290	1190	-
Benzene	8.25	<1	-
Toluene	<1	<1	-
Ethyl Benzene	117	<1	-
Total xylene	13.69	1	-
MTBE	1.02	9.99	-

COPC (µg/l)	11/12/2019	06/02/2020	24/02/2021
n-Hexane	<2	<2	<1
2-Methylnaphthalene	<1	<10	<1
Total phenols (mg/l)	-	-	<0.01
TPH (Ali & Aro >C5-C35)	<10	<10	<10
Benzene	<1	<1	<1
Toluene	<1	<1	<1
Ethyl Benzene	<1	<1	<1
Total xylene	<2	<2	<2
MTBE	8.19	16.4	10

COPC (µg/l)	11/12/2019	06/02/2020	25/02/2021
n-Hexane	<2	<2	<1
2-Methylnaphthalene	<1	<1	<1
Total phenols (mg/l)	-	-	<0.01
TPH (Ali & Aro >C5-C35)	<10	<10	<10
Benzene	<1	<1	<1
Toluene	<1	<1	<1
Ethyl Benzene	<1	<1	<1
Total xylene	<2	<2	<2
MTBE	<1	<1	<1

COPC (µg/l)	11/12/2019	06/02/2020	24/02/2021
n-Hexane	5.75	9.1	8
2-Methylnaphthalene	8.84	8.09	11
Total phenols (mg/l)	-	-	0.15
TPH (Ali & Aro >C5-C35)	4870	6160	177000
Benzene	750	940	193
Toluene	69.2	181	733
Ethyl Benzene	753	932	195
Total xylene	536	947	1916
MTBE	25.8	30.8	13

LEGEND

Monitoring Well Location

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
01	14.03.2022	-	AS	ML	ML
00	22.04.2021	-	MW	ML	ML

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Client
Shell UK Oil Products Limited

Project Title
Shell Whitemare Pool

Drawing Title
SITE PLAN WITH COPC IN GROUNDWATER

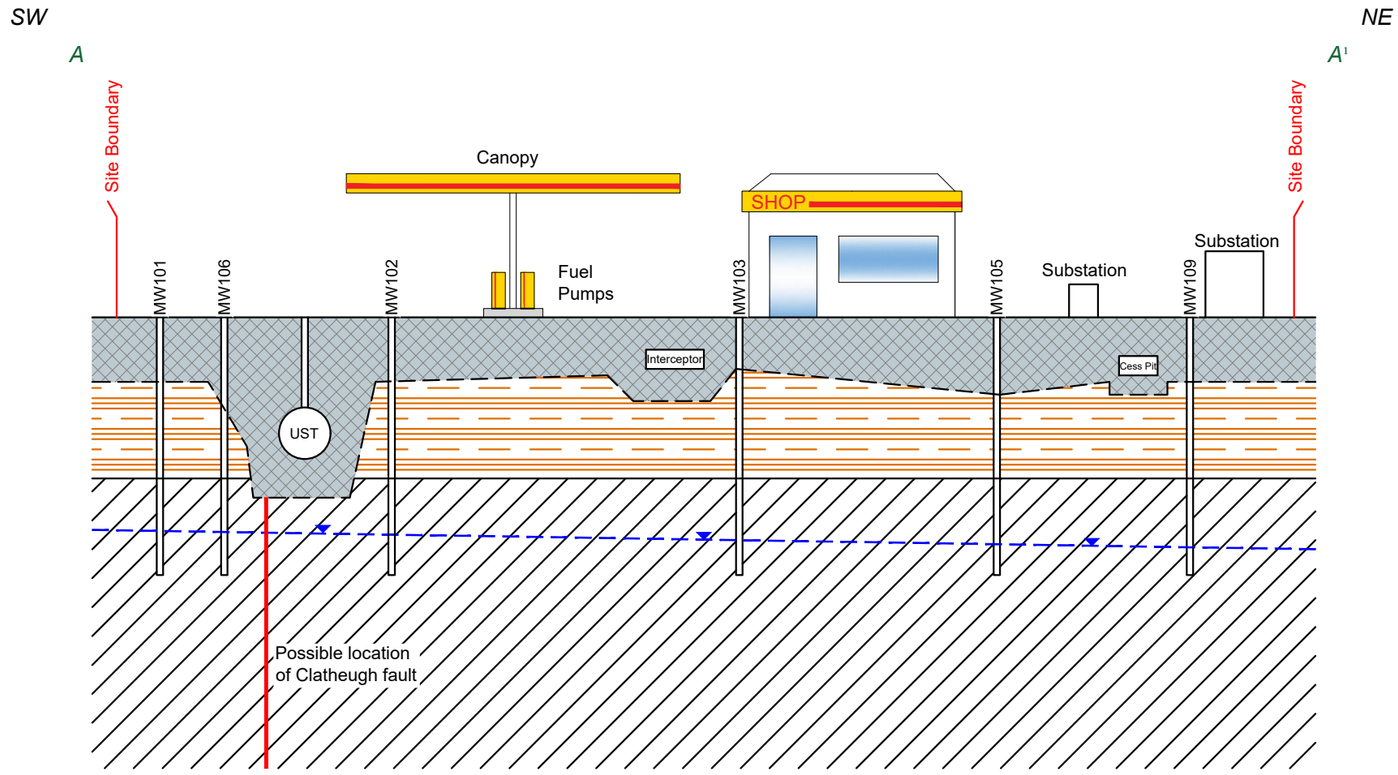
Drawn	Date	Checked	Date	Approved	Date
AS	14.03.22	ML	14.03.22	ML	14.03.22

Dimensions	Scale	Original Size
m	1:400	A3

Project Number	Drawing Number
355390	Figure 3

Drawing File	Rev
355390 - Fig 3 - rev 01 - SRP	01

0 5 10 15 20m



Sources

Potential on-site primary sources:

- petrol/ diesel as light non-aqueous phase liquid (LNAPL) arising from potential releases from fuel storage tanks and fuel lines;
- petrol/ diesel as light non-aqueous phase liquid (LNAPL) arising from potential releases from fuel dispensing infrastructure (underground pump lines, pump islands); and
- potential petroleum hydrocarbon COPC arising from potential releases from surface drainage interceptors and drainage.

Potential on-site secondary sources :

- soil impacted with retail petroleum COPC;
- dissolved phase retail petroleum COPC within groundwater; and
- soil vapour originating from retail petroleum COPC

Pathways

Human health:

- permeation of plastic pipework;
- particulate - ingestion, inhalation, dermal contact, with soil particulates; and
- volatilisation and subsequent vertical and lateral migration of vapours via permeable strata / along backfill to service trenches.

Controlled waters:

- leaching from unsaturated zone soils;
- remobilisation; and lateral and/or vertical migration.

Receptors

- on-site shop staff, visiting staff and general public;
- visiting contractors excavating ground;
- off-site workers and visitors in commercial properties to the south west of the site;
- surface water (Unnamed drain approximately 68m west of site but potentially as close as 30m north west of site, Monkton Burn 280m south east at its closest point and ponds 155m south west and 300m north east of site); and
- perched groundwater within the Pelaw Clay Member (Unproductive Strata) and Pennine Middle Coal Measures Formation (Secondary A Aquifer).

Potentially complete pollutant linkages following GQRA

- COPC in soils - leaching into groundwater in the Pennine Middle Coal Measures Formation (Secondary A Aquifer); and
- COPC in groundwater - lateral and vertical migration - towards the identified down gradient surface water receptors (Monkton Burn).

LEGEND

- Made Ground
- Pelaw Clay Member
- Pennine Middle Coal Measures Formation
- Groundwater Level



Rev.	Date	Amendment	Drawn	Chkd.	Appd.
01	14.03.2022	-	AS	ML	-
00	22.04.2021	-	MW	ML	-

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Client: Shell UK Oil Products Limited

Project Title: Shell Whitemare Pool

Drawing Title: Conceptual Site Model

Drawn	Date	Checked	Date	Approved	Date
AS	14.03.22	ML	14.03.22	ML	14.03.22

Dimensions	Scale	Original Size
m	NTS	A3

Project Number: 355390

Drawing Number: Figure 4

Drawing File: 355390 - Fig 4 - rev 01 - CSM

Rev: 01

APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Shell UK Oil Products Ltd (the "Client") in accordance with the terms of a contract between RSK and the Client, dated 11 January 2021 The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.

12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B
SUSTAINABILITY CONSIDERATIONS

APPROACH TO SUSTAINABILITY FOR PHASE 1, PHASE 2 AND RISK ASSESSMENT PROJECTS

Sustainability is inherent within RSK's business culture and daily operations through ISO14001. RSK's operates according to 9 key principles. These are:

1. Hiring, retaining and rewarding talented and dedicated people
2. Building enduring client relationships
3. Encouraging continuous improvement and innovation
4. Promoting a learning culture in a positive working environment
5. Marking strategic investments for sustainable growth
6. Committing to strong, predictable financial performance
7. Maintaining unwavering commitment to health and safety
8. Promoting the concept of sustainability in all that we do
9. Encouraging staff consultation and clear communication

The principle that specifically relates to sustainability is to '***promote the concept of sustainability in all that we do***' although social, economic and environmental considerations are relevant to each of the 9 principles above.

RSK has staff at 36 UK and 22 European locations. RSK strives to find innovative and more sustainable methods of working. For example, local offices are utilised where project work and staff competencies allow, deliverables are issued electronically, low-flow sampling is used to reduce waste water. Annually RSK sets corporate responsibility targets. The focus of these targets is determined by resources, ability to influence and change behaviour, reduce costs, and reduce our carbon footprint. An example from each of the four sectors targeted (community, work place, supply chain, and environment) is below.

BiTC subject area	Objective	Target	Strategy for success	Responsible person/team	Time scale	Deliverable (where applicable)	Status as at June 2012
Community	Engage with university and school students on the environment and careers/employability	RSK to attend 2 events per year where we are available to school and university students to discuss the environment, our skills areas and careers/employability	Relevant events include careers fairs and delivering lectures/lessons on the environment or RSK's specialist areas. Must be in RSK time and cannot have marketing the company as sole agenda	Person who coordinates CR calls	2 relevant events attended by RSK from April 2012 - April 2013 and record kept	Matrix of Activities updated as per office activities	Column in Matrix of Activities to be updated by person who coordinates CR calls
Workplace	Continue to hire and retain those who are the most suited to the job, to encourage the next generation of professionals and to maintain RSK's position as Investors in People	Apprenticeship - continue to hire more apprentices to match business need	Apprentices to continue to be hired where there is need within the business	Line Managers	Ongoing	Apprenticeships started in FY12-13	Ongoing
Supply chain	RSK to encourage wiser travel* by addressing travel carried out for clients	Include teleconferencing/phone meetings as alternative to travel to meetings in tenders	Staff to include teleconferencing/phone meetings as alternative to travel to meetings in tenders	All staff	April 2013	SHEQ MS audits of OP05 Tender Management to reveal whether this is included where applicable - aim for 50% achievement in first year (i.e. by 2013)	OP05 and audit checklist have been updated in order to allow for progress monitoring
Environment	Understand impact of UK water use at RSK offices	Measure carbon footprint associated with RSK office water use for FY 12-13	All RSK offices to request water meter readings for w/c 2nd April 2012 and w/c 1st April 2013. CR Coordinator and CR Manager to calculate footprint	CR Reps and person doing carbon footrprint	Summer 2013	Carbon footprint from UK water use	All UK and international offices provided water readings in April 2012. Need another in 2013 to calculate footprint

Targets have been set for energy measurement and reporting. Individual offices have a nominated CR representative who works with the office manager to implement energy saving practices where possible. RSK has also selected a company wide supplier of electricity which uses renewable sources (where RSK has control of the electricity supply contract). RSK is currently focussing on measuring our corporate business travel, including collection of data on distances and modes of transport used, which we will use to determine our carbon footprint and develop strategies for influencing travel methods. This will reduce not only our carbon footprint but also the risk of incidents.

SUSTAINABILITY FOR SHELL PROJECTS

Sustainability is implemented in Shell projects by RSK already using the methods above. Specifically for Shell, sustainability is incorporated at various stages of the E2E plans. At project commencement sustainability and risk-based decision making are linked to the business objectives. Once investigation work is required, best management practices (BMPs) are identified and reported (termed Tier 0).

Tier 0 – Best Management Practices

Where feasible, many BMPs such as those listed below and presented in the accompanying table are already utilised on the majority of projects in accordance with the RSK principles above, where technically appropriate for the specific project. RSK has identified a list of BMPs with methods of measurement and reporting that can be used as a checklist during desk-based and site

investigation work. For each investigation undertaken one or two of these can be selected, the rationale for its selection reported and performance against the BMP reviewed. For example, if a BMP of using local resource and local subcontractors is selected a review could be undertaken against the distance driven to and from site each month. A full list of BMPs relevant to general work and, phase 1 and 2 investigations are presented in the accompanying table in this appendix.

Example BMPs for office and site investigation

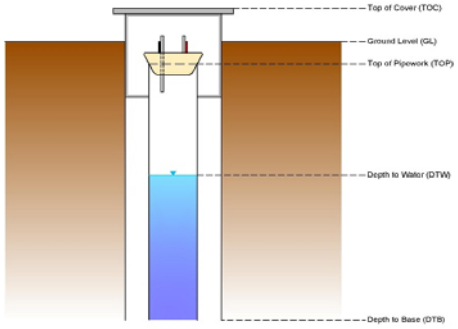
BMP	Benefit / Impact			Measurement
	Social	Economic	Environment	
Use local resource	People away from home less	Generates local employment Less travel costs	Reduced emissions	Mileage by staff and subcontractors
Conference calls	Less face to face time for building relationships	Reduced travel costs	Reduced emissions	Reason for travel
Use low-flow sampling techniques	Truer reflection of dissolved phase impact and thus more certainty in decision making	Reduced waste disposal costs	Reduced waste production	Sampling methodology employed on projects
Use onsite testing kits	Time saving and thus faster decision making	Reduced laboratory costs where onsite testing is cheaper	Reduced waste owing to fewer samples analysed	Percentage of onsite testing versus laboratory
Use a slug for permeability testing	NA	Reduced waste disposal costs	Reduced potential for waste water spillage	Qualitative statement

APPENDIX C
LOW FLOW GROUNDWATER SAMPLING RECORDS

Groundwater Sampling Data Form

Project Information	Project Name:	Shell Whitemare Pool		
	Project Number:	355390		
	Sampling Date:	24/02/2021	Sampled by:	Mike Lyskawa
	Weather:	Overcast, wet, 10oC		
	Well Notes - e.g. Condition, access, safety:			

Monitoring Information	Water Quality Meter Used:	Aquaread		
	Water Quality Meter Last Calibrated:	24/02/2021		
	Dissolved oxygen probe last calibrated:	24/02/2021		
	Water Level Meter Used (tick applicable):			
	Interface probe	X	Dip Meter	



Typical Parameter Stabilisation Criteria for Low-Flow Sampling	
Dissolved Oxygen (D.O.)	0.3 mg/l
Specific Conductivity (Sp.Cond)	3%
p.H	0.1 unit
Oxygen Reduction Potential (ORP)	10mV
* For REDOX correction, see separate guidance	

Well location	MW102 + QAQC1									
Measurement datum:	Notes: **Tick** the measurement datum used below and always include the offset to ground level. If ticked 'Ground Level', the offset to GL will be 0m. **Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL.** See figure above for definitions.									
Top of Cover (TOC)		Ground Level (GL)		Top of Pipework (TOP)	X	Offset from **datum** to GL (m):	-0.15			

Start Time:	10:40	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Corr. REDOX (mV)	Notes / Flow (ml/min)
Well Diameter (mm)	50								Aquaread[4]	<Select Probe
Well Material	HDPE	10:43	11.6	2273	1.11	7.39	-137.6	5.34	78.2	40ml/24sec
Static Water Level (m)	5.27	10:46	11.1	2276	0.12	7.47	-147.7	5.41	68.7	
		10:49	11.1	2255	0.02	7.48	-148.5	5.44	67.9	
LNAPL Present?	Y N X	10:52	11.1	2263	0	7.49	-150.1	5.47	66.3	
LNAPL Level (m)		10:55	11.0	2257	0	7.5	-151	5.49	65.4	
Well Headspace Reading (PID/FID)										
Purge Method	Low Flow X ~1.8L									
	Other:									
Sampling Method	Peristaltic Other:									
	Bladder X									
Pump Intake Depth (m)	6.9									
Depth to Base (m)	9.36	Sampling Notes (e.g. oil/colour/odour), Reasons if not monitored		Clear						
DNAPL Present?	Y N X	Sample Containers Obtained		2G, 3V, H2S04, +2G, 3V, H2SO4						
DNAPL Level (m)		Sample Collection Time		10:56						

Groundwater Sampling Data Form

Well location	MW103										
Measurement datum:	Notes: **Tick** the measurement datum used below and <u>always include the offset to ground level.</u> If ticked 'Ground Level', the offset to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.										
Top of Cover (TOC)		Ground Level (GL)		Top of Pipework (TOP)	X	Offset from **datum** to GL (m):	-0.08				
Start Time:	12:08	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Corr. REDOX (mV)	Notes / Flow (ml/min)	
Well Diameter (mm)	50								Aquaread[4]	<Select Probe	
Well Material	HDPE	12:11	10.88	3057	2.74	6.89	-37.1	0.33	179.3		
Static Water Level (m)	0.28	12:14	9.6	3304	0.83	6.95	-39.7	0.35	177.3		
		12:17	8.8	3292	0.21	7.02	-43.3	0.37	173.7		
LNAPL Present?	Y [ ] N [X]	12:20	8.6	3251	0.13	7.07	-45.7	0.39	171.3		
LNAPL Level (m)		12:23	8.5	3237	0.03	7.1	-47	0.41	170		
Well Headspace Reading (PID/FID)											
Purge Method	Low Flow [X] ~ 1L										
	Other: [ ]										
Sampling Method	Peristaltic [ ] Other: [ ]										
	Bladder [X]										
Pump Intake Depth (m)	1.1m										
Depth to Base (m)	1.7	Sampling Notes (e.g. oil/colour/odour), Reasons if not monitored		Clear							
DNAPL Present?	Y [ ] N [x]	Sample Containers Obtained		2G, 3V, H2SO4							
DNAPL Level (m)		Sample Collection Time		12:24							

