ENVIRONMENTAL EARTH SCIENCES
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2021-2022 ANNUAL REPORT OF GROUNDWATER MONITORING AT 38 TABBITA ROAD, DUNMORE NSW

DUNMORE SAND & SOIL PTY LTD

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ENVIRONMENTAL EARTH SCIENCES
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5 September 2022

Dunmore Sand & Soil Pty Ltd
c/- Boral Quarries
38 Tabbitta Road
Dunmore NSW 2529

Attention: **Ben Williams**
Environmental Coordinator

Dear Ben

Annual report on groundwater monitoring at 38 Tabbitta Road, Dunmore, NSW: 2021 – 2022

Please find enclosed a copy of our report entitled as above. Thank you for the opportunity to undertake this work.

Should you have any queries, please do not hesitate to contact us on (02) 9922 1777.

For and on behalf of
Environmental Earth Sciences NSW

Project Manager / Author
Karin Azzam
Environmental Scientist

Project Director / Internal Reviewer
Mark Stuckey
Senior Principal Soil Scientist,
Hydrogeologist & Risk Assessor

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1 INTRODUCTION

Environmental Earth Sciences NSW was engaged by Dunmore Sand & Soil Pty Ltd (DSS) to collate and interpret groundwater levels and quality data collected from the Dunmore Lakes Sand Project (Stages 2 – 4) at 38 Tabbita Road, Dunmore, NSW 2529 (the 'site') between May 2020 and May 2021. Refer to Figure 1 for the site's locality.

The Dunmore Lakes Sand Project (Stages 2 – 4) has been approved for the extraction and processing of approximately eight million tonnes of sand under Development Consent 195-8-2004 (2004), issued on 29 June 2005 per the Environmental Planning and Assessment (EP&A) Act 1979. It is recognised that the operation of the Dunmore Lakes Sand Project has the potential to influence groundwater beneath the site.

To manage the potential impact on groundwater, DSS has implemented a groundwater monitoring and management program in line with the Development Consents for Stage 2 – 4 as per the following plans:

- Dunmore Lakes Sand Project Stages 2, 3 and 4 – Water Management Plan (WMP) Version 1 (Dunmore Sand and Soil, 2018); and
- Groundwater Monitoring and Management Plan (GMMP) (Environmental Earth Sciences NSW, 2018b).

The additional extraction area (Stage 5) on adjoining private land, encompassing two separate extraction areas (Stage 5A located at 471 Riverside Drive, and Stage 5B located at 69 Fig Hill Lane, Dunmore) has been approved in November 2020. The Stage 5 Soil and Water Management Plan (EMM, 2021) with site-specific trigger values and triggered action response plans (TARPs) has been approved by Department of Planning Industry and Environment (DPIE). Quarterly groundwater monitoring events (GME) should continue in Stage 5 as per the approved Soil and Water Management Plan (EMM, 2021).

2 OBJECTIVES AND SCOPE OF WORKS

The objective of this report is to assess whether former and on-going sand extraction activities are impacting groundwater levels and quality in accordance with the aforementioned Development Consents and management plans pertaining to the site.

The scope of works undertaken to achieve this objective included:

- Collate, process and calculate water levels from downloaded data from water level loggers;
- Review manual water level measurement to calibrate water levels;
- Review water level data from data loggers in the vicinity of Swamp Road Quarry, the Stage 3 sand dredging area and the proposed Stage 5 sand dredging area; and

- Review the groundwater quality data collected by Boral during the monitoring period.

3 FIELDWORK AND DATA DOWNLOAD

The groundwater monitoring network established for the site is illustrated in **Figures 2** and **3**, with details summarised in **Table 1**.

3.1 Water level and quality data collection

Water level data from each active monitoring location was downloaded from pressure transducer data loggers ('divers') by Environmental Earth Sciences NSW personnel in August 2021 and by International Environmental Consultants in May 2022.

The current active monitoring locations with divers are:

- Stage 2 – 4: bores DG1, DG5d, DG6s, DG17, DG21, DG31 and DG36; and
- Stage 5: bores MW5A1, MW5A3, MW5B2s and MW5B2d.

Water level data from May 2021 to May 2022 for all bores in the active network have been compared to rainfall totals in **Appendix A**, **Chart 1a-1c** and to tidal data in **Appendix A**, **Chart 2a-2c**.

Water quality monitoring of the active groundwater network was undertaken at quarterly intervals by International Environmental Consultants personnel in August 2021, November 2021, February 2022 and May 2022. Field parameter measurements recorded at each location including standing water level (SWL, shown in **Table 2**), temperature, pH, electrolytic conductivity (EC) and oxidation-reduction potential (ORP).

Data was compared against trigger levels outlined in the GMMP (Environmental Earth Sciences NSW, 2018b) for the purposes of this Annual Report.

3.2 Water level manual measurement and logger calibration

SWLs are manually measured from the top of casing (TOC) of each monitoring bore with the TOCs surveyed to Australian Height Datum (mAHD). To assess groundwater levels, these measurements from TOC are converted into relative levels to calibrate datalogger measurements. Subtracting the bore dip from the surveyed TOC level provides a water level in mAHD that can be used to calibrate the datalogger pressure reading.

Table 1: Monitoring bore network

Bore ID	Easting	Northing	Elevation (mAHD[1,2])	Depth (m)	Screen interval (mBGL[3])	Status[4]	Diver installed[4]	Comments
BHA	301383	616892	2.225	5.2	2.2-5.2	Decommissioned	-[4]	-
BHB	301450	6167890	-	5.1	2.1-5.1	Decommissioned	-	Decommissioned in November 2016 due to Stage 3 dredge pond expansion.
BHC	301531	6167902	-	5.2	2.2-5.2	Decommissioned	-	
BHD	301620	6167901	1.760	5.1	2.1-5.1	Decommissioned	-	Decommissioned in May 2018.
BHE	301595	6167932	-	5.1	2.1-5.1	Decommissioned	-	Decommissioned in November 2016 due to Stage 3 dredge pond expansion.
BHF	301505	6167931	2.225	5.2	2.2-5.2	Decommissioned	-	Decommissioned in February 2018.
DG1	301665	6167434	2.225	-	-	**Active**	Yes	DG1-s included within active bore network in August 2019
DG2	301665	6167434	2.598	-	-	Inactive		Monitoring ceased due to completion of Stage 1 area.
DG3	302005	6167259	1.866	-	-	Inactive	-	2015-16 Annual review recommended that monitoring cease due to completion of Stage 1 (Environmental Earth Sciences, 2016)
DG4	301966	6167408	2.083	-	-	Inaccessible	-	No longer accessible. Removed from monitoring network.
DG5s	301883	6167521	1.717	7.00	4.0 – 7.0	**Active**	-	Nested bores (DG5s and DG5d)
DG5d	301883	6167521	1.717	15.00	11.0 – 15.0	**Active**	Yes	
DG6s[1]	301844	6167628	1.647	6.70	4.0 – 6.7	**Active**	Yes	

Bore ID	Easting	Northing	Elevation (mAHD[1,2])	Depth (m)	Screen interval (mBGL[3])	Status[4]	Diver installed[4]	Comments
DG6d	301844	6167628	1.647	14.30	10.0 – 14.3	**Active**	-	
DG7	301667	6168216	3.17	5.00	2.0 – 5.0	**Active**	Yes	Installed November 2018
DG17	301021	6167836	3.49	6.00	2.8 – 6.0	**Active**	Yes	Installed November 2018.
DG21	301424	6168196	2.12	5.00	2.0 – 5.0	**Active**	Yes	Re-installed in November 2018 as bore had been damaged (June 2017).
DG31	301301	6168176	3.05	5.50	2.5 – 5.5	**Active**	Yes	Re-installed in November 2018 as bore had been damaged (June 2017). Diver replaced in August 2018 as faulty.
DG35	301473	6168647	3.84	8.0	4.0 – 8.0	**Active**	-	Bore installed August 2018. No diver
DG36	301473	6168647	2.31	8.0	5.0 – 8.0	**Active**	-	Bore installed August 2018. Diver installed Nov 2018
DG54	301403	6167969	2.311	11.5	-	Decommissioned	-	Decommissioned in 2017 / 2018 due to Stage 3 dredge pond expansion.
DG56	301639	6168017	1.369	10.5	-	Decommissioned	-	
DG59	301125	6167718	1.763	8.69	-	Decommissioned	-	
DG60	301275	6167683	1.501	1.9	-	Decommissioned	-	
Lower Dam	300801	6167833		-	-	Decommissioned	-	Decommissioned prior to August 2021.
Rocklow Creek	300546	6167880		-	-	Decommissioned	-	
Middle Dam	-	-		-	-	Inactive	-	Recommend reinstallation as diver had been removed and location damaged.
MW5A1	302269	6166996	4.31	7.25	3.25-7.25	**Active**	Yes	Installed October 2018. Provides background data
MW5A2	302103	6166973	3.24	6.00	2.0-6.0	Inactive	-	Installed October 2018. Provides background data. Destroyed in May 2022

Bore ID	Easting	Northing	Elevation (mAHD[1,2])	Depth (m)	Screen interval (mBGL[3])	Status[4]	Diver installed[4]	Comments
MW5A3	302054	6167198	1.74	12.00	3.0-6.0/ 9.0-12.0	**Active**	Yes	Installed October 2018. Provides background data
MW5B1	301887	6166442	4.07	6.00	2.0-6.0	**Active**	-	Installed October 2018. Provides background data
MW5B2s	302004	6066039	3.93	6.69	2.0-6.0	**Active**	Yes	Installed October 2018. Provides background data
MW5B2d	302004	6066038	4.12	10.25	6.5-10.25	**Active**	Yes	Installed October 2018. Provides background .data
MW5B3	302247	6066272	2.06	11.20	3.0-6.0/ 8.5-11.2	**Active**	-	Installed October 2018. Provides background data
MW5B4	302157	6166438	2.56	6.33	2.0-6.0	**Active**	-	Installed October 2018. Provides background data
MW5B5	302131	6165707	4.63	12.0	3.0-6.0/ 9.0-12.0	**Active**	-	Installed October 2018. Provides background data. Often dry

Notes:

1. Surveyed from top of casing (TOC)
2. mAHD – metres above Australian Height Datum
3. mBGL – metres Below Ground Level
4. Correct as of May 2022 round by International Environmental Consultants
5. - : no information available

Table 2 below summarises the SWL for bores generally obtained during the August 2021 to May 2022 monitoring period. All measurements were taken by International Environmental Consultants staff. Quarterly measurement of SWL (mAHD) since February 2017 are presented in **Table 3** at the rear of this report.