Well location	MW109										
Measurement datum:	Notes: **Tick** the measurement datum used below and <u>always include the offset to ground level.</u> If ticked 'Ground Level', the offset to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.										
Top of Cover (TOC)		Ground Level (GL)		Top of Pipework (TOP)	X	Offset from **datum** to GL (m):	-0.1				
Start Time:	13:27	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Corr. REDOX (mV)	Notes / Flow (ml/min)	
Well Diameter (mm)	50								Aquaread[4]	<Select Probe	
Well Material	HDPE	13:30	10.7	1780	0.94	6.88	-33	6.03	183.4	40ml/38sec	
Static Water Level (m)	5.74	13:33	10.65	1761	0.62	6.96	-36.6	6.08	179.8		
		13:36	10.6	1750	0.57	6.98	-38.1	6.15	178.3		
LNAPL Present?	Y [ ] N [X]	13:39	10.6	1729	0.36	7.01	-40	6.21	176.4		
LNAPL Level (m)										Start sampling without stabilisation due to slow and low water recharge	
Well Headspace Reading (PID/FID)											
Purge Method	Low Flow [X] ~1L										
	Other: [ ]										
Sampling Method	Peristaltic [ ] Other: [ ]										
	Bladder [X]										
Pump Intake Depth (m)	7m										
Depth to Base (m)	9.37	Sampling Notes (e.g. oil/colour/odour), Reasons if not monitored		Clear							
DNAPL Present?	Y [ ] N [x]	Sample Containers Obtained		2G, 3V, H2SO4							
DNAPL Level (m)		Sample Collection Time		13:40							

Groundwater Sampling Data Form

Well location	MW105						
Measurement datum:	Notes: **Tick** the measurement datum used below and <u>always include the offset to ground level.</u> If ticked 'Ground Level', the offset to GL will be 0m. Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL. See figure above for definitions.						
Top of Cover (TOC)		Ground Level (GL)		Top of Pipework (TOP)	X	Offset from **datum** to GL (m):	-0.22

Start Time:	14:40
Well Diameter (mm)	50
Well Material	HDPE
Static Water Level (m)	5.82
LNAPL Present?	Y [ ] N [X]
LNAPL Level (m)	
Well Headspace Reading (PID/FID)	
Purge Method	Low Flow [X] ~2L; Other: [ ]
Sampling Method	Peristaltic [ ] Other: [ ]; Bladder [X]
Pump Intake Depth (m)	6.6
Depth to Base (m)	7.86
DNAPL Present?	Y [ ] N [x]
DNAPL Level (m)	

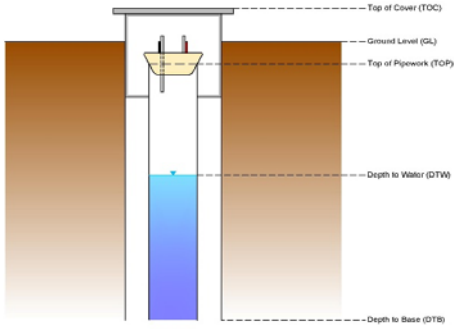
Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Corr. REDOX (mV)	Notes / Flow (ml/min)
							Aquaread[4]	<Select Probe
14:44	10.6	1474	2.78	6.7	-24	5.83	192.4	40ml/24sec
14:47	10.5	1479	0.75	6.83	-28.4	5.83	188	
14:50	10.5	1463	0.49	6.88	-30.9	5.83	185.5	
14:53	10.5	1457	0.47	6.91	-32.5	5.83	183.9	
14:56	10.5	1459	0	6.96	-35	5.84	181.4	
14:59	10.5	1457	0	6.98	-35.9	5.84	180.5	
15:02	10.5	1455	0	7	-36.3	5.84	180.1	

Sampling Notes (e.g. oil/colour/odour), Reasons if not monitored	Clear
Sample Containers Obtained	2G, 3V, H2SO4
Sample Collection Time	15:02

Groundwater Sampling Data Form

Project Information	Project Name:	Shell Whitemare Pool		
	Project Number:	355390		
	Sampling Date:	25/02/2021	Sampled by:	Mike Lyskawa
	Weather:	Clear, dry, 10oC		
	Well Notes - e.g. Condition, access, safety:			

Monitoring Information	Water Quality Meter Used:	Aquaread		
	Water Quality Meter Last Calibrated:	25/02/2021		
	Dissolved oxygen probe last calibrated:	24/02/2021		
	Water Level Meter Used (tick applicable):			
	Interface probe	x	Dip Meter	



Typical Parameter Stabilisation Criteria for Low-Flow Sampling	
Dissolved Oxygen (D.O.)	0.3 mg/l
Specific Conductivity (Sp.Cond)	3%
p.H	0.1 unit
Oxygen Reduction Potential (ORP)	10mV
* For REDOX correction, see separate guidance	

Well location	MW101									
Measurement datum:	Notes: **Tick** the measurement datum used below and always include the offset to ground level. If ticked 'Ground Level', the offset to GL will be 0m. **Record a positive offset if the datum is higher than GL or a negative offset if the datum is below GL.** See figure above for definitions.									
Top of Cover (TOC)		Ground Level (GL)		Top of Pipework (TOP)		Offset from **datum** to GL (m):	-0.11			
Start Time:	9.11	Time (HH:MM)	Temp (oC)	Sp.Cond (µS/cm)	D.O. (mg/l)	pH (units)	ORP (mV)	Depth to Water (m)	Corr. REDOX (mV)	Notes / Flow (ml/min)
Well Diameter (mm)	50								Aquaread⁴	<Select Probe
Well Material	HDPE	09:14	9.3	1334	6.74	6.21	3.6	4.01	220.6	40ml/24sec
Static Water Level (m)	4	09:17	9.5	1329	4.28	6.3	-0.6	4.02	216.4	
		09:20	9.8	1323	3.89	6.41	-7.9	4.03	209.1	
LNAPL Present?	Y N X	09:23	9.9	1311	3.11	6.48	-12.6	4.04	204.4	
LNAPL Level (m)		09:26	10.0	1309	2.99	6.51	-14.4	4.05	202.6	
Well Headspace Reading (PID/FID)		09:29	10.0	1300	2.91	6.58	-18.3	4.05	198.7	
		09:32	10.0	1302	2.87	5.59	-20.1	4.05	196.9	
Purge Method	Low Flow X ~ 1L	09:35	10.0	1306	2.8	6.61	-22.3	4.05	194.7	
	Other:									
Sampling Method	Peristaltic Other:									
	Bladder X									
Pump Intake Depth (m)	4.8									
Depth to Base (m)	6.73	Sampling Notes (e.g. oil/colour/odour), Reasons if not monitored				Clear				
DNAPL Present?	Y N x	Sample Containers Obtained				2G, 3V, H2SO4				
DNAPL Level (m)		Sample Collection Time				09:35				

APPENDIX D
LABORATORY TEST RESULTS

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 21/02099/1

Amendments: Re-issue following query/investigation

Envirolab Job Number: 21/02099
Issue Number: 2 **Date:** 15 March, 2022

Client:
RSK Environment Ltd Glasgow
65 Sussex Street
Glasgow
UK
G41 1DX

Project Manager: Grant Davis/Mark Lodge
Project Name: Shell Whitemare Pool
Project Ref: 355390
Order No: N/A
Date Samples Received: 02/03/21
Date Instructions Received: 02/03/21
Date Analysis Completed: 24/03/21

Approved by:

[redacted]

Holly Neary-King
Client Services Supervisor

UKAS TESTING
1247

Envirolab Job Number: 21/02099

Client Project Name: Shell Whitemare Pool

Client Project Ref: 355390

Lab Sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/6	21/02099/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	MW101	MW102	MW103	MW105	MW109	QAQC Duplicate	QAQC Blank			
Depth to Top	4.8	6.9	1.1	6.6	7					
Depth To Bottom										
Date Sampled	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
TPH total dissolved (>C6-C40) (w)$_{A}^{\#}$	<40	7104	<40	<40	<40	7132	<40	µg/l	40	A-T-007w
Hexane (n-Hexane) (w)$_{A}^{\#}$	<1	8	<1	<1	<1	7	<1	µg/l	1	A-T-022w
1,2-Dichloroethane$_{A}^{\#}$	<2	<2	<2	<2	<2	<2	<2	µg/l	2	A-T-006w
1,2-Dibromoethane$_{A}^{\#}$	<1	<1	<1	<1	<1	<1	<1	µg/l	1	A-T-006w
Ethanol (w)$_{A}$	<100	<100	<100	<100	<100	<100	<100	µg/l	100	Subcon ALS Haw
2-Methylnaphthalene$_{A}$	<1	11	<1	<1	<1	6	<1	µg/l	1	A-T-052w
Fuel Oxygenates (x6) (w)										
TAME (w)$_{A}$	<10	<10	<10	<10	<10	<10	<10	µg/l	10	A-T-022w
ETBE (w)$_{A}$	<10	<10	<10	<10	<10	<10	<10	µg/l	10	A-T-022w
DIPE (w)$_{A}$	<10	<10	<10	<10	<10	<10	<10	µg/l	10	A-T-022w
TBA (w)$_{A}$	<50	<50	<50	<50	<50	<50	<50	µg/l	50	A-T-022w

Envirolab Job Number: 21/02099

Client Project Name: Shell Whitemare Pool

Client Project Ref: 355390

Lab Sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/6	21/02099/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	MW101	MW102	MW103	MW105	MW109	QAQC Duplicate	QAQC Blank			
Depth to Top	4.8	6.9	1.1	6.6	7					
Depth To Bottom										
Date Sampled	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
PAH 16MS (w)										
Acenaphthene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Acenaphthylene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Anthracene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Benzo(a)anthracene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Benzo(a)pyrene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Benzo(b)fluoranthene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Benzo(ghi)perylene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Benzo(k)fluoranthene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Chrysene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Dibenzo(ah)anthracene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Fluoranthene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Fluorene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Indeno(123-cd)pyrene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Naphthalene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Phenanthrene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Pyrene (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Total PAH 16MS (w)$_A^{\#}$	IS	IS	IS	IS	IS	IS	IS	µg/l	0.01	A-T-019w
Phenols (speciated HPLC) (w)										
Phenol (w)$_A$	<0.01	0.03	<0.01	<0.01	<0.01	0.02	<0.01	mg/l	0.01	A-T-050w
Cresols (w)$_A$	<0.01	0.10	<0.01	<0.01	<0.01	0.11	<0.01	mg/l	0.01	A-T-050w
Xylenols (w)$_A$	<0.01	0.02	<0.01	<0.01	<0.01	0.04	<0.01	mg/l	0.01	A-T-050w
Resorcinol (w) $_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	0.01	A-T-050w
Phenols - Total by HPLC (w)$_A$	<0.01	0.15	<0.01	<0.01	<0.01	0.17	<0.01	mg/l	0.01	A-T-050w

Envirolab Job Number: 21/02099

Client Project Name: Shell Whitemare Pool

Client Project Ref: 355390

Lab Sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/6	21/02099/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	MW101	MW102	MW103	MW105	MW109	QAQC Duplicate	QAQC Blank			
Depth to Top	4.8	6.9	1.1	6.6	7					
Depth To Bottom										
Date Sampled	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21	24-Feb-21			
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW			
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
TPH CWG (w) with Clean Up *C1										
Ali >C5-C6 $(w)_A^{\#}$	<1	65	9	4	1	57	<1	µg/l	1	A-T-022w
Ali >C6-C8 $(w)_A^{\#}$	3	185	<1	<1	<1	160	1	µg/l	1	A-T-022w
Ali >C8-C10 $(w)_A^{\#}$	<5	138	<5	<5	<5	93	<5	µg/l	5	A-T-055w
Ali >C10-C12 $(w)_A^{\#}$	<5	<25	<5	<5	<5	<25	<5	µg/l	5	A-T-055w
Ali >C12-C16 $(w)_A^{\#}$	<5	<25	<5	<5	<5	<25	<5	µg/l	5	A-T-055w
Ali >C16-C21 $(w)_A^{\#}$	<5	<25	<5	<5	<5	<25	<5	µg/l	5	A-T-055w
Ali >C21-C35 $(w)_A^{\#}$	<5	52	<5	<5	<5	61	<5	µg/l	5	A-T-055w
Total Aliphatics $(w)_A^{\#}$	<5	440	9	<5	<5	371	<5	µg/l	5	A-T-055w
Aro >C5-C7 $(w)_A^{\#}$	<1	193	<1	<1	<1	159	<1	µg/l	1	A-T-022w
Aro >C7-C8 $(w)_A^{\#}$	<1	733	<1	<1	<1	623	<1	µg/l	1	A-T-022w
Aro >C8-C10 $(w)_A$	<5	14000	<5	<5	<5	13100	<5	µg/l	5	A-T-055w
Aro >C10-C12 $(w)_A^{\#}$	<5	2090	<5	<5	<5	2000	<5	µg/l	5	A-T-055w
Aro >C12-C16 $(w)_A^{\#}$	<5	168	<5	<5	<5	167	<5	µg/l	5	A-T-055w
Aro >C16-C21 $(w)_A^{\#}$	<5	<25	<5	<5	<5	<25	<5	µg/l	5	A-T-055w
Aro >C21-C35 $(w)_A^{\#}$	<10	<50	<10	<10	<10	<50	<10	µg/l	10	A-T-055w
Total Aromatics $(w)_A$	<10	17300	<10	<10	<10	16100	<10	µg/l	10	A-T-055w
TPH (Ali & Aro >C5-C35) $(w)_A$	<10	17700	<10	<10	<10	16500	<10	µg/l	10	A-T-055w
BTEX - Benzene $(w)_A^{\#}$	<1	193	<1	<1	<1	159	<1	µg/l	1	A-T-022w
BTEX - Toluene $(w)_A^{\#}$	<1	733	<1	<1	<1	623	<1	µg/l	1	A-T-022w
BTEX - Ethyl Benzene $(w)_A^{\#}$	<1	195	<1	<1	<1	157	<1	µg/l	1	A-T-022w
BTEX - m & p Xylene $(w)_A^{\#}$	<1	1259	<1	<1	<1	1088	<1	µg/l	1	A-T-022w
BTEX - o Xylene $(w)_A^{\#}$	<1	657	<1	<1	<1	575	<1	µg/l	1	A-T-022w
MTBE $(w)_A^{\#}$	<1	13	10	4	1	12	<1	µg/l	1	A-T-022w

REPORT NOTES

General
This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve
EPH CWG results have humics mathematically subtracted through instrument calculation
TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

v2

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: RSK Environment Ltd Glasgow, 65 Sussex Street, Glasgow, UK, G41 1DX

Project No: 21/02099

Date Received: 02/03/2021 (am)

Project: Shell Whitemare Pool

Cool Box Temperatures (°C): 0.3

Clients Project No: 355390

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples 5 ± 3°C), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

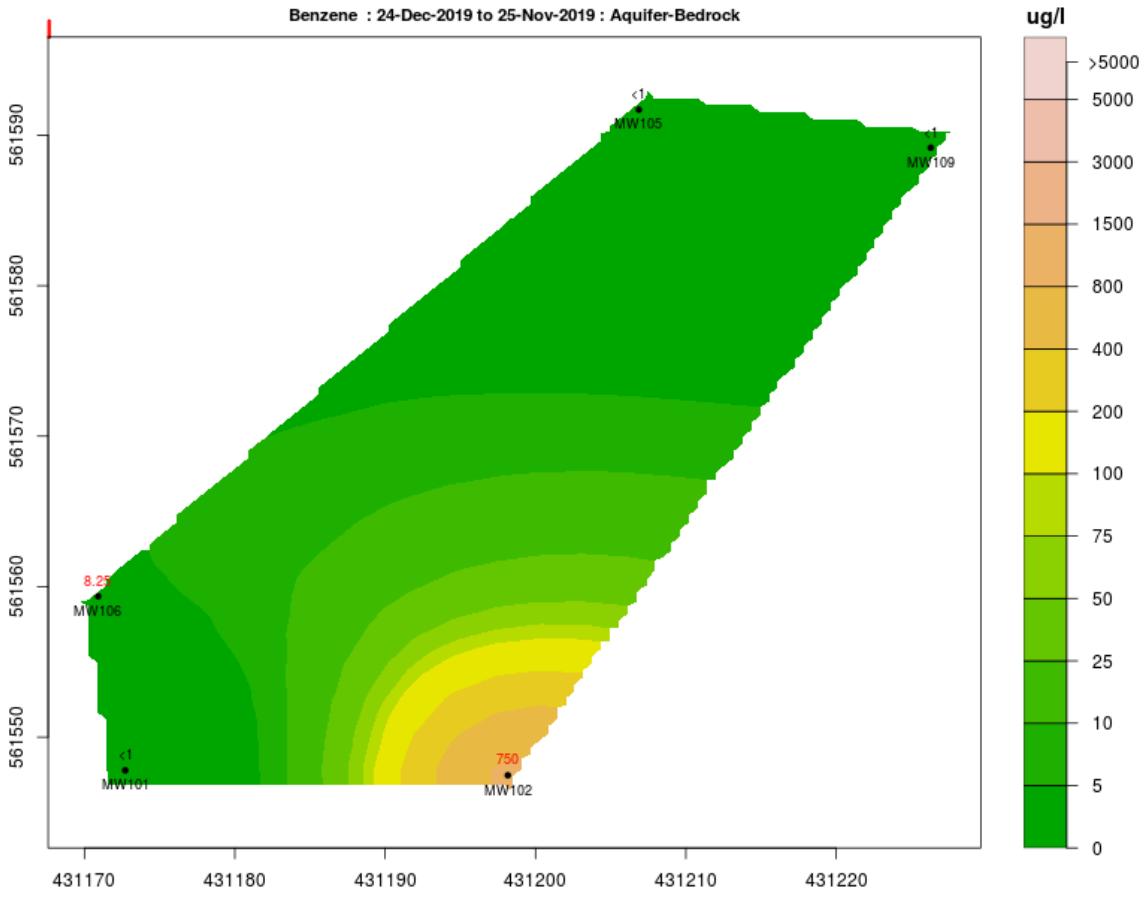
Envirolab Analysis Dates

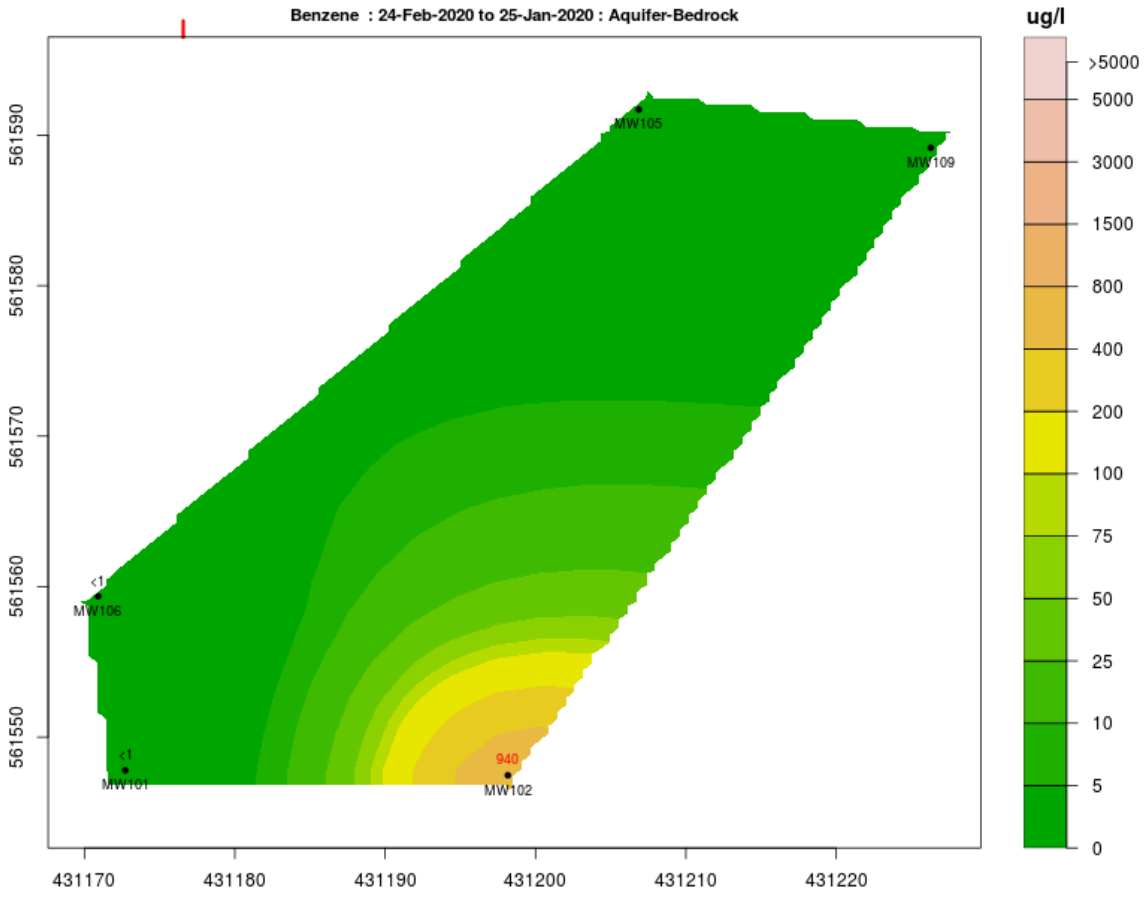
Lab Sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/6	21/02099/7
Client Sample No							
Client Sample ID/Depth	MW101 4.8m	MW102 6.9m	MW103 1.1m	MW105 6.6m	MW109 7m	QAQC Duplicate	QAQC Blank
Date Sampled	24/02/21	24/02/21	24/02/21	24/02/21	24/02/21	24/02/21	24/02/21
A-T-006w	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021
A-T-007w	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
A-T-019w	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021	24/03/2021
A-T-022w	11/03/2021	11/03/2021	11/03/2021	11/03/2021	11/03/2021	11/03/2021	11/03/2021
A-T-050w	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
A-T-052w	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021
A-T-055w	10/03/2021	10/03/2021	10/03/2021	10/03/2021	10/03/2021	10/03/2021	10/03/2021

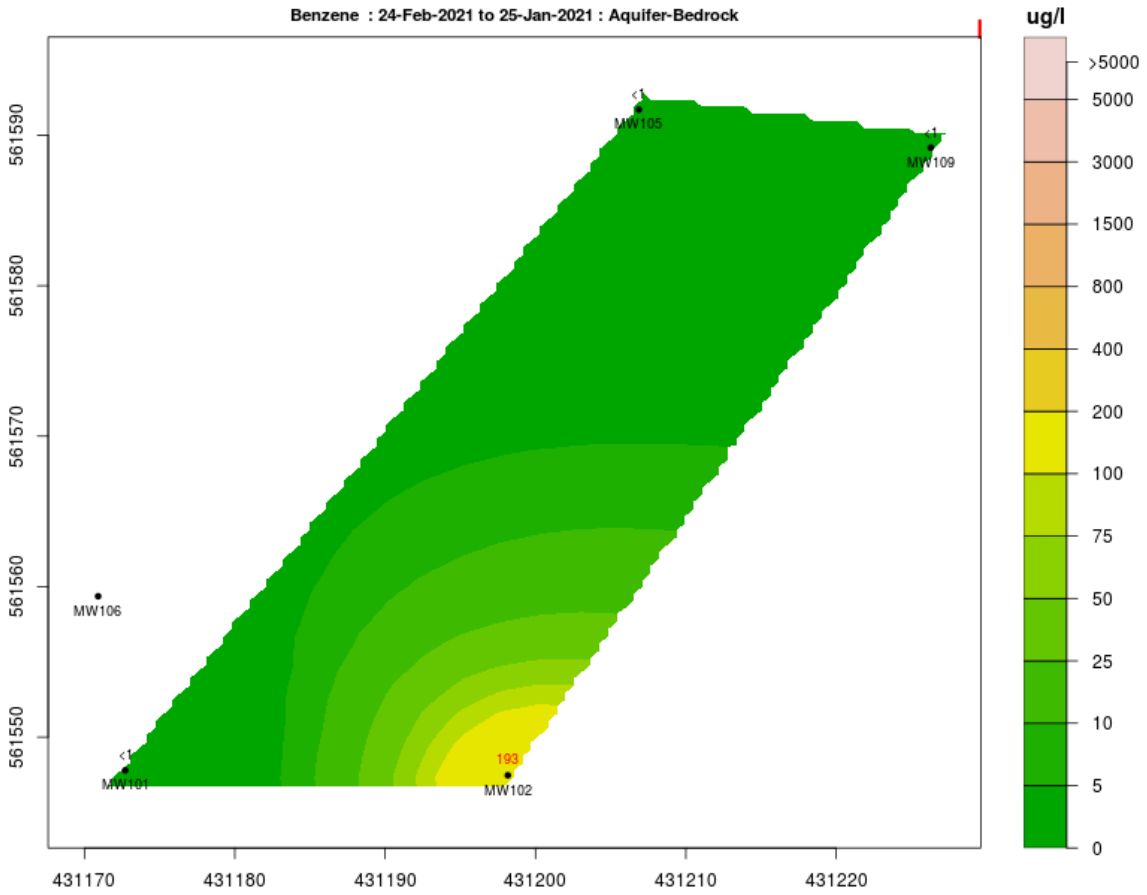
The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

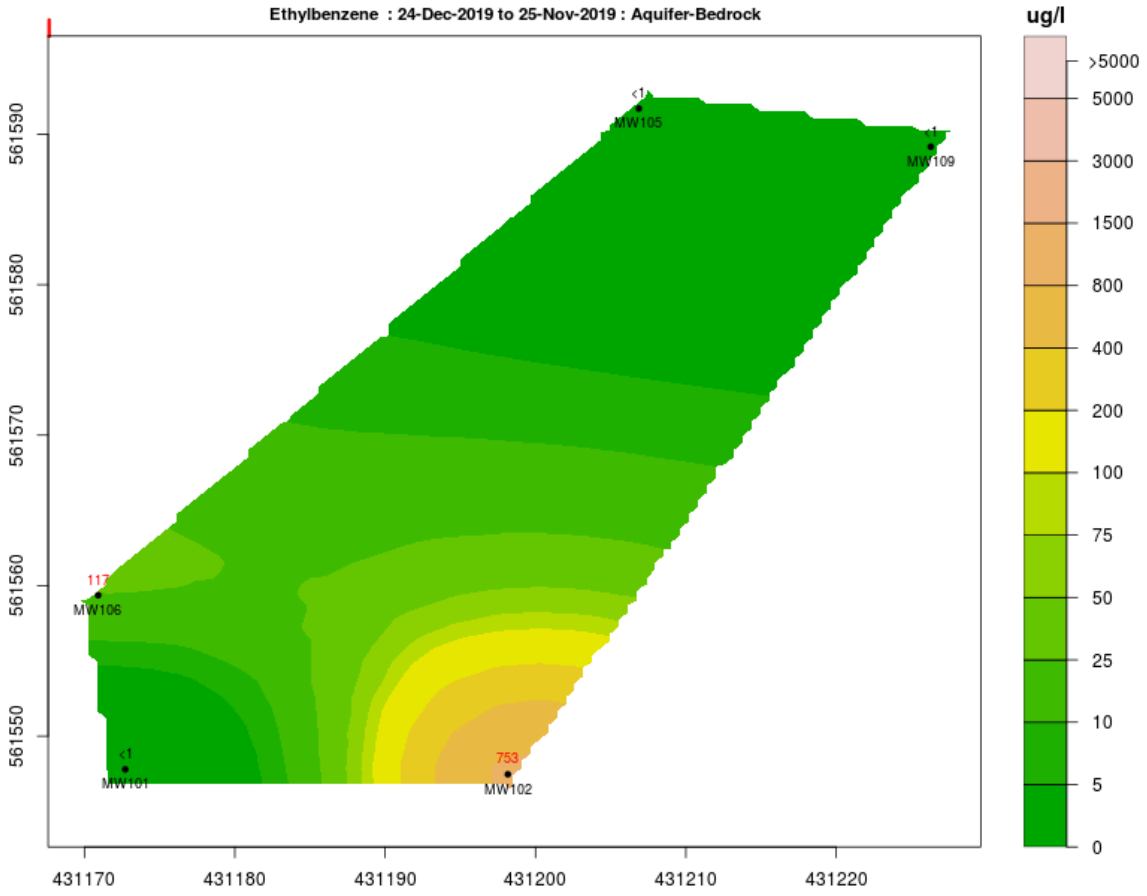
End of Report

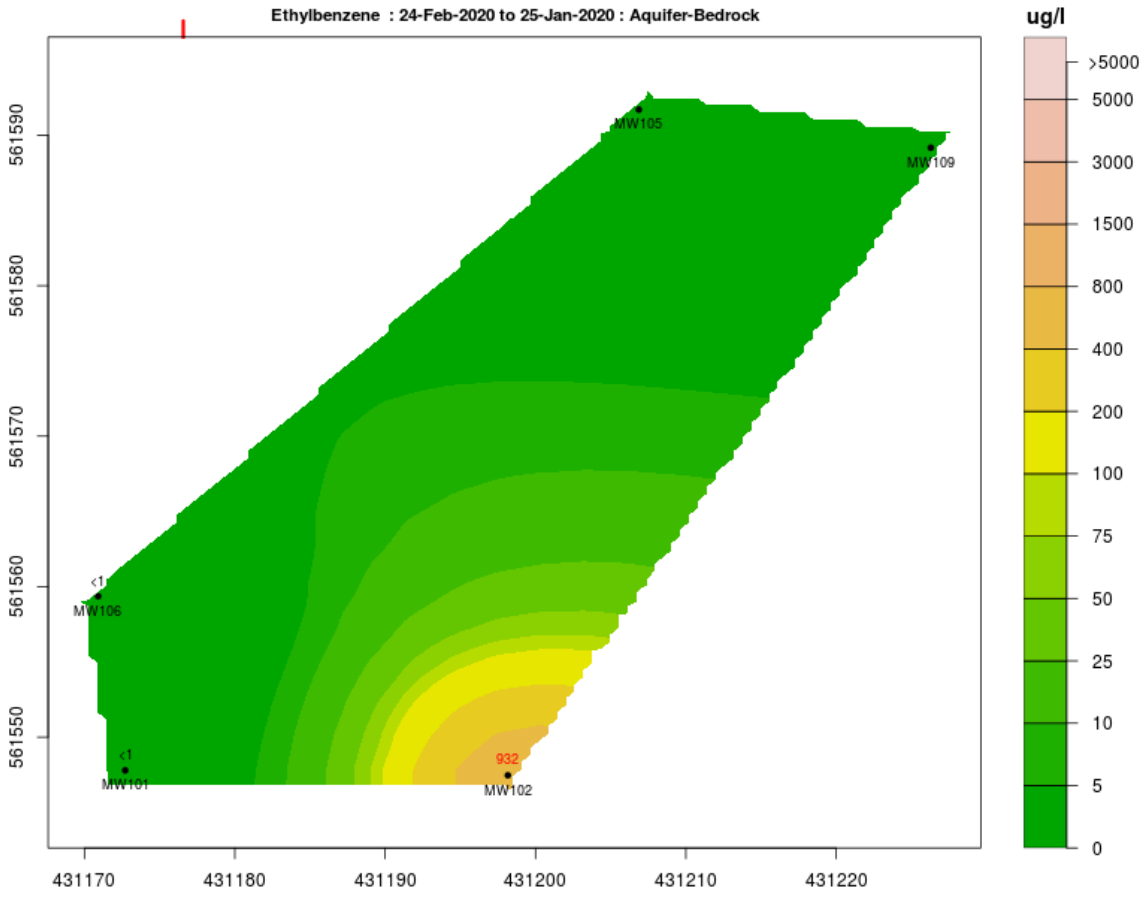
APPENDIX E
GWSDAT OUTPUTS

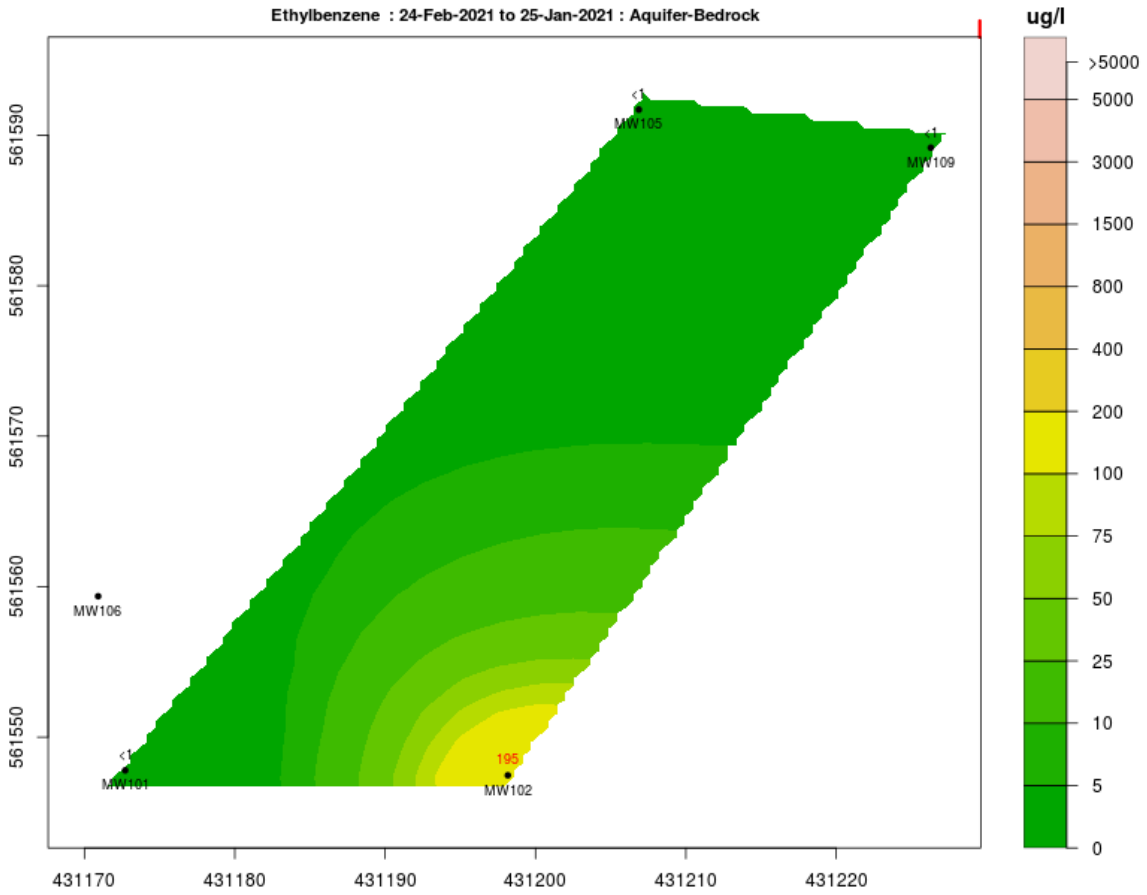

Benzene : 24-Dec-2019 to 25-Nov-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
<1
MW105
<1
MW109
8.25
MW106
<1
MW101
750
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