Table 2: Standing water levels (mAHD) across the monitoring network Aug 2021 – May 2022

Location	Trigger Value[1]		Aug 2021	Nov 2021	Feb 2022	May 2022
	Upper Limit (mAHD)	Lower Limit (mAHD)[3]				
DG-1	2.31	0.32	1.26	1.11	1.09	1.12
DG5 (shallow)	-	-	1.03	0.95	0.91	1.03
DG5 (deep)	1.91	0.17	0.97	0.81	0.84	0.97
DG6 (shallow)	-	-	0.67	0.89	0.70	0.98
DG6 (deep)	-	-	0.91	0.83	0.84	0.68
DG7			1.45	1.27	1.25	1.40
DG17			1.23	1.59	1.36	1.48
DG21			0.67	0.57	0.55	0.75
DG31	-	-	0.66	0.87	0.90	1.27
DG35			1.84	1.75	1.84	1.90
DG36			1.09	1.05	1.10	1.22
MW5A1	-	-	1.06	0.91	1.09	1.60
MW5A2	-	-	1.03	0.96	1.44	3.24
MW5A3	-	-	1.13	0.89	0.93	1.20
MW5B1	-	-	2.62	2.22	2.45	3.43
MW5B2s	-	-	2.00	1.70	1.80	3.38
MW5B2d	-	-	1.96	1.76	1.84	3.35
MW5B3	-	-	1.04	0.86	0.85	1.10
MW5B4	-	-	1.39	0.86	0.88	1.75
MW5B5	-	-	-	-	-	-

Notes:

1. Trigger values taken from Table 5: Physical Triggers – Groundwater Levels of the GMMP (Environmental Earth Sciences, 2018b) (mAHD).
2. – no information available or not applicable
3. All measurements in mAHD – metres Australian Height Datum

The data logging of the piezometric pressure (water pressure) in the monitoring bores containing divers was undertaken at 60-minute intervals, with readings compensated for barometric changes. The data from the loggers is downloaded at each location and used to compare the piezometric head with tidal influence and rainfall. No measurements obtained from the diver data or SWL readings exceeded the trigger values outlined in the GMMP (Environmental Earth Sciences, 2018b).

3.3 Rainfall data

Local daily rainfall data was obtained from the Bureau of Meteorology (BOM) weather station 068242 located at Kiama (Bombo Headland) approximately 4.6 km from site.

The May 2021 to May 2022 monitoring period was exceptionally wet with significant rainfall events exceeding 100 mm listed below:

- 05 May to 08 April 2021 – 174 mm
- 22 February to 09 March 2022 – 818 mm (rain consecutively over 16 days)
- 25 March to 02 April 2022 – 336 mm

Whilst the winter of 2021 saw below average rainfall and warmer than average days, the spring of 2021 was unseasonably wet with November recording rainfall of up to approximately 200 to 250% of the monthly average. The wet weather continued over the three summer months, with frequent and very long significant rainfall events.

Rainfall during this monitoring period differed from previous years with the unseasonably wet summer being a result of a combination of the negative Indian Ocean Dipole, developing La Niña and a persistent positive phase of the Southern Annular Mode. Rainfall totals at stage 2-4 and stage 5 compared to water level data at DS&S are presented in **Appendix A**, **Chart 1a** and **Chart 1b**.

3.4 Tidal data

Tidal data from the Minnamurra River tidal monitoring station (214442) was purchased from Manly Hydraulics Laboratory[2] for the period between 3 June 2021 and 3 June 2022, in addition to data from BOM for the purpose of comparing the water level data to tidal movements (**Appendix A**, **Chart 2a** and **Chart 2c**).

3.5 Water quality data

All four groundwater monitoring events (GMEs) in August 2021, November 2021, February 2022 and May 2022 was undertaken by International Environmental Consultants personnel. Groundwater samples were submitted to Boral Materials Technical Services, a NATA accredited laboratory for the following suites of analyses:

[2] Sourced from http://www.mhl.nsw.gov.au/Station-214442 Accessed and purchased on 22 August 2022

- pH
- Electrical conductivity
- Redox
- Dissolved oxygen
- Total phosphorous
- Total nitrogen
- Major cations and anions (Na, K, Mg, Cl, SO_4, HCO_3, Ca, F)
- Soluble iron
- Ammonium
- Nitrate
- Faecal coliforms and enterococci

The results for each location are illustrated in Schoeller Plots in **Appendix B** and compared to its historical results. Laboratory certificates of analysis are provided in **Appendix C**.

Bores west of the Princes Highway (ID: DG1, DG17, DG21, DG31, DG35 and DG36) and bores east of the Princes Highway (ID: DG5s, DG5d, DG6s and DG6d and DG7) are presented separately due to historic evidence of strong tidal influence on easterly bores. The results are compared to their site-specific trigger value derived in the GMMP (Environmental Earth Sciences, 2018b), not the DA criteria which is more generic and outlined under Development Consent 195-8-2004 (2004).

Table 4 of the **Tables Appendix** summarizes quarterly data for the western bores (ID: DG1, DG17, DG21, DG31, DG35 and DG36). The following were identified as exceeding GMMP Trigger Values:

- Groundwater pH was recorded very slightly below the trigger value range at bore DG21 in November 2021;
- Elevated EC above the trigger value of 1500 µS/cm in August 2021 and February 2022 at bore DG17 and on one occasion at bore DG21 and bore DG31 in November 2021;
- All sodium (Na) concentrations were below the GMMP Trigger Values and DA criteria at all locations;
- Elevated potassium (K) was reported on only one occasion May 2022 at bore DG17;
- Bore DG17 recorded magnesium (Mg) slightly in excess of DA criteria in February 2022 and chloride (Cl) in excess of DA criteria in August 2021;

- Elevated ammonia (NH_3-N) reported in excess of GMMP trigger value (3 mg/L) at all four monitoring rounds at bore DG17.

Table 5 of the **Tables Appendix** summarizes quarterly data for the eastern bores (ID: DG5s, DG5d, DG6s, DG6d and DG7). The following were identified as exceeding site-specific GMMP Trigger Values:

- Groundwater pH was recorded just below the trigger value range at bore DG6s in all four monitoring rounds;
- Elevated K was reported in all four consecutive monitoring events at bores DG6s and DG6d;
- Bore DG6d recorded elevated Mg in May 2022;
- Elevated Cl was recorded in all four consecutive monitoring events at bores DG6s and DG6d;
- Bore DG6d reported elevated concentrations of sulfate (SO_4) on three occasions (November 2020 and February and May 2021), which was in excess of GMMP trigger value (1,170 mg/L).

Table 6 and **Table 7** of the **Tables Appendix** summarizes quarterly data for the Stage 5A (ID: MW5A1, MW5A2 and MW5A3) and Stage 5B (ID: MW5B1, MW5B2s, MW5B2d, MW5B3 and MW5B4). Concentrations of major ions and other analytes were considered comparable to those in the 2020-2021 annual monitoring events. The following were identified as exceeding site-specific Trigger Values:

- Groundwater pH was recorded below the trigger value range at bore MW5A1 in February and May 2022 and at bore MW5A2 in August and November 2021 and February 2022;
- Elevated dissolved iron (Fe) was consistently recorded at bore MW5A2 at one occasion in February 2022;
- No exceedance was recorded at any locations of Stage 5B between August 2021 and May 2022 GMEs with the exception of bore MW5B1 recording a very slight exceedance of dissolved Fe.

These results are discussed in more detail in **Section 4.3**.

3.6 Procedures for quality control and quality assurance

For all groundwater monitoring events August 2021 to May 2022, quality control was achieved by a NATA registered laboratory using American Society for Testing and Materials (ASTM) standard methods supported by internal duplicates, the checking of high, abnormal or otherwise anomalous results against the background and other chemical results for the sample concerned.

Quality assurance is achieved by confirming that field results, or anticipated results based upon comparison with field observations, are consistent with laboratory results. Also, sampling methods are uniform, and decontamination is thorough. In addition, the laboratory

undertakes additional duplicate analysis as part of their internal quality assurance program on the basis of one duplicate analysis for every 20 samples analysed.

Field observations are compared with laboratory results when they are not as expected. Confirmation, re-sampling and re-analysis of a sample are undertaken if the results are not consistent with field observations and/or measurements. In addition, field duplicate sample results must be within the acceptable range of reproducibility. The summary of the relative percentage differences (RPDs) of the collected intra duplicate samples is presented in **Appendix D**.

4 DATA INTERPRETATION AND DISCUSSION

4.1 Temporal water levels

Chart 1a and **1b** in **Appendix A** display the latest rainfall and groundwater levels (mAHD) at:

- Current (bores DG1S, DG5, DG6, DG17, DG21, DG31 and DG36) monitoring locations at DS&S since May 2021 (**Chart 1a**); and
- Stage 5 area (MW5A1, MW5A3, MW5B2s and MW5B2d) since May 2021 (**Chart 1b**).

4.1.1 Dunmore Sand & Soil (Stage 2-4)

Based on the data collected during the monitoring period May 2021 – May 2022, the following comments can be made in reference to **Chart 1a**, and the water level monitoring at DS&S:

- All bores continue to display a strong relationship to large (> 20 mm) rainfall events with a slight lag time. This is especially evident during the significant and ongoing rainfall events in January, February, March and April 2022.
- Remaining fluctuations in groundwater are attributed to rainfall or tidal influences.
- Background bore DG5 (deep) reported a SWL ranging of 0.54-1.61 mAHD. This is within the normal SWL range (0.21-1.71 mAHD) for this location.