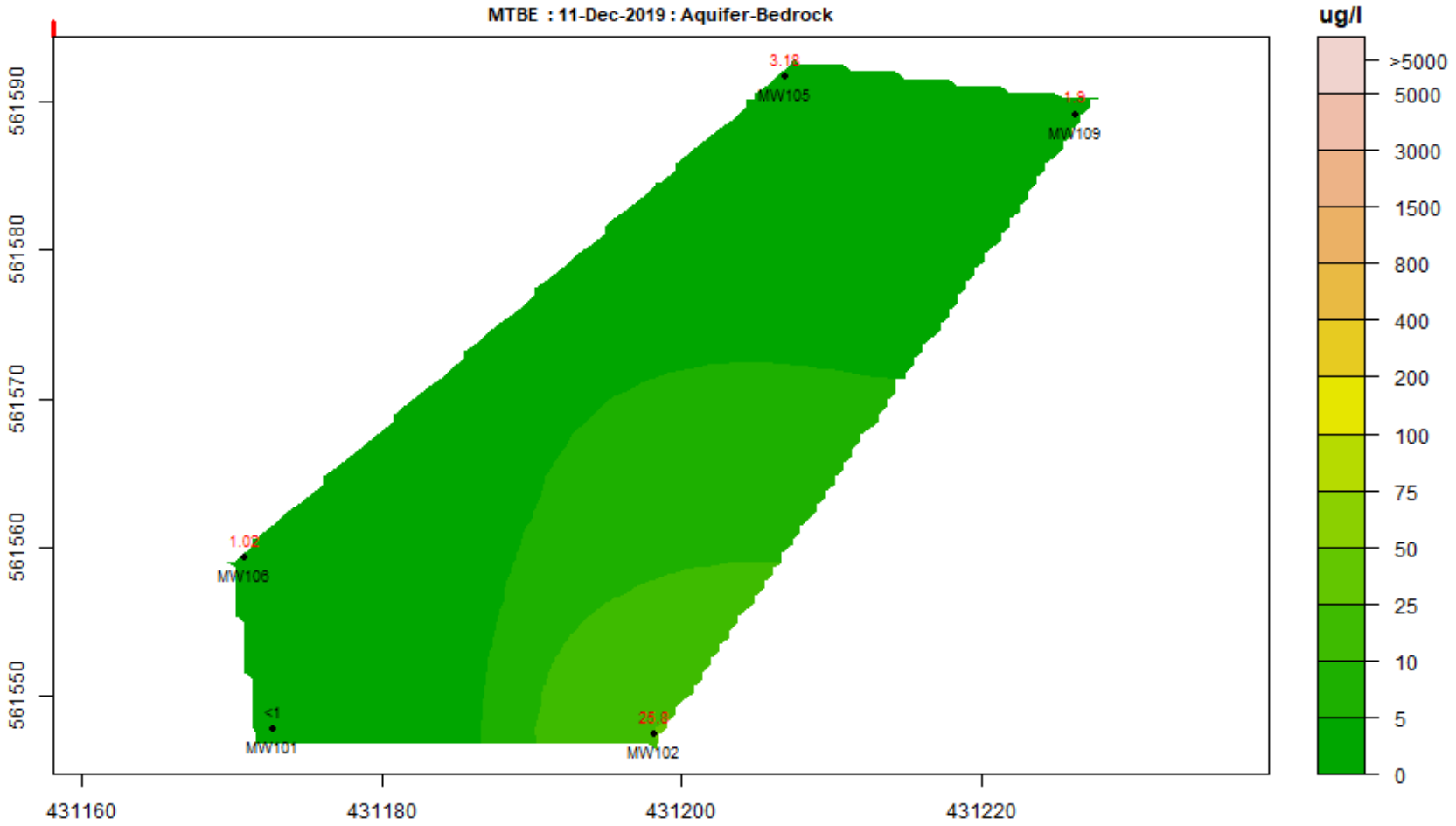

Benzene : 24-Feb-2020 to 25-Jan-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
MW105
MW109
<1
MW106
<1
MW101
940
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

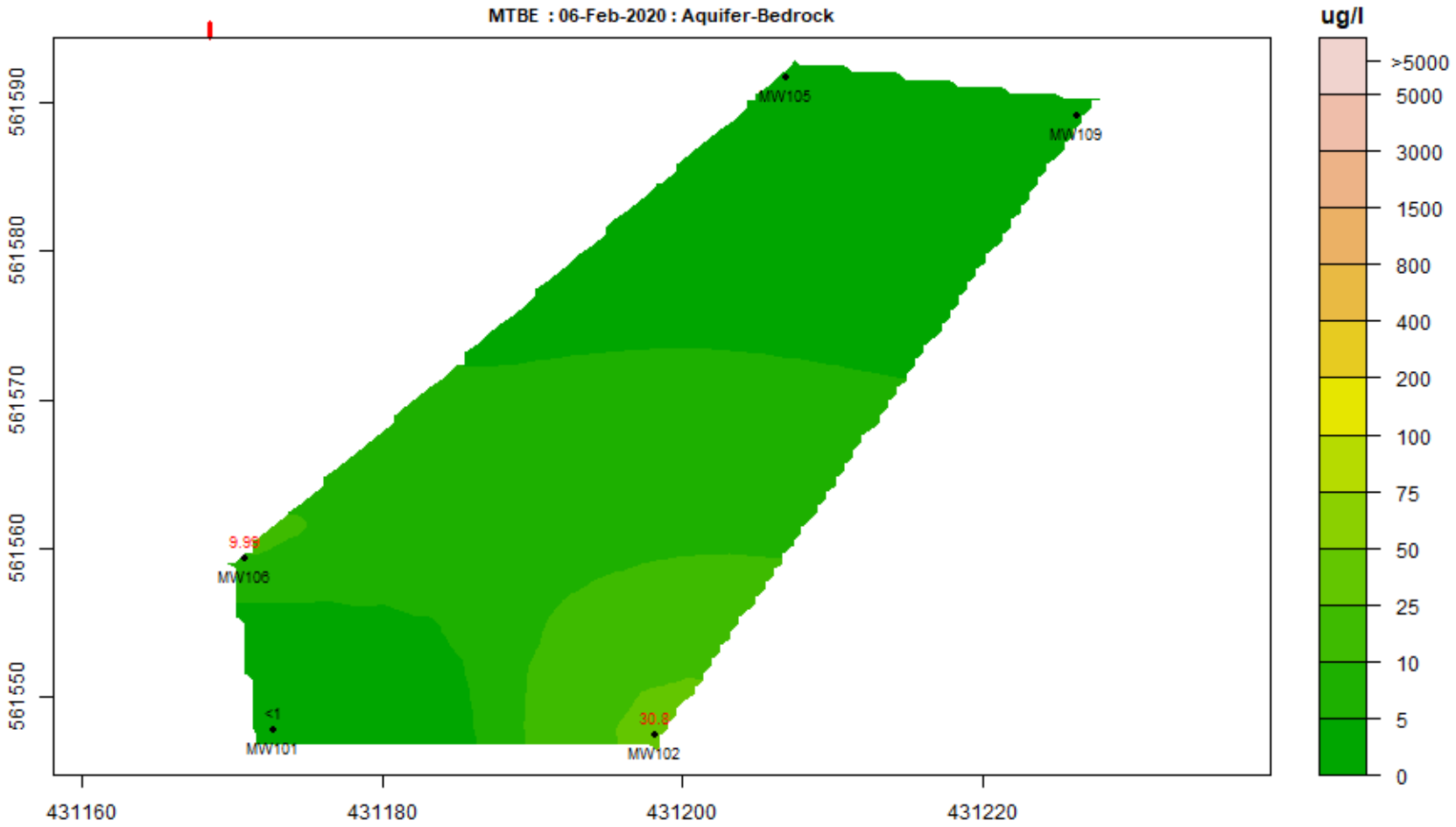

Benzene : 24-Feb-2021 to 25-Jan-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
<1
MW105
<1
MW109
MW106
<1
MW101
193
MW102

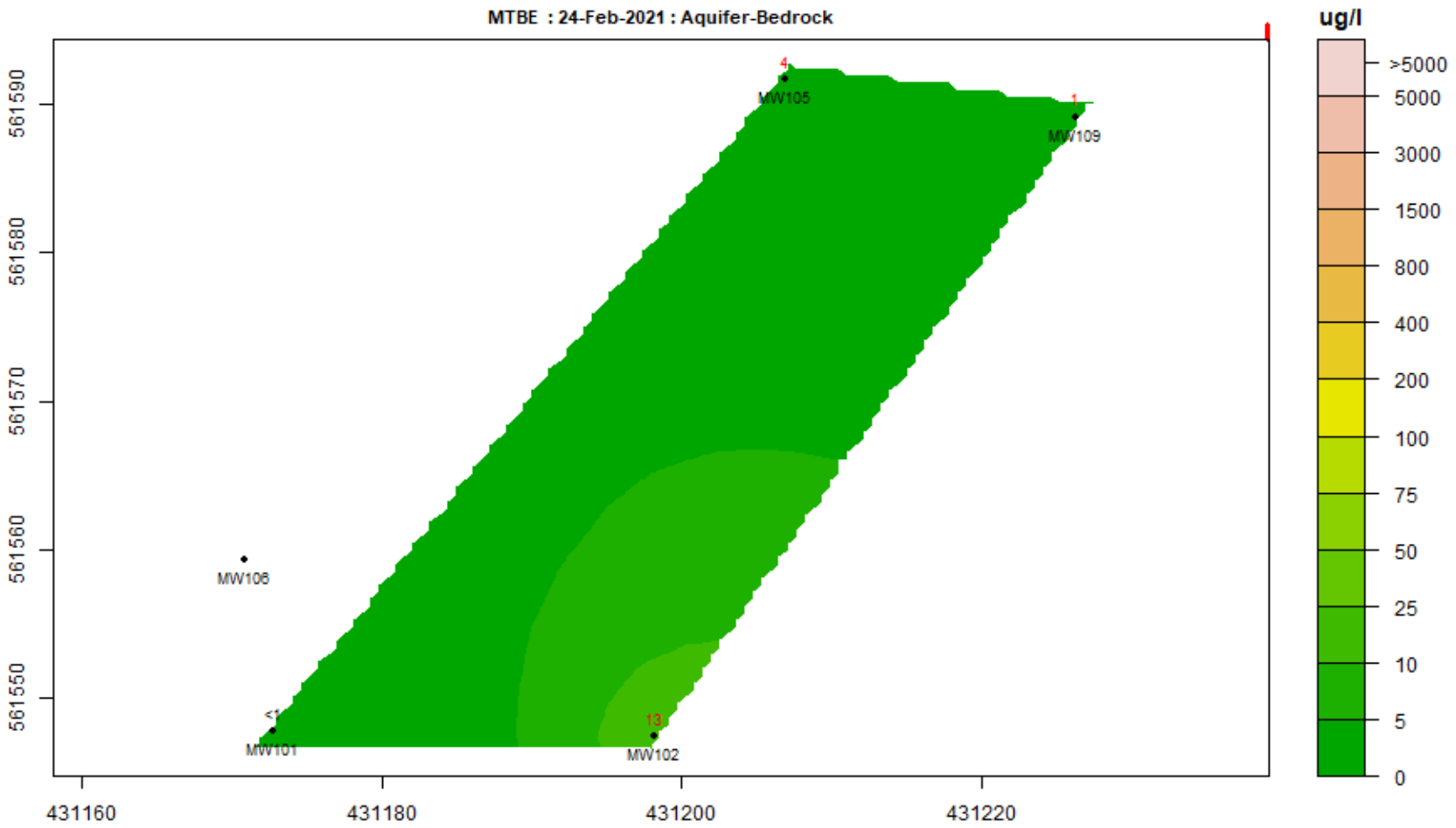

Ethylbenzene : 24-Dec-2019 to 25-Nov-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
<1
MW105
<1
MW109
117
MW106
<1
MW101
753
MW102

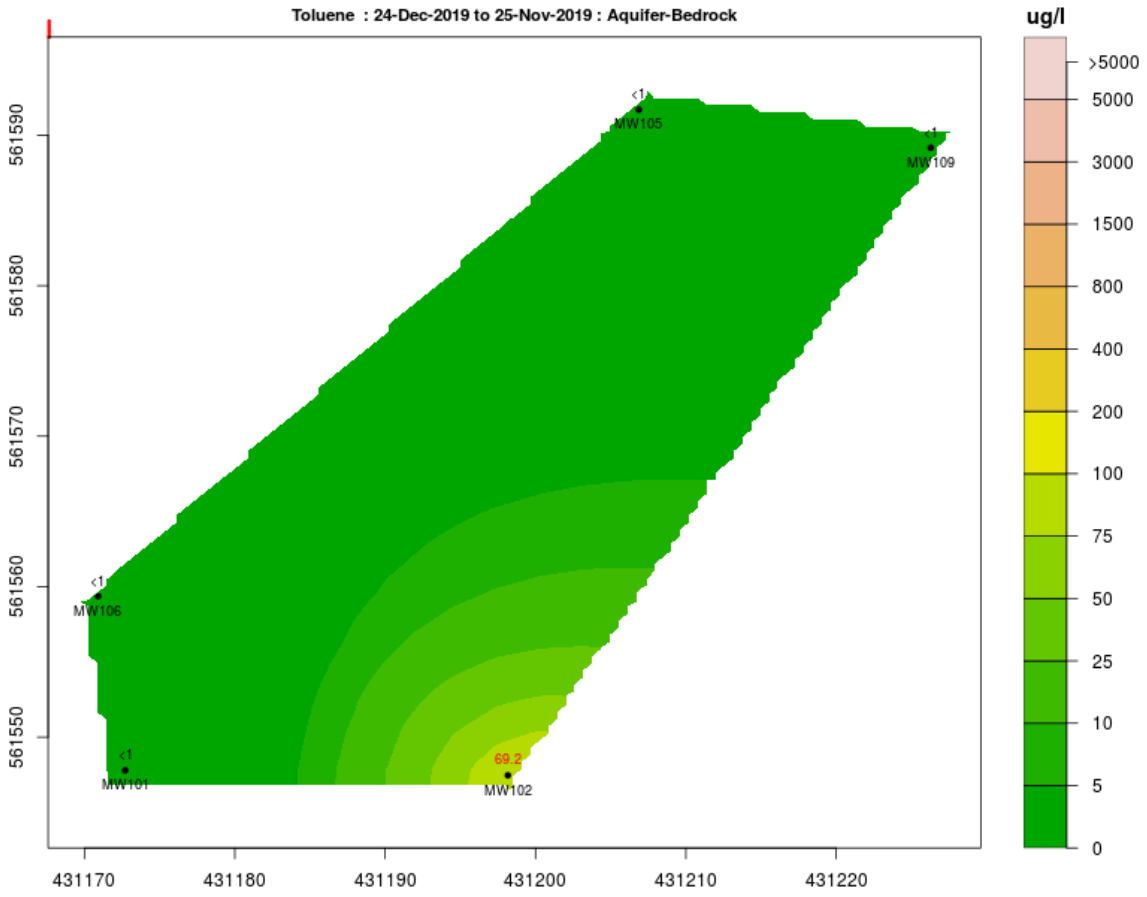

Ethylbenzene : 24-Feb-2020 to 25-Jan-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
MW105
MW109
<1
MW106
<1
MW101
932
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

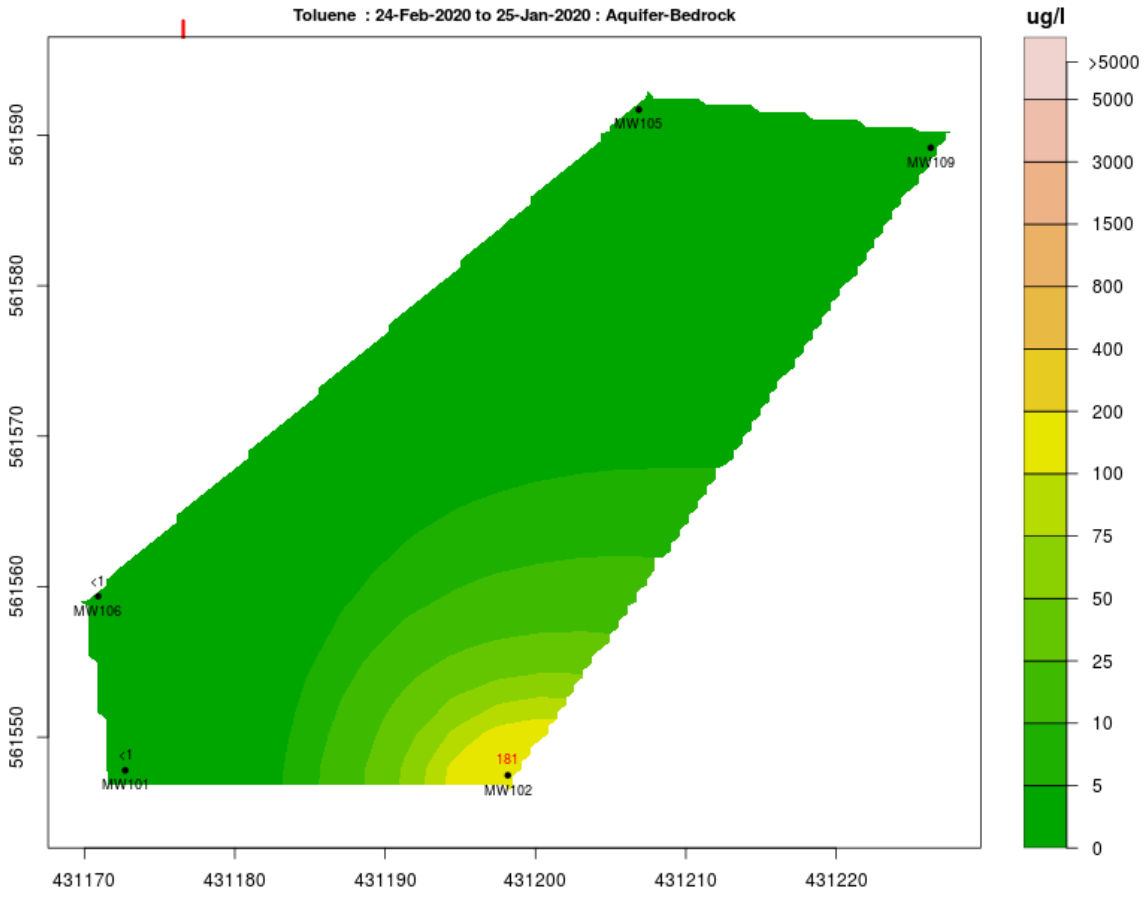

Ethylbenzene : 24-Feb-2021 to 25-Jan-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
<1
MW105
<1
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MW106
<1
MW101
195
MW102