The inferred groundwater flow directions are similar to previous annual groundwater monitoring events, indicated in **Figure 4** and **Figure 5** which showed a generally consistent south-easterly pressure gradient towards Rocklow Creek, the Minnamurra River and the coast.

4.1.2 Stage 5

The response to rainfall is rapid, confirming that recharge to the aquifer is primarily via direct infiltration from the surface, with potential local run-on from outcropping bedrock. Refer to **Chart 1b** attached. **Table 2** provides manual SWL dip levels converted to mAHD data for all bores for the same period and confirms the relative consistency of groundwater elevations over time, with bore MW5B1 being hydraulically up-gradient of Stage 5B and bore MW5A2

up-hydraulic gradient of Stage 5A. Groundwater flow directions are to the north-east at Stage 5A and east at Stage 5B as indicated in **Figures 6** and **7**.

4.1.3 Groundwater level response to rainfall

The aquifer beneath site has historically responded rapidly to local rainfall events (Environmental Earth Sciences 2009-2021), a trend which was repeated during 2021-2022 monitoring period at all locations (**Appendix A**, **Chart 1a** and **1b**).

Three rainfall events were recorded during the May 2021 – May 2022 monitoring period that exceeded 100 mm. Historically, several rainfall events >150 mm have been recorded across the monitoring period. The increased recharge of the aquifer via rainfall was evidenced in the upward trend in groundwater levels across the site, especially during the wet summer and spring, January to April 2022.

Water levels up-gradient (bore DG36) remained relatively steady over the winter of 2021, indicative of background aquifer behaviour, which is less influenced by tidal impacts and direct rainfall recharge. The heavy rainfall and saturated conditions during the summer and spring of 2022 did result in a fast and strong recharge of the aquifer.

Water levels at bore DG31 showed a very strong response to rainfall (higher overall fluctuations) with a downward trend in the drier start of the winter of 2021 before water levels rising sharply during the high rainfall events with the water table rising with >1.5 m during the significant rainfall event starting at the end of February 2022 (refer **Chart 1a**).

The groundwater in bore DG21, appear to have a similar direct response to rainfall events during 2021-22 as the other bores on site with rapid recharge of aquifer after rainfall events. This differed from previous years where the bore has been described as having a relatively dampened response to rainfall.

Bore DG17 appears to be influenced both by rainwater recharge, and upstream tidal influences of Rocklow Creek and Dunmore Creek (**Chart 1a** and **Chart 1b**).

Whilst bore DG17 is influenced by both rainwater recharge, and upstream tidal influences of Rocklow Creek and Dunmore Creek, it has, like the other bores, a stronger response to the significant rainfall events of 2021-22 (**Chart 1a** and **Chart 2a**).

Bores down-gradient (DG5 and DG6) have historically generally remained consistent as these are more influenced by tidal fluctuations. Whilst this was also evident in t2021-22, the persistent rainfall events did result in larger fluctuations than usual in the months of January to April 2022 (**Chart 1a** and **Chart 2a**).

Monitoring bores within Stage 5 exhibited a rapid rainfall response pattern and appeared to be more easily influenced by rainfall events (**Appendix A**, **Chart 1b**). At the beginning of the significant rainfall event commencing 22 February 2022, a rise of ~2 m in the water table can be seen in bores MW5B2S and MW5B2D, the upgradient bores in the southern portion of the Stage 5B area. Water levels in these bores remained high for the rest of the summer and autumn, likely due to saturated conditions.

The downgradient bore MWA1 in the Stage 5a area did also show similar rapid recharge of the water table in February 2022 but also fell in between rainfall events, corresponding well with the peaks and troughs of the rainfall data. This is seen to confirm that recharge to the aquifer is primarily via direct infiltration from the surface, with potential local run-on from outcropping bedrock. This differs for bore MW5A3 which, in comparison, remains more stable with smaller fluctuations in the water table during rainfall events. **Table 2** provides manual dip SWL data converted to mAHD for all bores for the same period and confirms the relative consistency of groundwater elevations over time.

4.1.4 Groundwater level response and tide analysis

The unconfined aquifer which is intercepted by all bore locations is susceptible to tidal influences, however at relatively low amplitudes. Tidal characteristics of the aquifer are shown in **Appendix A**, **Chart 2a** and **Chart 2b**.

Groundwater fluctuations in response to tidal influxes in bores DG5 and DG6 have historically been larger, while the tidal amplitudes at bores DG31 and DG21 exhibit dampened responses. Bore DG17 also continues to show dampened responses. Historically, bore DG17 has appeared to be impacted by fluctuations in Rocklow Creek and Dunmore Creek, respectively which has indicated a reduced tidal impact on groundwater levels further up the Rocklow Creek catchment.

Chart 2b shows groundwater fluctuations in bore MW5A3 at Stage 5A in response to tidal influxes is relatively larger than those bores (MW5B2d and MW5B2s) in Stage 5B, which showed dampened responses. This is to be expected given the proximity of Rocklow Creek to the north of Stage 5A, adjacent to bore MW5A3. Bore MW5A1 did not show the same response to tidal influences as MW5A3 but was dampened similarly to the bores in Stage 5b.

4.2 Hydraulic gradient and groundwater flow direction

The groundwater hydraulic gradient at each location is determined by comparing the average standing water level (SWL, converted to mAHD) in the unconfined aquifer at each location to down-gradient bore DG5.

The inferred groundwater contours for Stage 2-4 (**Figure 4** and **Figure 5**) indicate that groundwater flow is influenced by both tidal movements and localised dredging activities in Stage 3, although overall there is a consistent south-easterly gradient towards Rocklow Creek, the Minnamurra River and the coast.

Beneath Stage 5, groundwater flow is towards the Minnamurra River which in turn flows around the south and east of the site in a north-easterly direction. Groundwater flow is influenced by topography and regional recharge/ discharge zones. Hence, the hydraulic gradient is typical to the north-east and east for both Stage 5A and Stage 5B areas. It is anticipated that the outcrop of latite to the north of Stage 5B is likely to behave as a no-flow boundary which is in line with historical observation (**Figure 6** and **Figure 7**).

4.3 Groundwater quality

4.3.1 Stage 2 – 4

Table 4 and **Table 5** summarise the chemical data collected by Boral in the August 2021 to May 2022 monitoring period at bores west and east of Princes Highway in Stage 2 -4, respectively. Bores west of the Princes Highway (ID: DG1, DG17, DG21, DG31, DG35 and DG36) and bores east of the Princes Highway (ID: DG5s, DG5d, DG6s and DG6d and DG7) are presented separately due the strong tidal influence on easterly bores. The results are compared to their site-specific trigger value, not the DA Criteria, which is more generic.

Historically, due to tidal/ estuarine influences, bores east of the Princes Highway consistently reported greater salinity levels (as EC in µS/cm) than those at west of the Princes Highway.

The bores screened in the deeper portion of the aquifer (DG5d and DG6d) have historically exhibited greater salinity concentrations than those screened in the shallow aquifer (DG5s and DG5s and DG7). This was generally the trend during the 2021-22 period, but in this period, both the deep and the shallow bores (DG6d and DG6s) were higher than the deep bore DG5d.

Bores DG6d and DG6s did also report elevated potassium and chloride in all four monitoring events throughout the year, exceeding the trigger levels with bore DG6s also reporting pH just below trigger values.

There were no exceedances of ammonia (NH_3-N) concentrations in any of the bores this period.

Bore DG17 did report bicarbonate (HCO_3^-) concentrations exceeding the trigger level in all four monitoring events throughout the year, as well as exceedances of chloride (Cl) in August 2021.

Electrical conductivity (EC) above trigger values in the bores west of the Princes Highway will continue to be monitored. Analytes reported above the trigger values will continue to be monitored as per the contingency plan in the GMMP (Environmental Earth Sciences, 2018b), with consideration to current site operations and climate.

4.3.2 Stage 5

As works at Stage 5 have yet to commence, chemical data is provided for baseline information only and is subsequently presented in **Table 6** and **Table 7** for Stage 5a and Stage 5b, respectively. This area does not have site-specific values derived[3], the results have been compared to the DA Criteria currently in place for Stages 2-4, which is more generic. However, the more conservative values from the GMMP have also been included, for reference.

[3] A site-specific Soil and Water Management has been prepared for Stage 5 by EMM Consulting Pty Ltd (July 2021) with trigger values, therefore discussion of Stage 5 groundwater quality should be made based upon those trigger values in the 2021-2022 annual report.

Based on the data collected to date, the following comments can be made in reference to the groundwater chemical monitoring at Stage 5:

- The dissolved iron concentrations were reported to exceed trigger values at bore MW5A3 in February 2022, with concentrations at bore MW5A2 sitting just on the trigger value of 3 mg/L. Due to their proximity to the river, the elevated iron concentrations are considered representative of background levels;

- No elevated concentrations exceeding trigger values were recorded at Stage 5B from August 2021 to May 2022 groundwater monitoring events with the exception of dissolved iron slightly exceeding the trigger value at bore MW5B1 in May 2022.

5 RECOMMENDATIONS FOR FUTURE MONITORING

Quarterly groundwater level and quality monitoring should continue in line with the WMP (DS&S, 2018) and GMMP (Environmental Earth Sciences, 2018b). It is understood that DSS ceased Stage 1 dredging activities at the Swamp Road site in March 2009, and the site is currently a rehabilitated pond. Sand dredging of Stage 2 is complete and dredging operations within Stage 3 are approaching capacity. Approval for Stage 5 was obtained in November 2020.

Based on a review of 2021/ 2022 monitoring data the following adjustments are recommended to the program:

- monitoring of representative onsite diver locations for both Stage 2 -4 and Stage 5 should continue at quarterly intervals as indicated on **Figure 2** and **Figure 3** by the active monitoring network; and

- Stage 5 has been approved in November 2020 and Stage 5 *Soil and Water Management Plan* (EMM, 2021) with site-specific trigger values and TARPs has been approved by DPIE. GMEs should continue in Stage 5 as per the approved *Soil and Water Management Plan* (EMM, 2021).

The data obtained from the data loggers installed in bores DG1, DG5, DG6, DG7, DG17, DG21, DG31, DG35, and DG36 indicates that over the past monitoring year natural fluctuations in water levels were occurring in response to rainfall and tide as illustrated in **Appendix A**. This is consistent with previous findings dating back to 2003 (Environmental Earth Sciences 2009, 2010, 2011, 2012, 2013a, 2014, 2015, 2016a, 2017, 2018a, 2019, 2020 and 2021).

All data obtained from the bores monitored strongly indicates the following:

- that influences on groundwater levels are related to recharge from rainfall and minor tidal influx (this finding is supported by chemical monitoring of tidal seawater intrusion from Rocklow Creek);

- reductions in groundwater levels are related to periods of low rainfall where the aquifer is slowly draining from Rocklow Creek and the south-east aquifer boundary; and

- water-table fluctuations are therefore naturally occurring and cannot be seen to be impacted by dredging activities in the area, except in immediate proximity to the dredge pond.

Based on the data collected to date, it is recommended to:

- continue to monitor SWL in all bores with downloads and manual measurements at quarterly intervals;
- exceedances of K, Mg and Cl in the deep aquifer to the east of the highway, and Mg in bores DG17 and DG21, are considered natural occurrences, and the GMMP should be revised to reflect this occurrence; and
- continue to monitor groundwater quality in all active bores at quarterly intervals for both Stages 2-4 and Stage 5.

6 LIMITATIONS

This report has been prepared by Environmental Earth Sciences NSW ACN 109 404 006 in response to and subject to the following limitations:

1. The specific instructions received from Dunmore Sand & Soil Pty Ltd;
2. May not be relied upon by any third party not named in this report for any purpose except with the prior written consent of Environmental Earth Sciences NSW (which consent may or may not be given at the discretion of Environmental Earth Sciences NSW);
3. This report comprises the formal report, documentation sections, tables, figures and appendices as referred to in the index to this report and must not be released to any third party or copied in part without all the material included in this report for any reason;
4. The report only relates to the site referred to in the scope of works being located at 38 Tabbita Road, Dunmore, NSW, 2529 (“the site”);
5. The report relates to the site as at the date of the report as conditions may change thereafter due to natural processes and/or site activities;
6. No warranty or guarantee is made in regard to any other use than as specified in the scope of works and only applies to the depth tested and reported in this report; and
7. Our General Limitations set out at the back of the body of this report.

7 REFERENCES

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8 GLOSSARY OF TERMS

The following descriptions are of terms used in the text of this report.

Aquifer. A rock or sediment in a formation, group of formations, or part of a formation which is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

Aquifer, confined. An aquifer that is overlain by a confining bed with significantly lower hydraulic conductivity than the aquifer.

Aquifer, perched. A region in the unsaturated zone where the soil is locally saturated because it overlies soil or rock of low permeability.

Background. The natural level of a property.

Baseline. An initial value of a measure.

Bore. A hydraulic structure that facilitates the monitoring of groundwater level, collection of groundwater samples, or the extraction (or injection) of groundwater. Also known as a well, monitoring well or piezometer, although piezometers are typically of small diameter and only used for measuring the groundwater elevation or potentiometric surface.

Borehole. An uncased well drill hole.

Confined Aquifer. An aquifer that is confined between two low-permeability aquitards. The groundwater in these aquifers is usually under hydraulic pressure, i.e. its hydraulic head is above the top of the aquifer.

Confining layer. A layer with low vertical hydraulic conductivity that is stratigraphically adjacent to one or more aquifers. A confining layer is an aquitard. It may lie above or below the aquifer.

Contaminant. Generally, any chemical species introduced into the soil or water. More particularly relates to those species that render soil or water unfit for beneficial use.

Contamination. Is considered to have occurred when the concentration of a specific element or compound is established as being greater than the normally expected (or actually quantified) background concentration.

Dissolved Oxygen (DO). Oxygen in the gaseous phase dissolved in water. Measured either as a concentration in mg/L or as a percentage of the theoretical saturation point, which

is inversely related to temperature. At 19, 20 and 21 degrees Celsius, the oxygen concentrations in mg/L corresponding to 100% saturation are 9.4, 9.2 and 9.0 respectively.

Electrical Conductivity (EC). The EC of water is a measure of its ability to conduct an electric current. This property is related to the ionic content of the sample, which is in turn a function of the total dissolved (ionisable) solids (TDS) concentration. An estimate of TDS in fresh water can be obtained by multiplying EC by 0.65.

Flow path. The direction in which groundwater is moving.

Fluvial. A material deposited by, or in transit, in streams or watercourses.

Gradient. The rate of inclination of a slope. The degree of deviation from the horizontal; also refers to pressure.

Groundwater. The water held in the pores in the ground below the water table.

Groundwater Elevation. The elevation of the groundwater surface measured relative to a specified datum such as the Australian Height Datum (mAHD) or an arbitrary survey datum onsite, or “reduced level” (mRL).

Heavy Metals. All metallic elements whose atomic mass exceeds that of calcium (20) and includes lead (Pb), copper (Cu), Zinc (Zn), cadmium (Cd), and tin (Sn).

Heterogeneous. A condition of having different characteristics in proximate locations. Non-uniform. (Opposite of homogeneous).

Horizon. An individual soil layer, based on texture and colour, which differs from those above and below.

Hydraulic Conductivity (K). A coefficient describing the rate at which water can move through a permeable medium. It has units of length per time. The units for hydraulic conductivity are typically m3/day/m2 or m/day.

Hydraulic Gradient (i). The rate of change in total head per unit of distance of flow in a given direction – the direction is that which yields a maximum rate of decrease in head. Hydraulic Gradient is unit less.

Hydraulic Head (h). The sum of the elevation head and the pressure head at a point in an aquifer. This is typically reported as an elevation above a fixed datum, such as sea level.

Infiltration. The passage of water, under the influence of gravity, from the land surface into the subsurface.

Ionic Exchange. Adsorption occurs when a particle with a charge imbalance, neutralises this charge by the attraction (and subsequent adherence of) ions of opposite charge from solution. There are two types of such a charge: pH dependent; and pH independent or crystalline charge. Metal hydroxides and oxy-hydroxides represent examples of the former type, whilst clay minerals are representative of the latter and are normally associated with cation exchange.

Ions. An ion is a charged element or compound as a result of an excess or deficit of electrons. Positively charged ions are called cations, whilst negatively charged ions are called anions. Cations are written with superscript +, whilst anions use - as the superscript. The major aqueous ions are those that dominate total dissolved solids (TDS). These ions include: Cl-, SO42-, HCO3-, Na+, Ca2+, Mg2+, K+, NH4+, NO3-, NO2-, F-, PO43- and the heavy metals.

Perched Groundwater. Unconfined groundwater separated from an underlying main body of groundwater by an unsaturated zone. Perched groundwater typically occurs in discontinuous, often ephemeral, lenses, with unsaturated conditions both above and below.

Permeability (k). Property of porous medium relating to its ability to transmit or conduct liquid (usually water) under the influence of a driving force. Where water is the fluid, this is effectively the hydraulic conductivity. A function of the connectivity of pore spaces.

Piezometric or Potentiometric Surface. A surface that represents the level to which water will rise in cased bores. The water table is the potentiometric surface in an unconfined aquifer.

pH. A logarithmic index for the concentration of hydrogen ions in an aqueous solution, which is used as a measure of acidity.

Porosity (n). The ratio of the volume of void spaces in a rock or sediment to the total volume of the rock or sediment. Typically given as a percentage.

Porosity, effective (ne). The volume of the void spaces through which water or other fluids can travel in a rock or sediment divided by the total volume of the rock or sediment.

Purge (wells). The pumping out of well water to remove drilling debris or impurities; also conducted to bring fresh groundwater into the casing for sample collection. The later ensures that a more representative sample of an aquifer is taken.

QA/QC. Quality Assurance / Quality Control.

Recharge Area. Location of the replenishment of an aquifer by a natural process such as addition of water at the ground surface, or by an artificial system such as addition through a well

Recovery. The rate at which a water level in a well rises after pumping ceases.

Redox. REDuction-OXidation state of a chemical or solution.

Redox potential (Eh). The oxidation/reduction potential of the soil or water measured as milli-volt.

Representative Sample. Assumed not to be significantly different than the population of samples available. In many investigations samples are often collected to represent the worst case situation.

Saturated Zone. A zone in which the rock or soil pores are filled (saturated) with water.

Standing Water Level (SWL). The depth to the groundwater surface in a well or bore measured below a specific reference point – usually recorded as metres below the top of the well casing or below the ground surface.

Stratigraphy. A vertical sequence of geological units.

Total Dissolved Salts (TDS). The total dissolved salts comprise dissociated compounds and undissociated compounds, but not suspended material, colloids or dissolved gases.

Toxicity. The inherent potential or capacity of a material to cause adverse effects in a living organism.

Unsaturated Zone. The zone between the land surface and the water table, in which the rock or soil pores contain both air and water (water in the unsaturated zone is present at less than atmospheric pressure). It includes the root zone, intermediate zone and capillary fringe. Saturated bodies such as perched groundwater may exist in the unsaturated zone. Also referred to as the Vadose Zone.

Volatile. Having a low boiling or subliming pressure (a high vapour pressure).

Water table. Interface between the saturated zone and unsaturated zones. The surface in an aquifer at which pore water pressure is equal to atmospheric pressure.

Well. A hydraulic structure that facilitates the monitoring of groundwater level, collection of groundwater samples, or the extraction (or injection) of groundwater. Also known as a Bore.