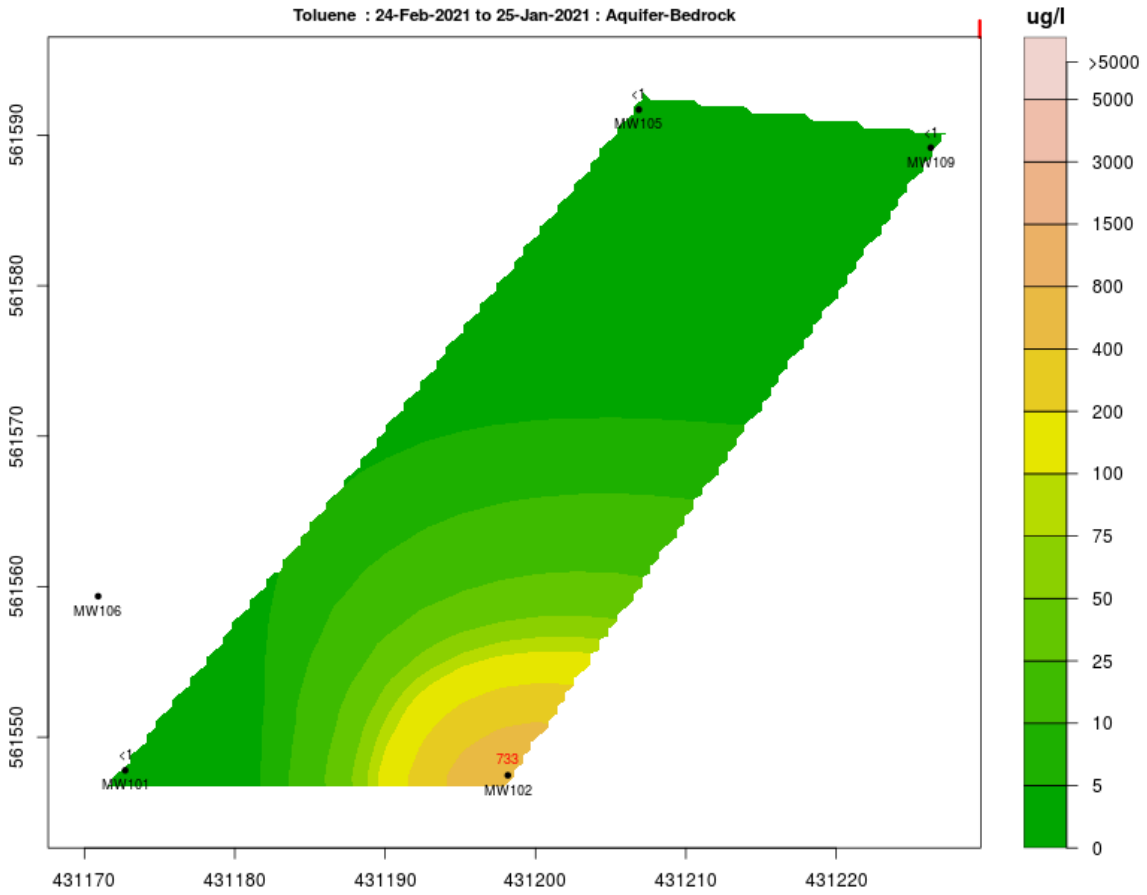

MTBE : 11-Dec-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
3.18
MW105
1.9
MW109
1.05
MW106
<1
MW101
25.8
MW102
561590
561580
561570
561560
561550
431160
431180
431200
431220

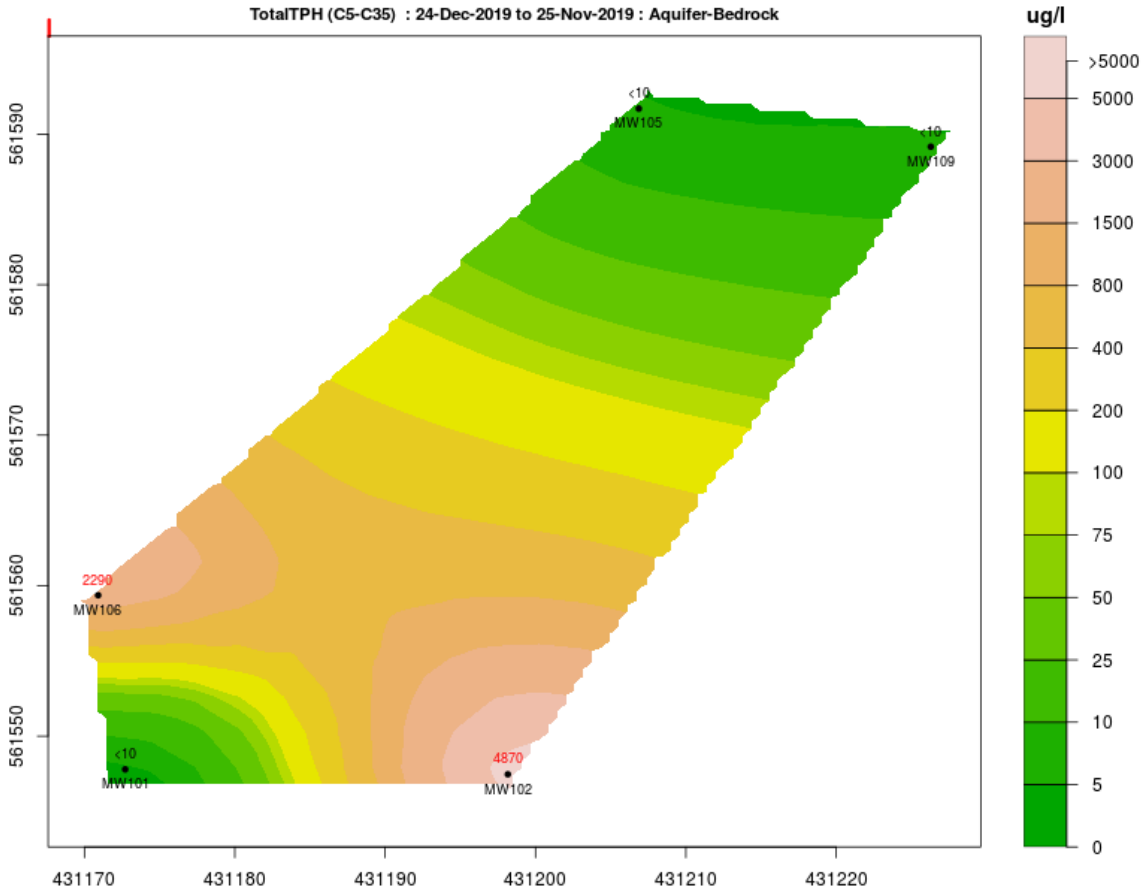

MTBE : 06-Feb-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
MW105
MW109
9.99
MW106
<1
MW101
30.8
MW102
561590
561580
561570
561560
561550
431160
431180
431200
431220

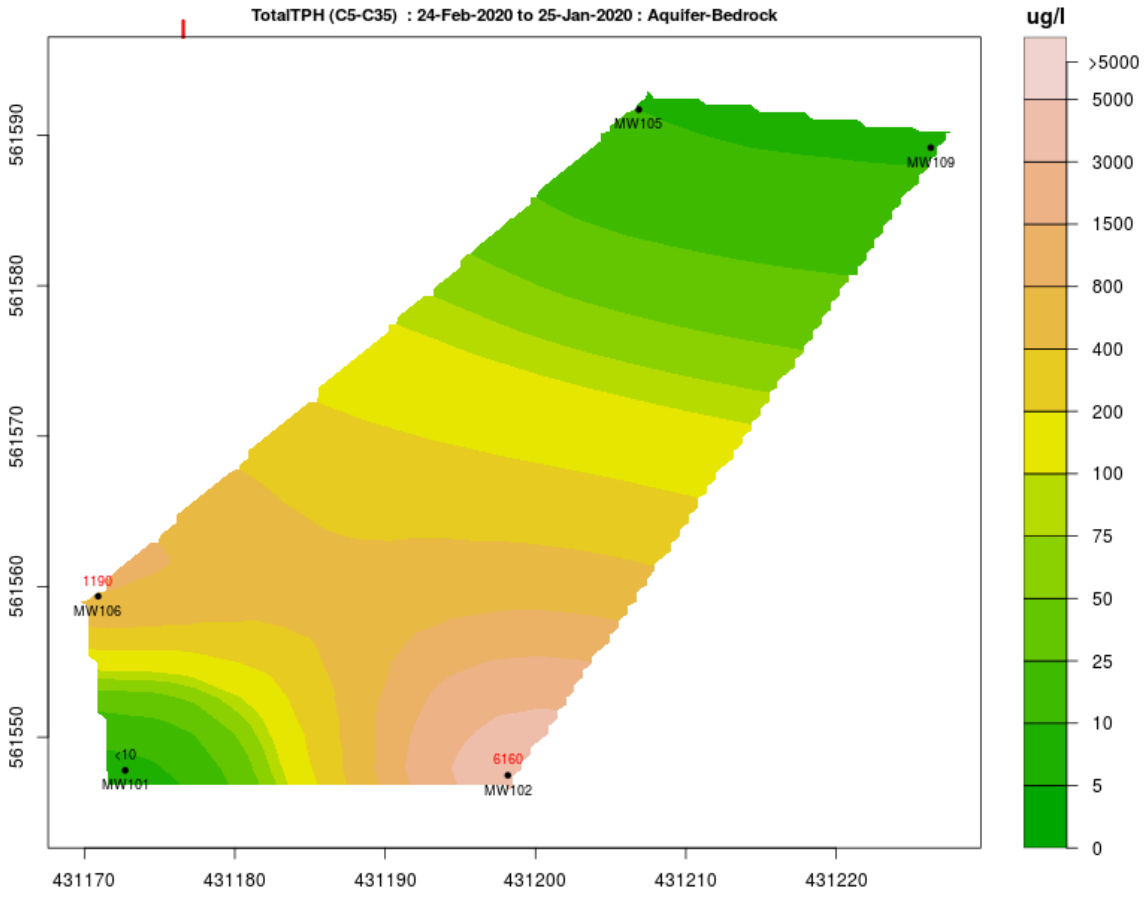

MTBE : 24-Feb-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
4
MW105
1
MW109
MW106
<1
MW101
13
MW102
561590
561580
561570
561560
561550
431160
431180
431200
431220

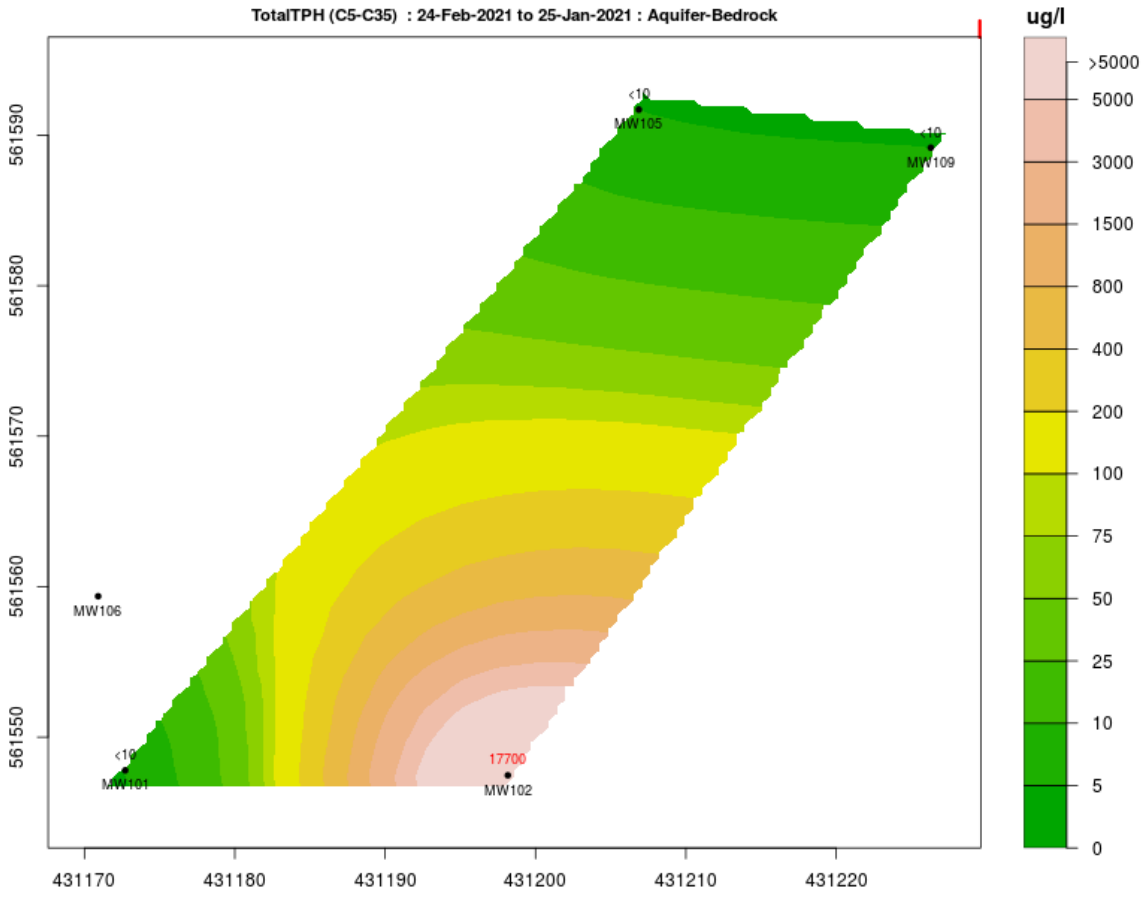

Toluene : 24-Dec-2019 to 25-Nov-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
<1
MW105
<1
MW109
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MW106
<1
MW101
69.2
MW102

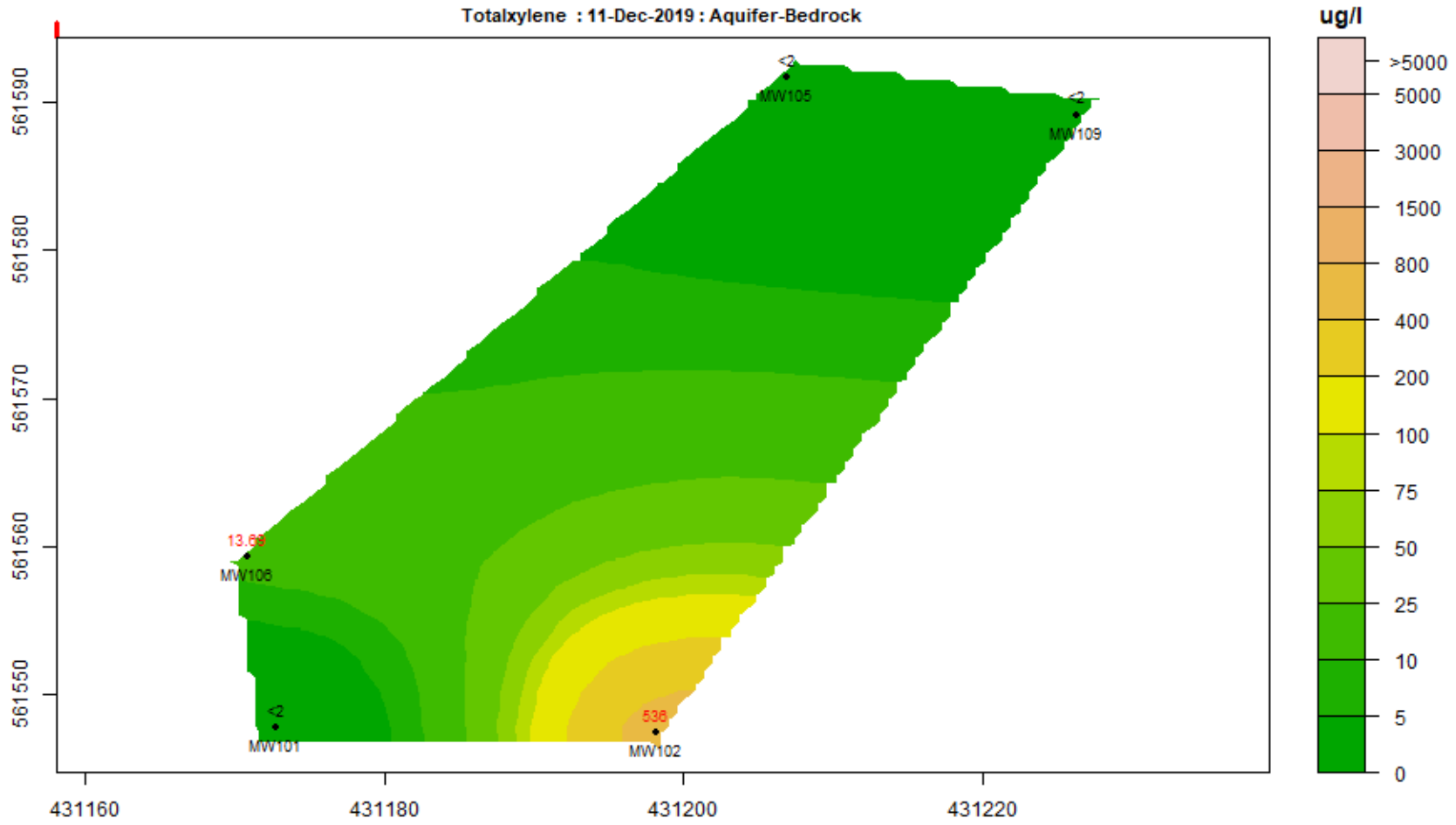

Toluene : 24-Feb-2020 to 25-Jan-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
MW105
MW109
<1
MW106
<1
MW101
181
MW102