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ENVIRONMENTAL EARTH SCIENCES GENERAL LIMITATIONS

Scope of services
The work presented in this report is Environmental Earth Sciences response to the specific scope of works requested by, planned with and approved by the client. It cannot be relied on by any other third party for any purpose except with our prior written consent. Client may distribute this report to other parties and in doing so warrants that the report is suitable for the purpose it was intended for. However, any party wishing to rely on this report should contact us to determine the suitability of this report for their specific purpose.

Data should not be separated from the report
A report is provided inclusive of all documentation sections, limitations, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Subsurface conditions change
Understanding an environmental study will reduce exposure to the risk of the presence of contaminated soil and or groundwater. However, contaminants may be present in areas that were not investigated, or may migrate to other areas. Analysis cannot cover every type of contaminant that could possibly be present. When combined with field observations, field measurements and professional judgement, this approach increases the probability of identifying contaminated soil and or groundwater. Under no circumstances can it be considered that these findings represent the actual condition of the site at all points.

Environmental studies identify actual sub-surface conditions only at those points where samples are taken, when they are taken. Actual conditions between sampling locations differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact. For this reason, site owners should retain our services.

Problems with interpretation by others
Advice and interpretation is provided on the basis that subsequent work will be undertaken by Environmental Earth Sciences NSW. This will identify variances, maintain consistency in how data is interpreted, conduct additional tests that may be necessary and recommend solutions to problems encountered on site. Other parties may misinterpret our work and we cannot be responsible for how the information in this report is used. If further data is collected or comes to light we reserve the right to alter their conclusions.

Obtain regulatory approval
The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.

Limit of liability
This study has been carried out to a particular scope of works at a specified site and should not be used for any other purpose. This report is provided on the condition that Environmental Earth Sciences NSW disclaims all liability to any person or entity other than the client in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by any such person in reliance, whether in whole or in part, on the contents of this report. Furthermore, Environmental Earth Sciences NSW disclaims all liability in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by the client, or any such person in reliance, whether in whole or any part of the contents of this report of all matters not stated in the brief outlined in Environmental Earth Sciences NSW's proposal number and according to Environmental Earth Sciences general terms and conditions and special terms and conditions for contaminated sites.

To the maximum extent permitted by law, we exclude all liability of whatever nature, whether in contract, tort or otherwise, for the acts, omissions or default, whether negligent or otherwise for any loss or damage whatsoever that may arise in any way in connection with the supply of services. Under circumstances where liability cannot be excluded, such liability is limited to the value of the purchased service.

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FIGURES

Source: Google Maps

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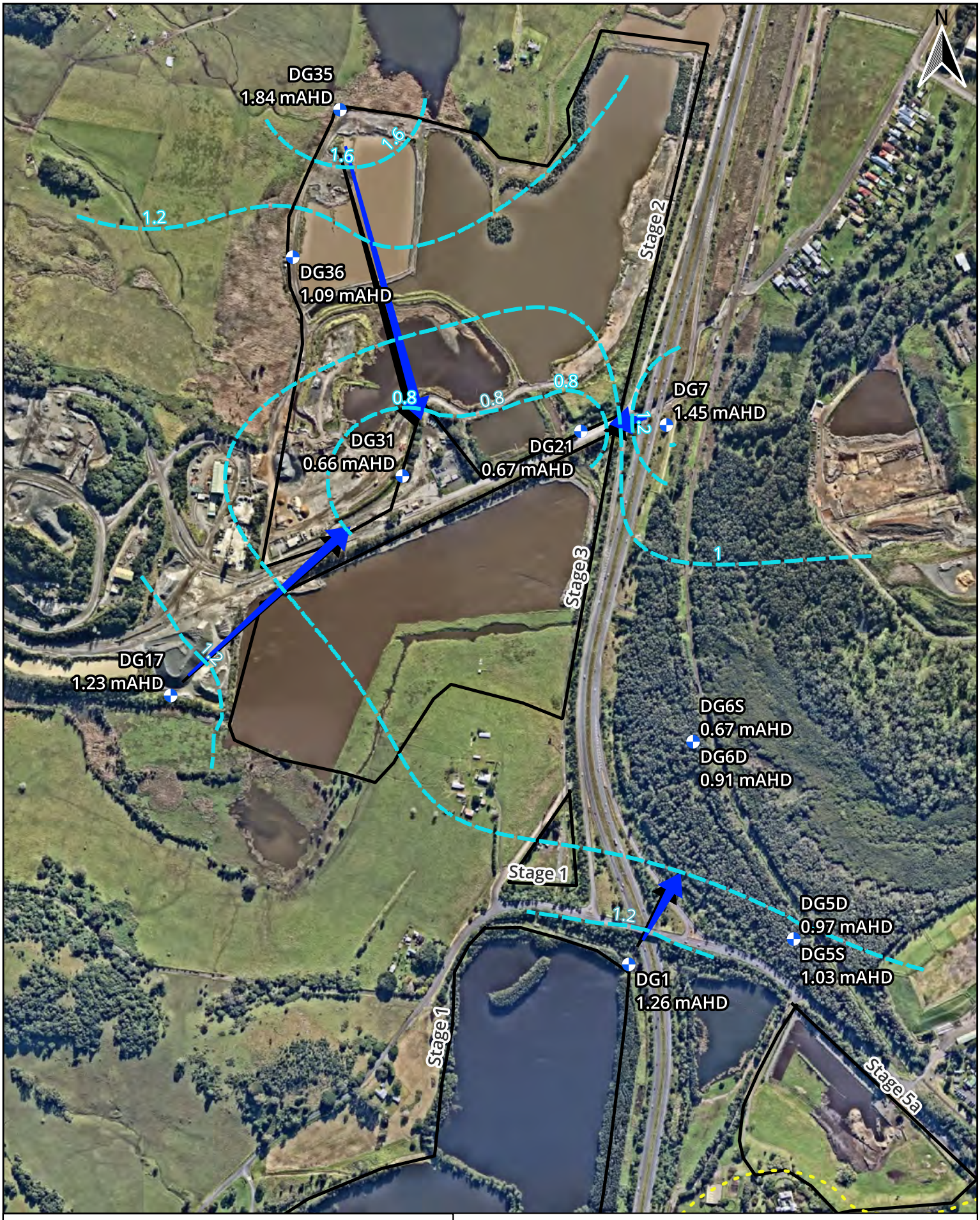
Title:	Site Locality Map		
Location:	Dunmore, NSW		
Client:	Dunmore Sand and Soil Pty Ltd		Job No: 122071
Project Man:	KA	Scale:	As Shown
Drawn By:	ZZ	Date:	July 2021
			Figure 1

ENVIRONMENTAL EARTH SCIENCES CONTAMINATION RESOLVED	Drawn by: ZZ	Date: July 2021	**Dunmore Sand & Soil Pty Ltd**	Site Layout and Borehole Locations - Stage 2-4	Figure No. 2
	Proj. Manager: KA	Scale: As shown	Dunmore, NSW		
	Job No: 120071	Source: NearMaps (c)			

ENVIRONMENTAL EARTH SCIENCES CONTAMINATION RESOLVED	Drawn by: ZZ	Date: July 2021	**Dunmore Sand & Soil Pty Ltd**	Figure No. 3
	Proj. Manager: KA	Scale: As shown	Dunmore, NSW	Site Layout and Borehole Locations - Stage 5
	Job No: 120071	Source: NearMaps (c)		



Legend:

- Inferred groundwater contours (mAHD)
- Inferred groundwater flow
- Well locations

0 10 20 30 40 m

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Inferred groundwater contours Stage 2-4 - August 2021