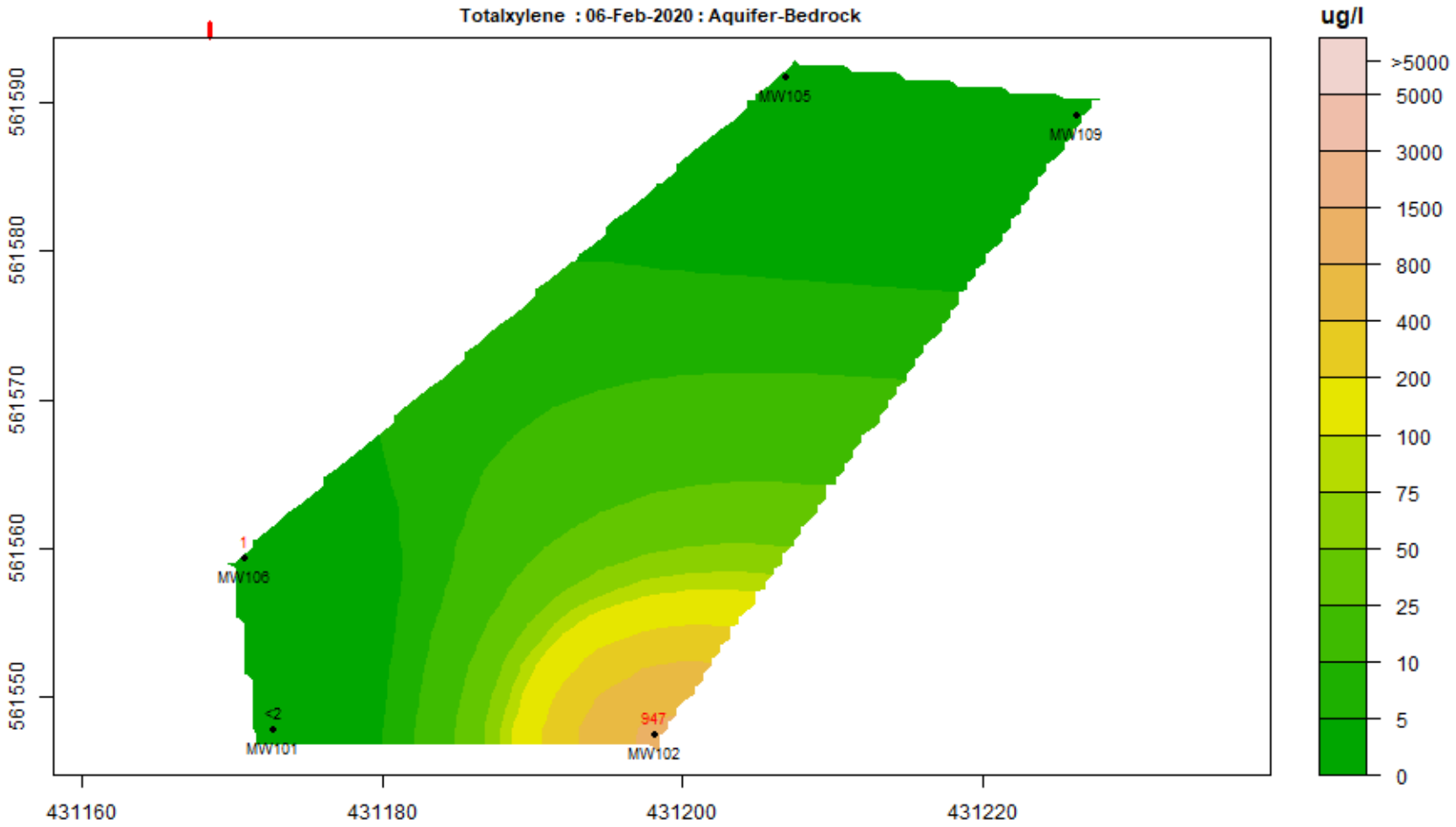

Toluene : 24-Feb-2021 to 25-Jan-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220
<1
MW105
<1
MW109
MW106
<1
MW101
733
MW102

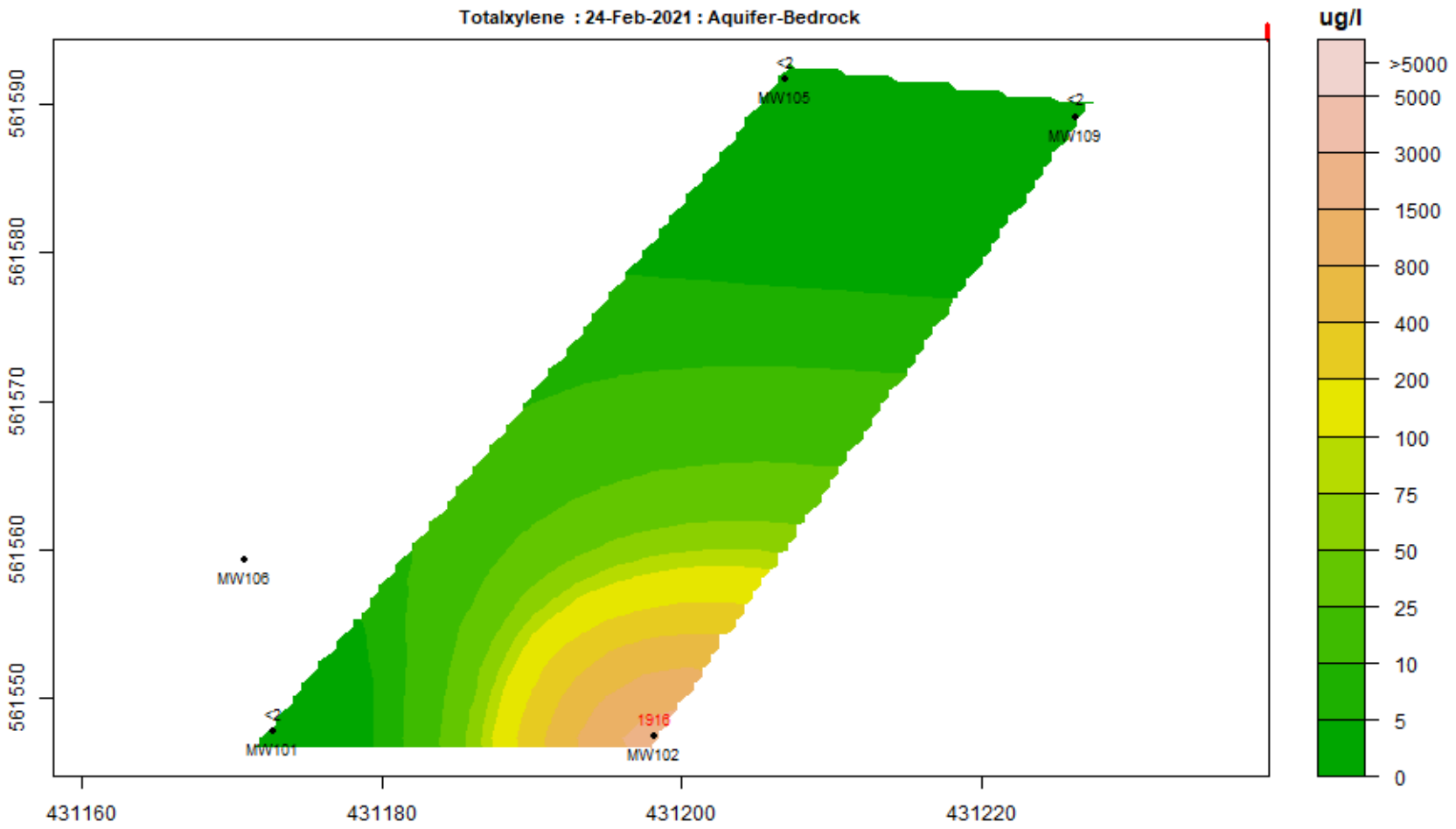

TotalTPH (C5-C35) : 24-Dec-2019 to 25-Nov-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
<10
MW105
<10
MW109
2290
MW106
<10
MW101
4870
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

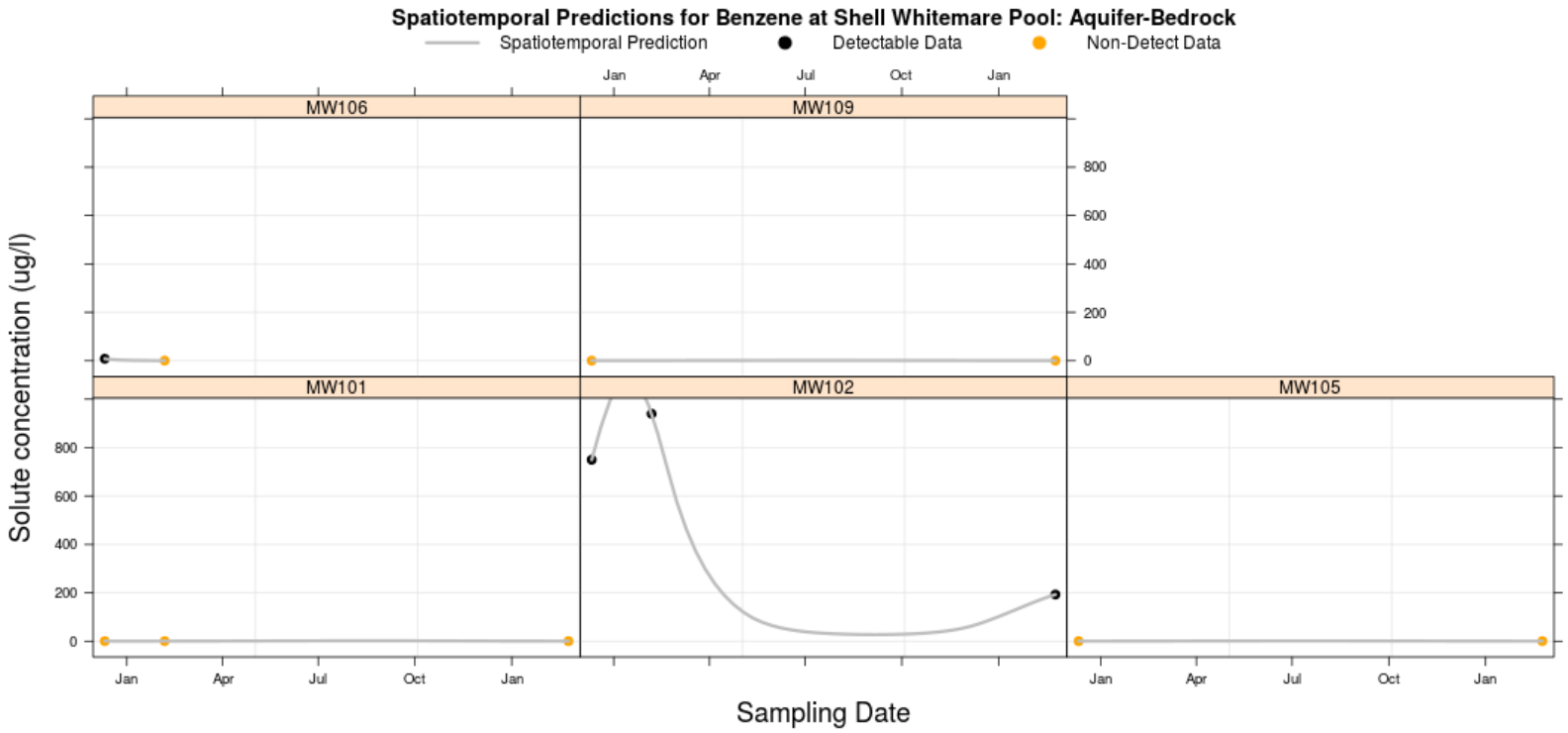

TotalTPH (C5-C35) : 24-Feb-2020 to 25-Jan-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
MW105
MW109
1190
MW106
<10
MW101
6160
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

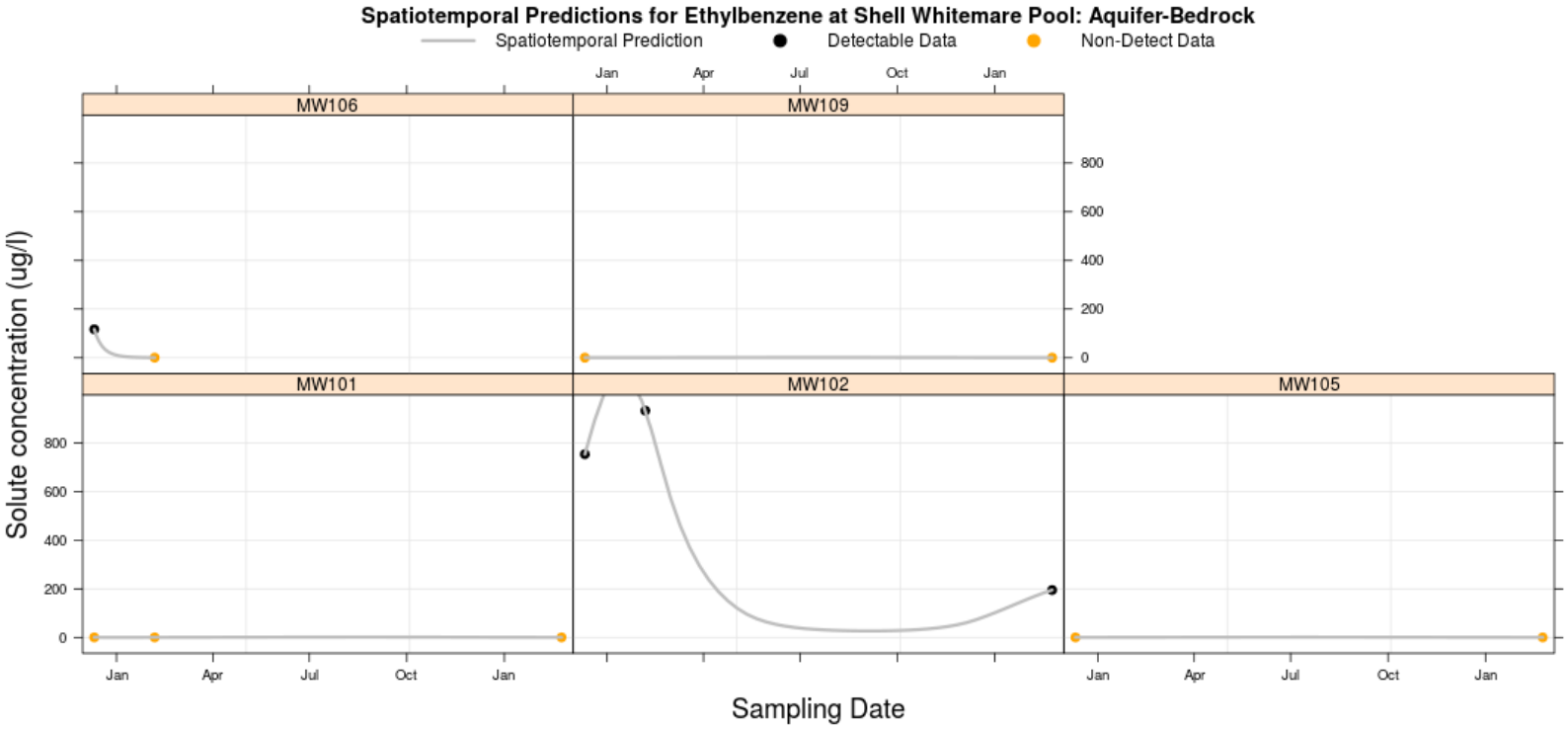

TotalTPH (C5-C35) : 24-Feb-2021 to 25-Jan-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
<10
MW105
<10
MW109
MW106
<10
MW101
17700
MW102
561590
561580
561570
561560
561550
431170
431180
431190
431200
431210
431220

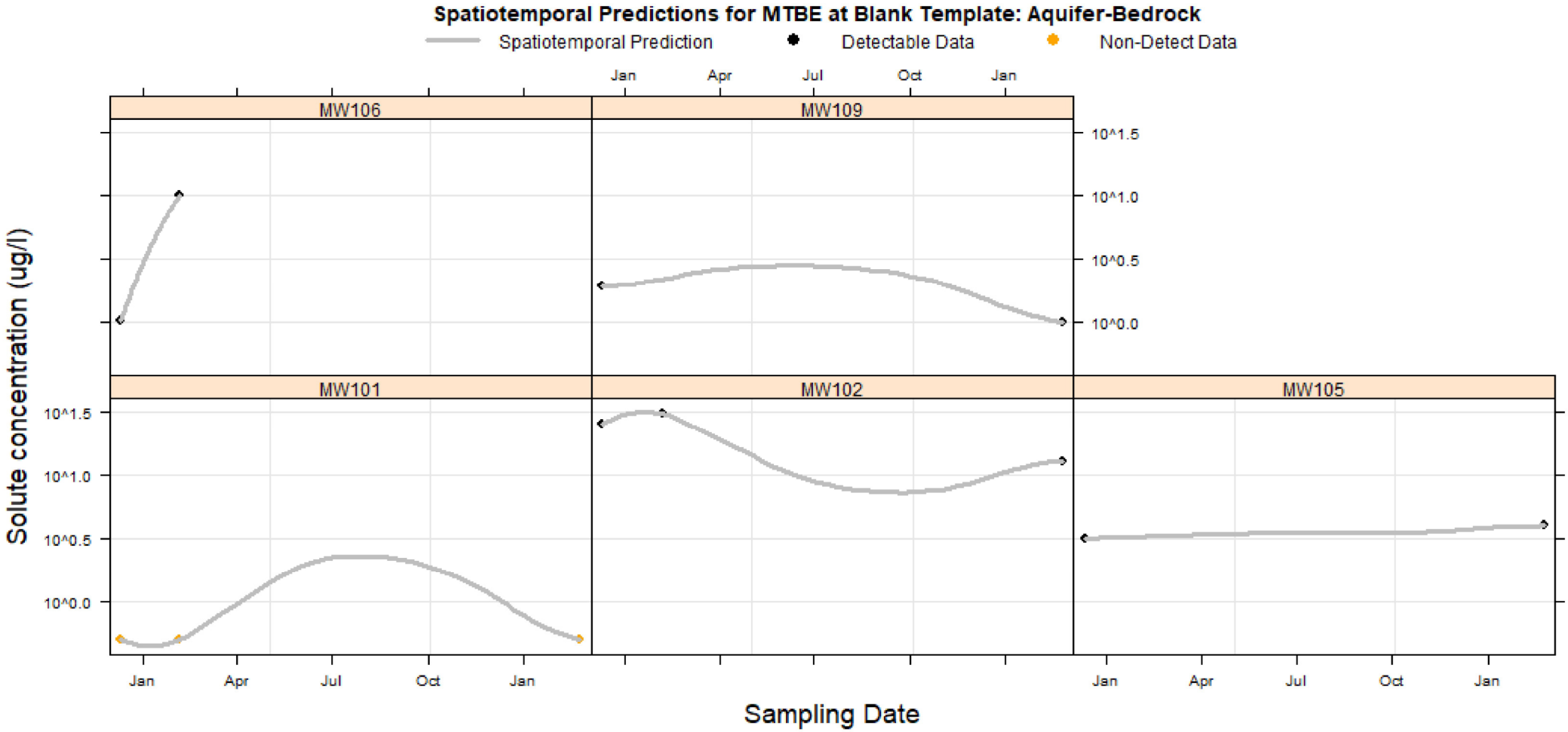

Totalxylene : 11-Dec-2019 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
<2
MW105
<2
MW109
13.69
MW106
<2
MW101
536
MW102
561590
561580
561570
561560
561550
431160
431180
431200
431220