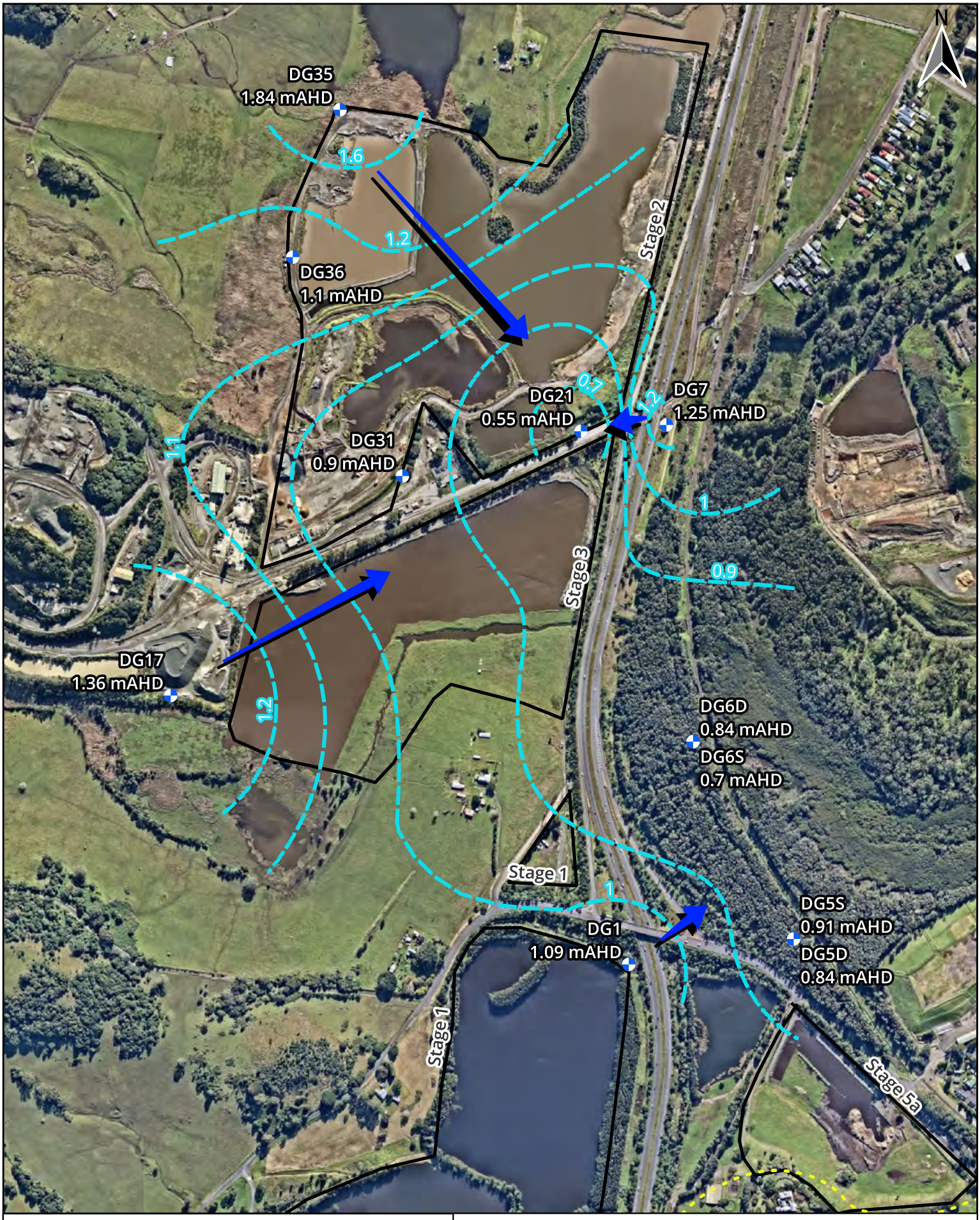
Client: Dunmore Sand & Soil

Location:38 Tabbita Rd, Dunmore, NSW

Project Manager: Karin Azzam | Scale: As Shown | Job No: 122071

Drawn By: Karin Azzam | Date: August 2022

Figure 4



Legend:

- Inferred groundwater contours (mAHD)
- Inferred groundwater flow
- Well locations

0 10 20 30 40 m

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Inferred groundwater contours Stage 2-4 - February 2022

Client: Dunmore Sand & Soil

Location:38 Tabbita Rd, Dunmore, NSW

Project Manager: Karin Azzam | Scale: As Shown | Job No: 122071

Drawn By: Karin Azzam | Date: August 2022

Figure 5

Legend:

- Inferred groundwater contours (mAHD)
- Inferred groundwater flow
- Well locations
- Latite

0 10 20 30 40 m

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Inferred groundwater contours Stage 5 - Aug 2021

Client: Dunmore Sand & Soil

Location:38 Tabbita Rd, Dunmore, NSW

Project Manager: Karin Azzam | Scale: As Shown | Job No: 122071

Drawn By: Karin Azzam | Date: August 2022

Figure 6

Legend:

- Inferred groundwater contours (mAHD)
- Inferred groundwater flow
- Well locations
- Latite

0 10 20 30 40 m

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Inferred groundwater contours Stage 5 - February 2022

Client: Dunmore Sand & Soil

Location:38 Tabbita Rd, Dunmore, NSW

Project Manager: Karin Azzam | Scale: As Shown | Job No: 122071

Drawn By: Karin Azzam | Date: August 2022

Figure 7

TABLES

ENVIRONMENTAL EARTH SCIENCES
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Table 3: Standing water levels: Feb 2017 – May 2022

Location	Feb-17	May-17	Aug-17	Nov-17	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-20	Nov-20	Feb-21	May-21	Aug-21	Nov-21	Feb-22	May-22
Units	mAHD																	
DG-1							0.74	0.62	1.08	0.90	1.11	0.93	0.99	1.13	1.26	1.11	1.09	1.12
DG5_S		0.54	0.71			0.60	0.57	0.48	0.88	0.68		0.66	0.75	0.90	1.03	0.95	0.91	1.03
DG5_D	0.62	0.49	0.65	0.47	0.61	0.60	0.50	0.41	0.84	0.68	0.87	0.66	0.75	0.90	0.97	0.81	0.84	0.97
DG6_S	0.62	0.52	0.68	0.66	0.62	0.68	0.58	0.47	0.78	0.62	0.77	0.51	0.71	0.73	0.67	0.89	0.70	0.98
DG6_D		0.46	0.62			0.61	0.52	0.43	0.78	0.62	0.77	0.59	0.71	0.73	0.91	0.83	0.84	0.68
DG7				0.92	0.96	1.06	0.94	0.20	1.06	1.05		1.08	1.12	1.24	1.45	1.27	1.25	1.40
DG17				1.01	0.96	0.83	0.71	0.44	1.26	1.06	1.26	1.07	1.28	1.24	1.23	1.59	1.36	1.48
DG21				-0.12	-0.08	0.09	-0.04	-0.17	0.58	0.24	0.61	0.35	0.37	0.42	0.67	0.57	0.55	0.75
DG31	0.27	0.15		0.03	0.25	0.22	0.09	0.01	0.91	0.37	0.95	0.55	0.62	0.78	0.66	0.87	0.90	1.27
DG35				1.49	1.64	1.63	1.49	1.06	1.73	2.53	2.56	1.74	1.73	2.80	1.84	1.75	1.84	1.90
DG36				0.87	0.98	0.95	0.84	0.34	1.09	0.90	1.10	0.85	1.01	0.95	1.09	1.05	1.10	1.22
DG59	0.28	0.09	0.11	0.28	0.23	0.25												
DG60	-0.13			-0.06	-0.08													
Rocklow Creek	0.565	0.383	0.325	0.25	0.3	3.75	0.36	0.63		*	0.20	0.22	0.23	0.2				
Lower Dam	4.361	4.832	4.47	3.44	2.92	0.3	4.12	4.17		*	2.65	2.79	2.78	2.67				

Location	Feb-17	May-17	Aug-17	Nov-17	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-20	Nov-20	Feb-21	May-21	Aug-21	Nov-21	Feb-22	May-22
MW5A1						0.28	0.64	0.34	1.08	0.65	1.59	0.79	0.81	1.27	1.06	0.91	1.09	1.60
MW5A2						0.65	0.65	0.55	1.14	0.63	1.54	0.49	0.82	1.31	1.03	0.96	1.44	3.24
MW5A3						0.61	0.64	0.44	0.97	0.70	1.02	0.70	0.79	1.02	1.13	0.89	0.93	1.20
MW5B1							1.17	1.01	1.73	1.27	2.68	2.71	1.92	2.72	2.62	2.22	2.45	3.43
MW5B2s						0.96	0.90	0.83	1.35	0.85	2.13	1.70	1.67	2.13	2.00	1.70	1.80	3.38
MW5B2d						0.92	0.86	0.79	1.51	1.05	2.12	1.89	1.86	2.14	1.96	1.76	1.84	3.35
MW5B3						0.57	0.53	0.43	0.70	0.56	0.87	0.86	0.70	0.89	1.04	0.86	0.85	1.10
MW5B4						0.25	0.48	0.40	0.61	0.16	1.56	0.46	0.47	0.86	1.39	0.86	0.88	1.75
MW5B5						dry	dry	dry	dry	dry	dry	dry	dry	dry	-	-	-	-

Table 4: Laboratory results for bores west of the Princes Highway (ID: DG1, DG17, DG21, DG31 and DG36) between August 2021 - May 2022

Analyte[1]	Units	Trigger Value		DG1				DG-17				DG-21				DG-31				DG-35				DG-36			
		DA[2]	GMMP[3]	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22
pH	-	**6.5 – 8.5**	6.5 – 8.5	7.3	7.2	7.3	7.4	7.2	7.1	7.1	7.1	6.5	6.4	6.5	6.6	6.9	6.8	6.9	7	6.6	6.5	6.7	6.7	7.2	6.8	7	6.9
EC	µS/cm	**<1,500**	33,000	543	540	573	647	2,710	1,091	2,010	1,714	923	15,100	1,228	919	1,171	1,638	1,091	258	1,034	1,107	1,137	979	1,036	996	990	1,135
TDS	mg/L	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total N	mg/L	**100 – 500**	-	1.33	0.97	1.67	0.8	1.51	0.57	1.54	1.58	0.11	0.28	0.01	0.49	0.83	3.85	0.57	0.35	0.96	1.4	1.12	1.01	0.19	0.85	0.01	0.36
Na	mg/L	**400**	5,500	19	27	36	40	95	80	240	240	45	80	147	117	40	68	94	14	38	46	93	88	38	44	87	106
K	mg/L	**50**	170	3.1	3.2	3.3	3.5	31	23	45	76	1	7.1	1.7	1.7	6.8	10	7	2	10	10	12	11	17	15	19	21
Mg	mg/L	**50**	420	2.1	7.4	11	14	14	27	55	71	2.9	15	18	16	5.6	21	21	6.2	6.2	20	33	35	5.9	17	26	38
Cl	mg/L	**300**	6,900	40	40	43	48	434	191	280	242	162	155	233	114	128	203	129	14	61	58	58	59	91	85	83	100
Ca	Ca-	**-**	-	0.05	0.2	0.13	75	0.07	0.06	0.35	68	0.36	0.17	0.4	45	0.08	0.53	0.67	28	0.32	0.3	0.1	68	0.04	0.09	0.09	96
F	mg/L	**-**	-	0.1	0.2	6.7	0.2	0.64	0.3	7.4	0.68	< 0.05	0.05	7.8	0.08	< 0.05	0.05	7.7	0.07	0.05	0.09	7.7	0.1	0.2	0.3	7.8	0.4
Fe	mg/L	**6**	4	0.05	0.2	0.13	0.03	0.07	0.06	0.35	0.01	0.36	0.17	0.4	0.18	0.08	0.53	0.67	0.06	0.32	0.3	0.1	0.02	0.04	0.09	0.09	0.02
NO_3^-	mg/L	**-**	-	0.47	0.86	0.57	0.63	0.17	0.57	1.06	0.76	0.08	0.24	<0.01	0.22	0.42	0.53	0.07	0.29	0.23	0.44	0.61	0.23	0.19	0.2	<0.01	0.16
SO_4^{2-}	mg/L	**250**	1,170	1.2	2.9	1.6	2.9	4.1	51	23	15	42	98	83	63	193	370	223	36	149	257	98	210	74	117	98	137
PO_4^{3-}	mg/L	**5 – 50**	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HCO_3^-	mg/L	**750**	420	217	217	226	259	857	510	690	589	138	146	134	192	117	184	134	71	238	259	309	268	293	288	284	326
NH_3N	mg/L	**20**	3	0.1	< 0.01	0.0	< 0.01	0.3	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.0	< 0.01	0.12	< 0.01	0.0	< 0.01	< 0.01	0.69	0.0	0.22	0.06	< 0.01	0.01	< 0.01

Notes:

1. EC = Electrical Conductivity; TDS = Total Dissolved Solids; PO4 = Phosphorous; Total N = Total Nitrogen; Na = Sodium; K = Potassium; Mg = Magnesium; Cl = Chloride; Ca = Calcium; F = Fluoride; SO4 = Sulfate; HCO3 = Bicarbonate; Fe = Dissolved Iron; NH3N = Ammonia
2. DA Criteria is not site specific and outlined under Development Consent 195-8-2004 (2004), issued on 29 June 2005 for The Dunmore Lakes Sand Project (Stages 2 – 4).
3. GMMP Criteria are site-specific criteria for groundwater quality and a sub-plan to the WMP (Arcadis, 2016).
4. Elevated concentrations to site-specific GMMP criteria are shaded in Red.