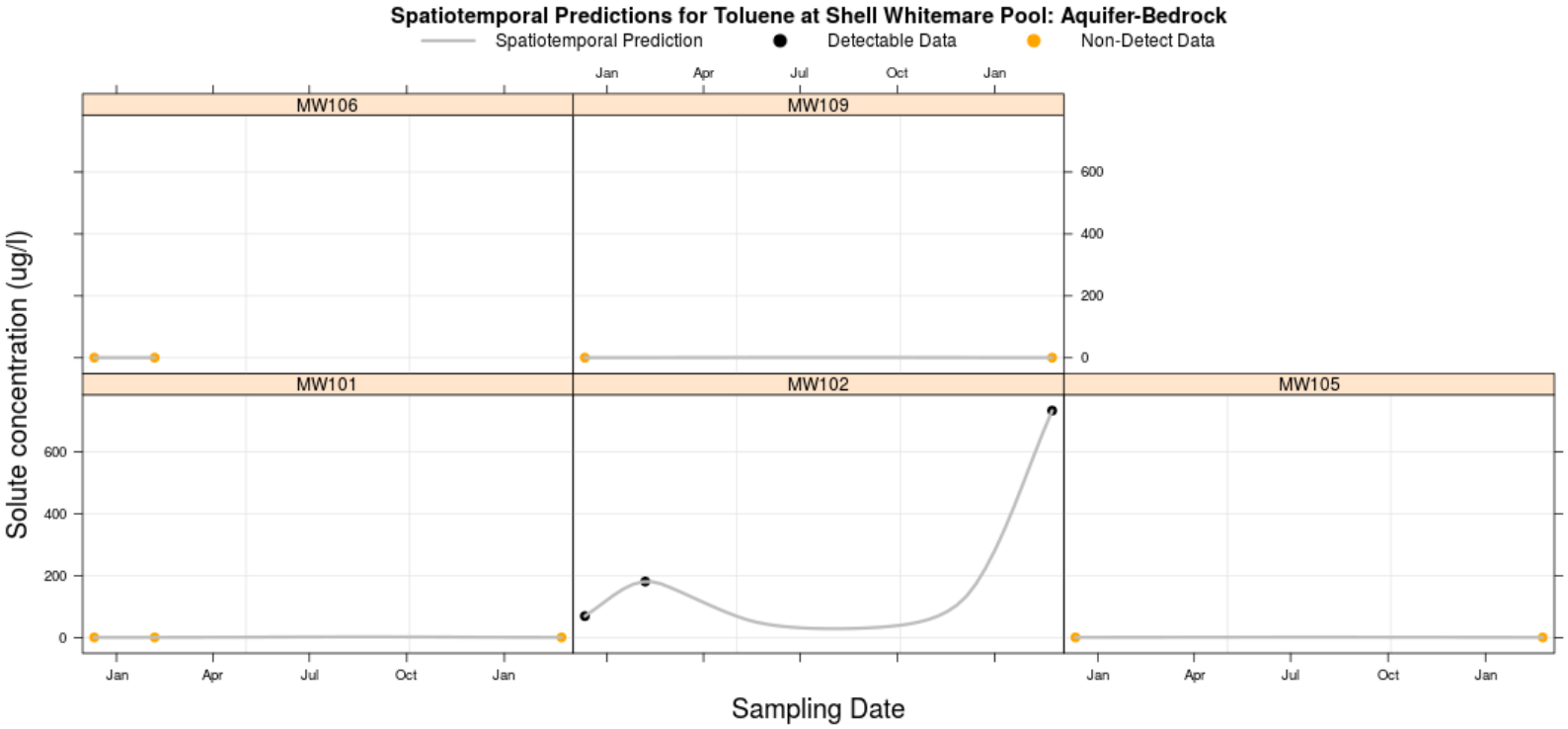

Totalxylene : 06-Feb-2020 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
MW105
MW109
1
MW106
<2
MW101
947
MW102
561590
561580
561570
561560
561550
431160
431180
431200
431220

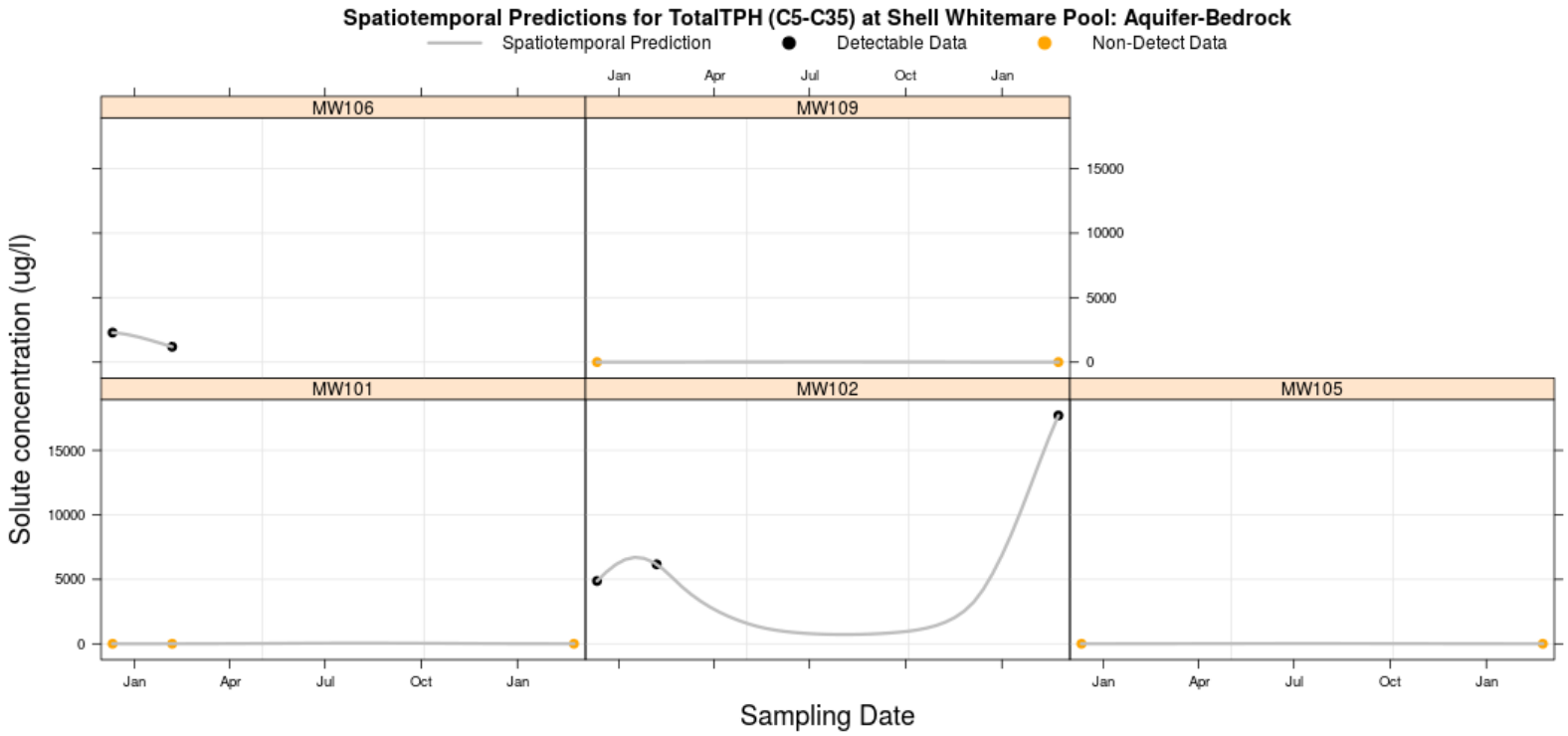

Totalxylene : 24-Feb-2021 : Aquifer-Bedrock
ug/l
>5000
5000
3000
1500
800
400
200
100
75
50
25
10
5
0
561590
561580
561570
561560
561550
431160
431180
431200
431220
<2
MW105
<2
MW109
MW106
<2
MW101
1916
MW102

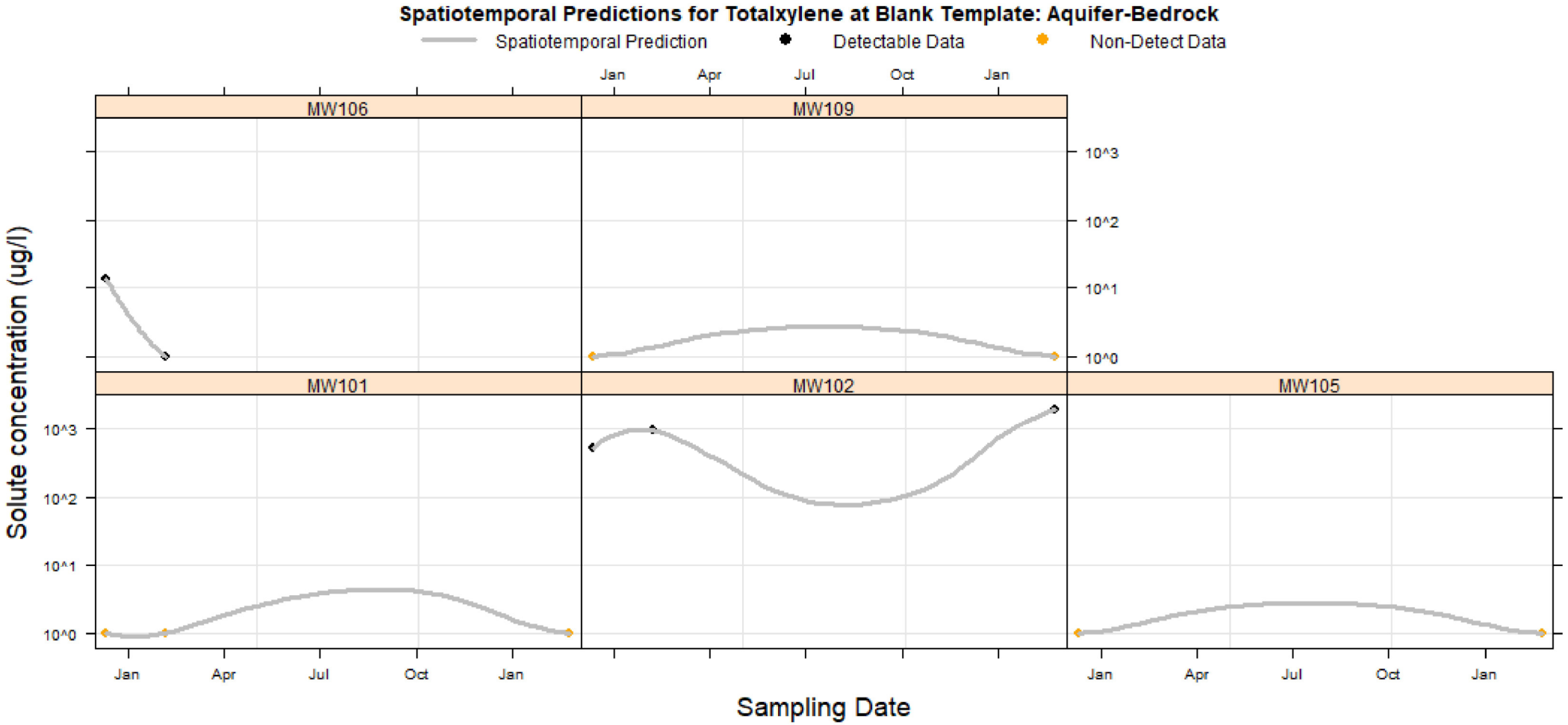

Spatiotemporal Predictions for Benzene at Shell Whitemare Pool: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Solute concentration (ug/l)
0
200
400
600
800
Jan
Apr
Jul
Oct
Jan
Sampling Date


Spatiotemporal Predictions for Ethylbenzene at Shell Whitemare Pool: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Solute concentration (ug/l)
0
200
400
600
800
Jan
Apr
Jul
Oct
Jan
Sampling Date


Spatiotemporal Predictions for MTBE at Blank Template: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Jan
Apr
Jul
Oct
Jan
10^1.5
10^1.0
10^0.5
10^0.0
Solute concentration (ug/l)
Sampling Date


Spatiotemporal Predictions for Toluene at Shell Whitemare Pool: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Solute concentration (ug/l)
0
200
400
600
Jan
Apr
Jul
Oct
Jan
Sampling Date


Spatiotemporal Predictions for TotalTPH (C5-C35) at Shell Whitemare Pool: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Solute concentration (ug/l)
0
5000
10000
15000
Jan
Apr
Jul
Oct
Jan
Sampling Date


Spatiotemporal Predictions for Totalxylene at Blank Template: Aquifer-Bedrock
Spatiotemporal Prediction
Detectable Data
Non-Detect Data
MW106
MW109
MW101
MW102
MW105
Jan
Apr
Jul
Oct
Jan
10^3
10^2
10^1
10^0
Solute concentration (ug/l)
Sampling Date

APPENDIX F
CONTROLLED WATERS GENERIC ASSESSMENT CRITERIA

Notes for GQRA (water) Screening Tool Output	
Details of the **GAC used in the GQRA and the GAC version** are displayed at the top of the output screening sheet.	
Full details of the **GAC derivation** are included in a separate appendix document	
Any laboratory results that are shown as appended (e.g. Tentatively Identified Compounds, certain subcontracted results e.g. Hg etc.) are not screened against the GAC in the report output. These results will be included in an appendix to the main report.	
Certain groups of analytes are summed within the tool (these results are shown as the analyte names with the pre-fix "SUM", for example 'SUM - chromium trivalent plus hexavalent), which is required to enable a comparison of laboratory results to the GAC, which is a sum of certain analytes.	
Where analytes have been summed, any concentration reported as below the laboratory method detection limited is treated as zero.	
Certain GACs are calculated (e.g. ammoniacal nitrogen reported as N, NH_3 or NH_4) from the primary GAC. The GAC is therefore the same, but expressed as a different molecular weight. These are shown in italics.	
Relevant laboratory methods (e.g. leachate dilutions) are included in the section entitled 'Methods'.	
Analyte groupings are based on the Envirolab laboratory reporting groups.	
* denotes a non-statutory GACs (e.g. *ethylbenzene* *).	
Shading of cells (individual results and the GAC/T1) has the following meaning:	
GAC	GAC definitely exceeded
GAC	GAC may be exceeded (e.g. lab results include a < or > symbol)
T1	First level screening threshold definitely exceeded
T1	First level screening threshold may be exceeded (e.g. lab results include a < or > symbol)
T1	**First level screening threshold, equating to:**
	GrAC: Result compared to the theoretical aqeuous solublity limit.
Comment	Applicable across all GrACs. Where the GrAC has been set at the theoretical aqueous solubility for the analyte, which is below the modelled assessment criteria.
	EQS Cadmium: Compared to lowest EQS for Class 1 <40mg/l $CaCO_3$/l.
Comment	Freshwater EQS for cadmium is hardness dependent.
	EQS Copper: Compared to EWS for the lowest Dissolved Organc Carbon (DOC) of <1mg/l.
Comment	Transitional waters EQS for copper is DOC dependent, compared to lowest Dissolved Organc Carbon (DOC) of <1mg/l.
	EQS Aluminium (Scotland only): Compared to EQS for pH >6.5.
Comment	Freshwater EQS for aluminium (Scotland) is pH dependent and only applicable at a pH >6.5.
	DWS/RPV Aro EC8-10: Total compared to DWS/RPV for ethylbenzene (conservative assessment).
Comment	Aro EC8-10 fraction contains xylenes, ethylbenzene and trimethylbenzene.
	DWS/RPV chromium total: Total is compared to CrVI (conservative assessment) for either freshwater or for transitional waters.
Comment	Freshwater and transitional EQS are a sum of the individual EQS for CrVI and CrIII (8.1ug/l).
grey font	Where individual reported concentrations are presented in grey (not black) font, the result was below the laboratory method detection limit.
	Where cells are shaded grey, all results for that analyte are below the laboratory method detection limit

Project name	Shell Whitemare Pool
Project code	355390
Client name	Shell UK Oil Products Ltd
Address	Leam Lane Whitemare Pool Gateshead NE10 8YB
NGR	
Output type	Interpretive Controlled Waters
Scenario	EQS freshwater, England, Wales and Northern Ireland
GAC version	Rev15

Notes

Lab sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/7	21/02099/6		
Client sample ID	MW101	MW102	MW103	MW105	MW109	QAQC Blank	QAQC Duplicate		
Depth to top	4.8	6.9	1.1	6.6	7				
Depth to bottom									
Date sampled	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021		

Analyte	Unit	GAC	T1	Max	Min	Count	# Detects	# Non-detects										
Volatile organic compounds																		
1,2-Dibromoethane	µg/l			<1	<1	7	0	7	<1	<1	<1	<1	<1	<1	<1			
1,2-Dichloroethane	µg/l	10		<2	<2	7	0	7	<2	<2	<2	<2	<2	<2	<2			
Semi-volatile organic compounds																		
2-Methylnaphthalene	µg/l			11	<1	7	2	5	<1	11	<1	<1	<1	<1	6			
Petroleum hydrocarbons																		
Ali >C5-C6 (w)	µg/l			65	<1	7	5	2	<1	65	9	4	1	<1	57			
Ali >C6-C8 (w)	µg/l			185	<1	7	4	3	3	185	<1	<1	<1	1	160			
Ali >C8-C10 (w)	µg/l			138	<5	7	2	5	<5	138	<5	<5	<5	<5	93			
Ali >C10-C12 (w)	µg/l			<25	<5	7	0	7	<5	<25	<5	<5	<5	<5	<25			
Ali >C12-C16 (w)	µg/l			<25	<5	7	0	7	<5	<25	<5	<5	<5	<5	<25			
Ali >C16-C21 (w)	µg/l			<25	<5	7	0	7	<5	<25	<5	<5	<5	<5	<25			
Ali >C21-C35 (w)	µg/l			61	<5	7	2	5	<5	52	<5	<5	<5	<5	61			
Total Aliphatics (w)	µg/l			440	<5	7	3	4	<5	440	9	<5	<5	<5	371			
Aro >C5-C7 (w)	µg/l	10		193	<1	7	2	5	<1	193	<1	<1	<1	<1	159			
Aro >C7-C8 (w)	µg/l	74		733	<1	7	2	5	<1	733	<1	<1	<1	<1	623			
Aro >C8-C10 (w)	µg/l			14000	<5	7	2	5	<5	14000	<5	<5	<5	<5	13100			
Aro >C10-C12 (w)	µg/l			2090	<5	7	2	5	<5	2090	<5	<5	<5	<5	2000			
Aro >C12-C16 (w)	µg/l			168	<5	7	2	5	<5	168	<5	<5	<5	<5	167			
Aro >C16-C21 (w)	µg/l			<25	<5	7	0	7	<5	<25	<5	<5	<5	<5	<25			
Aro >C21-C35 (w)	µg/l			<50	<10	7	0	7	<10	<50	<10	<10	<10	<10	<50			
Total Aromatics (w)	µg/l			17300	<10	7	2	5	<10	17300	<10	<10	<10	<10	16100			
TPH (Ali & Aro >C5-C35) (w)	µg/l			17700	<10	7	2	5	<10	17700	<10	<10	<10	<10	16500			
TPH total dissolved (>C6-C40) (w)	µg/l			7132	<40	7	2	5	<40	7104	<40	<40	<40	<40	7132			
BTEX - Benzene (w)	µg/l	10		193	<1	7	2	5	<1	193	<1	<1	<1	<1	159			
BTEX - Toluene (w)	µg/l	74		733	<1	7	2	5	<1	733	<1	<1	<1	<1	623			
BTEX - Ethyl Benzene (w)	µg/l			195	<1	7	2	5	<1	195	<1	<1	<1	<1	157			
BTEX - m & p Xylene (w)	µg/l	30*		1259	<1	7	2	5	<1	1259	<1	<1	<1	<1	1088			
BTEX - o Xylene (w)	µg/l	30*		657	<1	7	2	5	<1	657	<1	<1	<1	<1	575			
MTBE (w)	µg/l			13	<1	7	5	2	<1	13	10	4	1	<1	12			
SUM - xylenes (BTEX o plus m&p)	µg/l	30*		1916	<1	7	2	5	*<1*	*1916*	*<1*	*<1*	*<1*	*<1*	*1663*			
Phenols																		
Cresols (w)	µg/l			110	<10	7	2	5	<10	100	<10	<10	<10	<10	110			
Phenol (w)	µg/l	7.7		30	<10	7	2	5	<10	30	<10	<10	<10	<10	20			
Phenols - Total by HPLC (w)	µg/l	7.7		170	<10	7	2	5	<10	150	<10	<10	<10	<10	170			
Resorcinol (w)	µg/l			<10	<10	7	0	7	<10	<10	<10	<10	<10	<10	<10			
Xylenols (w)	µg/l			40	<10	7	2	5	<10	20	<10	<10	<10	<10	40			
Other analytes																		
DIPE (w)	µg/l			<10	<10	7	0	7	<10	<10	<10	<10	<10	<10	<10			
ETBE (w)	µg/l			<10	<10	7	0	7	<10	<10	<10	<10	<10	<10	<10			
Ethanol (w)	µg/l			<100	<100	7	0	7	<100	<100	<100	<100	<100	<100	<100			
Hexane (n-Hexane) (w)	µg/l			8	<1	7	2	5	<1	8	<1	<1	<1	<1	7			

								Lab sample ID	21/02099/1	21/02099/2	21/02099/3	21/02099/4	21/02099/5	21/02099/7	21/02099/6			
								Client sample ID	MW101	MW102	MW103	MW105	MW109	QAQC Blank	QAQC Duplicate			
								Depth to top	4.8	6.9	1.1	6.6	7					
								Depth to bottom										
								Date sampled	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021	24/02/2021			
Analyte	Unit	GAC	T1	Max	Min	Count	# Detects	# Non-detects										
TAME (w)	µg/l			<10	<10	7	0	7	<10	<10	<10	<10	<10	<10	<10			
TBA (w)	µg/l			<50	<50	7	0	7	<50	<50	<50	<50	<50	<50	<50			

SELECTION OF GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

Protection of the water environment

The water environment in the United Kingdom is protected under a number of regulatory regimes. The relevant environmental regulator is consulted where there may be a risk that pollution of 'controlled waters' may occur or may have occurred in the past.

The term 'controlled waters' refers to coastal waters, inland freshwaters and groundwater. The EU Water Framework Directive (WFD) (2000/60/EC) is implemented via domestic regulations and guidance, covering aspects of groundwater and surface water protection as well as drinking water supply policy. Domestic legislation and guidance will vary across the United Kingdom. Therefore, the relevant legislation for England, Wales, Northern Ireland and Scotland should be reviewed, alongside guidance provided by the Environment Agency (EA), Natural Resource Wales (NRW), the Scottish Environmental Protection Agency (SEPA) or the Northern Ireland Environment Agency (NIEA), as appropriate.

The main objectives of the protection and remediation of groundwater under threat from land contamination are set out within "The Environment Agency's approach to groundwater protection", version 1.0 (March 2017)[1] and the associated guidance "Land contamination groundwater compliance points: quantitative risk assessments (March 2017)[1a] that have replaced the previous guidance document "Groundwater Principles and Practice (GP3)". When assessing risks to groundwater, the following need to be considered:

- Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to:
    - ***prevent*** *the input of* ***hazardous*** *substances into groundwater (see description of hazardous substances below)*
    - ***limit*** *the entry of other (non-hazardous) pollutants into groundwater to avoid pollution, deterioration in the status of groundwater bodies and to prevent sustained, upward trends in pollutant concentrations in groundwater.*
- Where pollutants have already entered groundwater, the priority is to take all necessary and reasonable measures to:
    - ***minimise*** *further entry of "contaminants" where there is a defined source*
    - ***limit the pollution*** *of groundwater or any effect on the status of the groundwater body from the future expansion of the 'plume', if necessary, by actively reducing its extent.*

Within the context of groundwater risk assessments on sites affected by land contamination, "reasonable" means feasible without involving disproportionate costs. What costs are "disproportionate" depends on site-specific circumstances, which may include:

- Considerations of technical feasibility such as identified by the remedial options appraisal, this may be due to the distribution or nature of the contamination and the available remedial methods to treat the identified contamination;
- Sustainability considerations.

Selecting the appropriate assessment criteria

When assessing the risks to controlled waters, various assessment criteria apply, depending on the nature of the assessment and the conceptual site model.

A simple flow chart is included on the next page to inform selection of the appropriate target concentrations when considering potential risks to controlled waters, in keeping with the principles of "prevent / limit".

Where a surface water body is considered as the primary receptor, then Environmental Quality Standards (EQS) defined within The Water Framework Directive (Standards and Classification) Directions (England and Wales)[2] are the relevant assessment criteria as they are designed to be protective of surface water ecology.

Where a public water supply or a Principal aquifer is considered the primary receptor, then the standards defined in The Water Supply (Water Quality) Regulations[3] are the main source of assessment criteria. The Private Water Supplies Regulations[4] may also be applicable in some cases.

For instances where there are **no statutory** UK assessment criteria, then other available, non-statutory assessment criteria may be used where necessary, and where justified by the conceptual site model. Available non-statutory assessment criteria for the purposes of this contract include GAC based on aquatic toxicity factors (ATF) for fresh and marine waters[5], Risk Based-Screening Levels (RBSLs) derived by GSI Environmental for Shell Downstream Sites which are applicable to water intended or used for ingestion and other domestic uses within a residential setting[6] and the World Health Organisation (WHO) drinking water guidelines[7].

This appendix presents the generic assessment criteria (GAC) that RSK considers suitable for assessing risks to controlled waters for our most commonly encountered determinants.

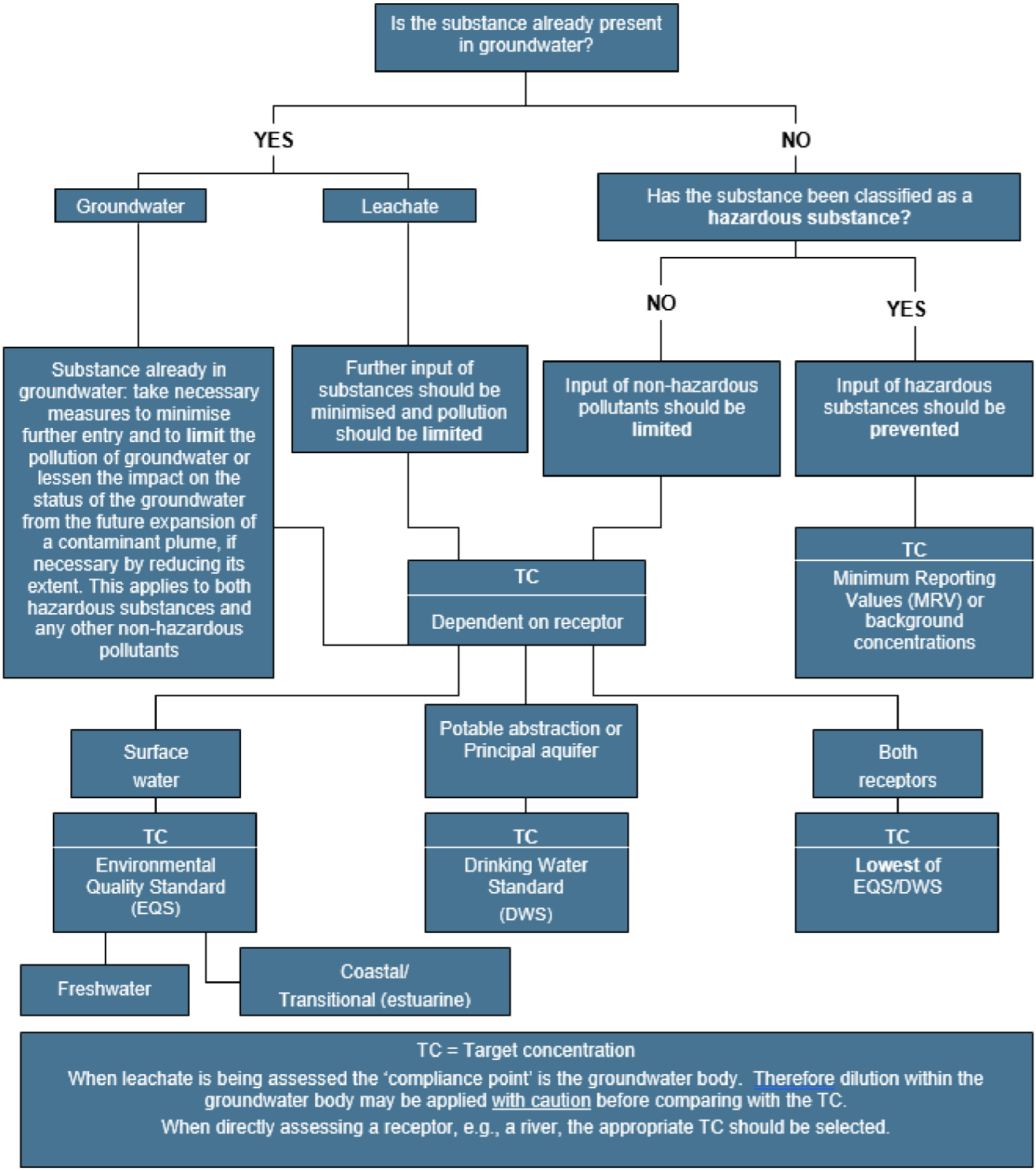
The RSK GAC for controlled waters are presented in **Table 1** and **Table 2**. In line with the Environment Agency's Remedial Targets Methodology[8], the GAC for controlled waters are termed 'target concentrations'.

The appropriate target concentrations should be selected with consideration to:

- The site conceptual model (i.e. the receptor at potential risk);
- Whether the substance is already present in groundwater at the site;
- Whether or not the substance is classified as a priority hazardous substance under the Priority Substances Directive (2013/39/EC) (see above), or as a hazardous substance according to the current list of JAGDAG determinations[9]; and
- Background concentrations in the aquifer (if applicable).

It is important to remember that the WFD and Environment Agency guidance[1 & 1a] advocate for a sustainable, risk-based approach be applied to groundwater contamination. Exceedance of any target concentration does not necessarily imply that an unacceptable risk exists or that remediation is inevitably required.

FLOW CHART TO ASSIST WITH SELECTION OF TARGET CONCENTRATIONS



TARGET CONCENTRATIONS FOR CONTROLLED WATERS

Target concentrations shaded in green are **statutory values**	Target concentrations shaded in orange are **non-statutory values**	**LTOT:** Target concentration based on the lowest of available taste and odour thresholds **RBSL:** Target concentration based on a risk based screening level (derived to be protective of groundwater ingestion in a domestic setting)

Note: Units µg/l throughout

Table 1: Target concentrations for controlled waters (excluding TPH CWG fractions)

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[9]	Surface water receptors[2]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Lead scavengers						
Non-hazardous pollutant	Priority substance	1,2-Dichloroethane (EDC)	1.0[10]	3.0[3]	10[2a]	10[2a]
Hazardous substance	-	1,2-Dibromoethane (EDB)	-	LTOT: - RBSL: 1.90[6]	-	-
Semi-volatile organic compounds (SVOC)						
Non-hazardous pollutant	Priority substance	Naphthalene (C10-C12)	-	LTOT: 21[11] RBSL: 150[6]	2[2a]	2[2a]

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[9]	Surface water receptors[2]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Hazardous substance	**Priority hazardous substance(s)**	Benzo(a)pyrene (C16-C35)	-	0.01[3]	0.00017[2a]	0.00017[2a]
Petroleum hydrocarbons						
Hazardous substance	-	Total petroleum hydrocarbons*	-	See Table 2 for individual (non-statutory) TPH CWG fractions with respect to drinking water receptors	See individual risk driving compounds (i.e. BTEX and PAH) for specific EQS	
Hazardous substance	Priority substance	Benzene (Aro EC5-EC7)	1[10]	1[3]	10[2a]	8[2a]
Hazardous substance	Specific pollutant	Toluene (Aro EC7-EC8)	4[10]	LTOT: 42[12] RBSL: 480[6]	74[2a]	74[2a]
Hazardous substance	-	Ethylbenzene (Aro EC8-EC10)	-	LTOT: 29[13] RBSL: 590[6]	118[5a]	118[5a]
Hazardous substance	-	Xylenes (Aro EC8-EC10)	3[10]	LTOT: - RBSL: 1,200[6]	EA operational target: 30[2g] ATF: 290[5a]	ATF: 290[5a]
Ether oxygenates						
Non-hazardous pollutant	-	Methyl tertiary butyl ether (MTBE)	-	LTOT: 20[14] RBSL: 2,300[6]	51,000[5b]	18,000[5b]
(Not determined)	-	Ethyl tert-butyl ether (ETBE)	-	LTOT: 13[15] RBSL: 1,700[6]	11,100[5b]	3,400[5b]

Substance classification		Determinant	Target concentrations (µg/l)			
Groundwater receptors[9]	Surface water receptors[2]		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent	
					Freshwater	Transitional (estuaries) and coastal waters
Ether oxygenates (continued)						
(Not determined)	-	Tert-amyl methyl ether (TAME)	-	LTOT: 128[15] RBSL: 800[6]	9,500[5b]	3,400[5b]
(Not determined)	-	Diisopropyl ether (DIPE)	-	LTOT: 0.8[15] RBSL: 440[6]	9,500[5b]	7,600[5b]
(Not determined)	-	Tert-butyl alcohol (TBA)	-	LTOT: - RBSL: 7,500[6]	-	-
Miscellaneous						
(Not determined)	-	2-Methyl naphthalene	-	LTOT:10[11] RBSL: 28[6]	20[5c]	20 [5c]
(Not determined)	-	Hexane	-	LTOT: - RBSL: 310[6]	50[5c]	50 [5c]

Note "-" indicates no target concentration available.

* "Total petroleum hydrocarbons" is used for consistency, but is an analytical method-defined measurement for a mixture of hydrocarbons subject to environmental analysis[11].

Table 2: Non-statutory target concentrations available for TPH CWG fractions in groundwater with potential drinking water use

TPH CWG fraction	Overall relative mobility in groundwater (as ranked in CL:AIRE, 2017[16])	Non-statutory target concentrations for drinking water receptors (µg/l)
Aliphatic fractions:		
Aliphatic EC5-EC6	High	RBSL: 30,000[6]
Aliphatic >EC6-EC8	Moderate	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: 15,000[7]
Aliphatic >EC8-EC10	Low	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: 300[7]
Aliphatic >EC10-EC12	Low	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: 300[7]
Aliphatic >EC12-EC16	Very low	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: 300[7]
Aliphatic >EC16-EC21	Very low	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: N/A[7]
Aliphatic >EC21-EC35	-	-
Aromatic fractions:		
Aromatic EC5-EC6	High	Refer to benzene: Statutory DWS of 1 [3]
Aromatic >EC6-EC8	High	Refer to toluene: LTOT: 42[12] or RBSL: 480[6]
Aromatic >EC8-EC10	High	Refer to ethyl benzene: LTOT: 29[13] or RBSL: 590[6] **OR** Refer to xylene: RBSL: 1,200[6]
Aromatic >EC10-EC12	Moderate	RBSL: 250[6]
Aromatic >EC12-EC16	Moderate	RBSL: 270[6]
Aromatic >EC16-EC21	Low	RBSL: 260[6]
Aromatic >EC21-EC35	Very low	RBSL[6] exceeds the aqueous solubility limit for this fraction WHO DWS: 90[7]