Table 5: Laboratory results for bores east of the Princes Highway (ID: DG5-S, DG5-D, DG6-S, DG6-D and DG7) between August 2021 - May 2022

Analyte[1]	Units	Trigger Value		DG5-S				DG5-D				DG6-S				DG6-D				DG7			
		DA[2]	GMMP[3]	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22
pH	-	**6.5 – 8.5**	6.5 – 8.5	7.6	7.3	7.3	7.5	7.4	7.4	7.4	7.4	6.4	6.4	6.3	6.4	6.8	6.7	6.7	6.7	7.3	7	7.1	7.2
EC	µS/cm	**<1,500**	33,000	1,170	1,091	1,097	1,029	15,360	15,100	15,570	14,920	20,800	20,200	19,960	16,060	29,800	996	29,200	28,000	897	497	821	584
TDS	mg/L	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	z	NT	NT	NT	NT	NT	NT
Total N	mg/L	**100 – 500**	-	0.2	1.07	0.12	0.32	1.38	4.06	8.58	10.27	2	5.94	11.48	12.66	16.33	23.5	26.91	23.56	1.57	4.15	1.84	2.64
Na	mg/L	**400**	5,500	40	51	70	101	1399	313	2290	2383	2068	357	3272	3798	2751	399	4987	5224	42	52	75	73
K	mg/L	**50**	170	9.2	8.3	9.1	7.3	123	139	117	163	189	184	172	244	262	221	248	288	3.4	2.7	2.8	2.5
Mg	mg/L	**50**	420	3.8	10	17	20	14	80	127	393	17	65	141	144	21	68	146	827	2.8	12	16	13
Cl	mg/L	**300**	6,900	163	138	198	123	5686	5287	5501	5588	7464	8429	7800	5826	10982	11201	11443	11117	121	80	81	48
Ca	Ca-	**-**	-	0.44	1.6	0.86	131	0.78	1.4	0.54	235	0.76	0.84	1.8	239	0.2	2.2	0.82	385	0.29	0.56	0.86	56
F	mg/L	**-**	-	0.3	0.2	7.5	0.2	< 0.05	0.74	6.5	1.74	0.08	0.3	6.9	1.56	< 0.05	< 0.05	7.3	1.02	0.5	0.3	7.3	0.5
Fe	mg/L	**6**	4	0.44	1.6	0.86	0.02	0.78	1.4	0.54	0.03	0.76	0.84	1.8	1.0	0.2	2.2	0.82	0.82	0.29	0.56	0.86	0.86
NO_3	mg/L	**-**	-	0.2	0.45	0.12	0.11	0.81	2.92	7.01	8.1	1.86	5.23	11.3	10.7	16.3	23.2	26.9	23.2	0.59	1.34	1.34	2.15
SO_4	mg/L	**250**	1,170	91	164	146	167	441	698	699	757	802	1017	1072	821	1154	1388	1585	1589	45	59	48	33
PO_4	mg/L	**5 – 50**	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HCO_3	mg/L	**750**	420	213	222	217	213	276	276	318	272	276	305	360	297	372	397	360	376	211	276	255	209
NH_3N	mg/L	**20**	3	0.07	< 0.01	0.0	< 0.01	1.23	< 0.01	NT	< 0.01	0.12	< 0.01	0.0	< 0.01	0.34	< 0.01	0.0	< 0.01	< 0.01	< 0.01	0.03	< 0.01

Notes:

1. EC = Electrical Conductivity; TDS = Total Dissolved Solids; PO4 = Phosphorous; Total N = Total Nitrogen; Na = Sodium; K = Potassium; Mg = Magnesium; Cl = Chloride; Ca = Calcium; F = Fluoride; SO4 = Sulfate; HCO3 = Bicarbonate; Fe = Dissolved Iron; NH3N = Ammonia
2. DA Criteria is not site specific and outlined under Development Consent 195-8-2004 (2004), issued on 29 June 2005 for The Dunmore Lakes Sand Project (Stages 2 – 4).
3. GMMP Criteria are site-specific criteria for groundwater quality and a sub-plan to the WMP (Arcadis, 2016).
4. Elevated concentrations to site-specific GMMP criteria are shaded in Red.

Table 6: Laboratory results for bores in Stage 5A between August 2021 - May 2022

Analyte[1]	Units	Trigger Value		MW5A1				MW5A2[5]				MW5A3			
		DA[2]	GMMP[3]	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22
pH	-	**6.5 – 8.5**	6.5 – 8.5	7.2	7.2	6.4	6.0	6.3	6.3	6.4	-	6.9	6.9	6.5	6.4
EC	µS/cm	**<1,500**	1,500	397.0	397.0	176.0	128.0	910.0	910.0	906.0	-	1234.0	1234.0	1034.0	1750.0
TDS	mg/L	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-
Total N	mg/L	**100 – 500**	-	0.03	0.03	0.34	1.49	0.09	0.09	1.42	-	0.28	0.28	1.33	0.85
Na	mg/L	**400**	560	10.0	10.0	8.4	6.0	36.0	36.0	68.0	-	51.0	51.0	91.0	187.0
K	mg/L	**50**	50	7.8	7.8	4.9	9.6	2.0	2.0	1.7	-	9.3	9.3	9.4	15.0
Mg	mg/L	**50**	90	1.4	1.4	2.3	2.3	5.0	5.0	28.0	-	3.2	3.2	14.0	32.0
Cl	mg/L	**300**	1,400	35.0	35.0	18.0	13.0	123.0	123.0	103.0	-	294.0	294.0	222.0	194.0
Ca	mg/L	**-**	-	0.07	0.07	0.48	7.90	1.50	1.50	3.20	-	3.00	3.00	3.00	90.00
F	mg/L	**-**	-	0.10	0.10	7.90	< 0.05	< 0.05	< 0.05	6.60	-	0.10	0.10	6.90	0.20
Fe	mg/L	**6**	3	0.07	0.05	0.48	0.61	1.50	0.25	3.20	-	3.00	3.00	3.00	2.60
NO_3	mg/L	**-**	-	0.03	0.03	0.34	1.45	0.09	0.09	0.39	-	0.09	0.09	0.55	0.16
SO_4	mg/L	**250**	300	27.0	27.0	12.0	7.8	22.0	22.0	18.0	-	6.6	6.6	13.0	9.9
PO_4	mg/L	**5 – 50**	4	-	-	-	-	-	-	-	-	-	-	-	-
HCO_3	mg/L	**750**	400	100.0	100.0	38.0	29.0	242.0	242.0	326.0	-	146.0	146.0	134.0	134.0
NH_3N	mg/L	**20**	1	< 0.01	< 0.01	0.01	< 0.01	0.60	0.60	0.01	-	0.50	0.50	0.01	< 0.01

Notes:

1. EC = Electrical Conductivity; TDS = Total Dissolved Solids; PO4 = Phosphorous; Total N = Total Nitrogen; Na = Sodium; K = Potassium; Mg = Magnesium; Cl = Chloride; Ca = Calcium; F = Fluoride; SO4 = Sulf
2. DA Criteria is not site specific and outlined under Development Consent 195-8-2004 (2004), issued on 29 June 2005 for The Dunmore Lakes Sand Project (Stages 2 – 4).
3. GMMP Criteria are site-specific criteria for groundwater quality and a sub-plan to the WMP (Arcadis, 2016).
4. Elevated concentrations to site-specific GMMP criteria are shaded in Red.
5. Bore destroyed in May 2022.

Table 7: Laboratory results for bores in Stage 5B between August 2021 - May 2022

Analyte[1]	Units	Trigger Value		MW5B1				MW5B2S				MW5B2D				MW5B3		
		DA[2]	GMMP[3]	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22	May-22	Aug-21	Nov-21	Feb-22
pH	-	**6.5 – 8.5**	6.5 – 8.5	7.2	7.2	6.7	6.5	7.3	7.3	7.1	7.4	7.5	7.5	7.3	7.3	7.8	7.8	7
EC	µS/cm	**<1,500**	1,500	262	262	252	209	745	745	844	640	698	698	714	622	444	444	468
TDS	mg/L	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total N	mg/L	**100 – 500**	-	1.33	1.33	0.6	2.51	0.29	0.29	0.1	0.11	0.45	0.45	0.86	0.28	0.16	0.16	0.48
Na	mg/L	**400**	560	6.9	6.9	9.3	17	26	26	50	38	21	21	36	35	9.3	9.3	15
K	mg/L	**50**	50	7.3	7.3	6.7	8.6	5.3	5.3	6.1	5.2	7.1	7.1	7.3	6.5	2	2	2.2
Mg	mg/L	**50**	90	0.77	0.77	3.3	3.4	2.2	2.2	12	12	2.3	2.3	12	12	1.3	1.3	6.4
Cl	mg/L	**300**	1,400	25	25	82	24	72	72	58	50	60	60	58	53	29	29	30
Ca	mg/L	**-**	-	0.08	0.08	0.1	35	0.71	0.71	2.5	86	1.9	1.9	0.78	80	0.1	0.1	0.14
F	mg/L	**-**	-	0.07	0.07	7.8	< 0.05	0.1	0.1	7.7	0.1	0.06	0.06	7.6	0.1	0.2	0.2	7.8
Fe	mg/L	**6**	3	0.08	0.1	0.1	3.2	0.71	0.79	2.5	0.87	1.9	0.34	0.78	0.32	1.9	0.05	0.14
NO_3	mg/L	**-**	-	1.33	1.33	0.56	1.25	0.29	0.29	0.1	0.11	0.45	0.45	0.26	0.23	0.16	0.16	0.09
SO_4	mg/L	**250**	300	9.1	9.1	12	2.9	30	30	46	34	17	17	29	20	2.5	2.5	5.4
PO_4	mg/L	**5 – 50**	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HCO_3	mg/L	**750**	400	75	75	84	238	238	238	276	247	242	242	259	251	188	188	259
NH_3N	mg/L	**20**	1	< 0.01	< 0.01	0.0	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.0	< 0.01	0.05	0.05	0.01

Notes:

1. EC = Electrical Conductivity; TDS = Total Dissolved Solids; PO4 = Phosphorous; Total N = Total Nitrogen; Na = Sodium; K = Potassium; Mg = Magnesium; Cl = Chloride; Ca = Calcium; F = Fluoride; SO4 = Sulf
2. DA Criteria is not site specific and outlined under Development Consent 195-8-2004 (2004), issued on 29 June 2005 for The Dunmore Lakes Sand Project (Stages 2 – 4).
3. GMMP Criteria are site-specific criteria for groundwater quality and a sub-plan to the WMP (Arcadis, 2016).
4. Elevated concentrations to site-specific GMMP criteria are shaded in Red.

ENVIRONMENTAL EARTH SCIENCES
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APPENDIX A: HYDROGRAPHS

Chart 1a - Rainfall and groundwater levels at Stage 2 - 4

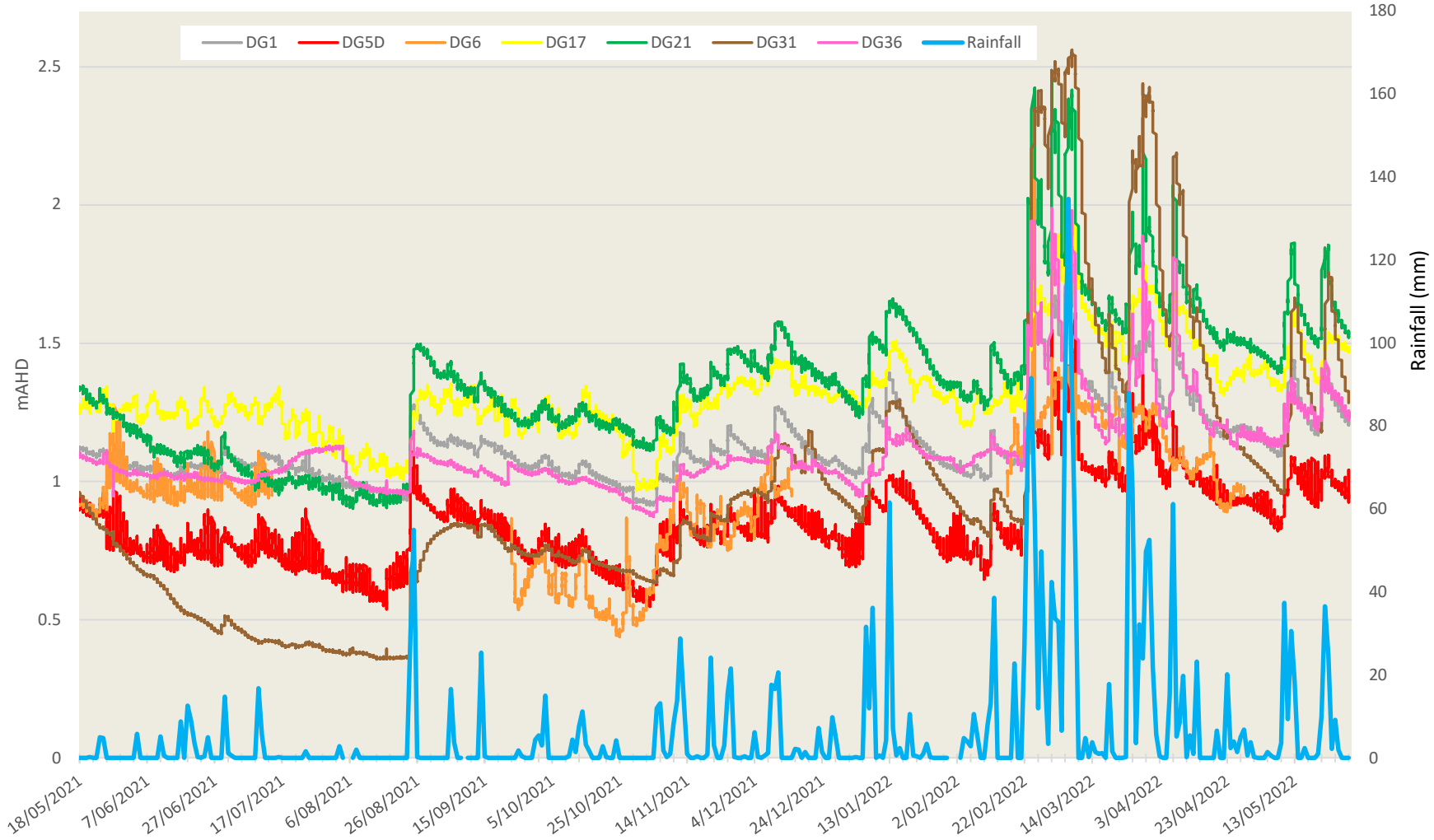


Chart 1b - Rainfall and groundwater levels at Stage 5

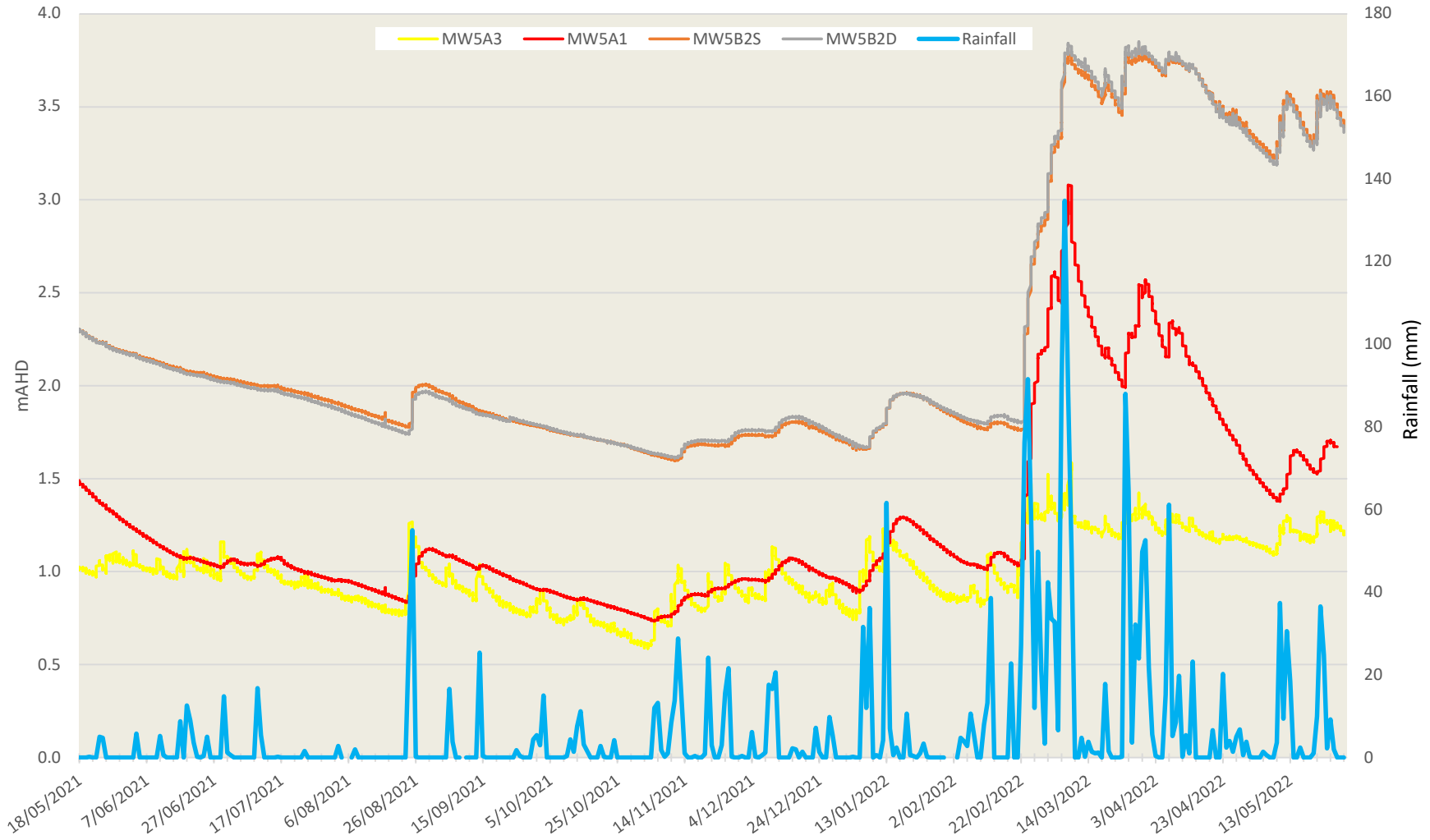


Chart 2a - Tidal data compared to groundwater levels at Stage 2 - 4

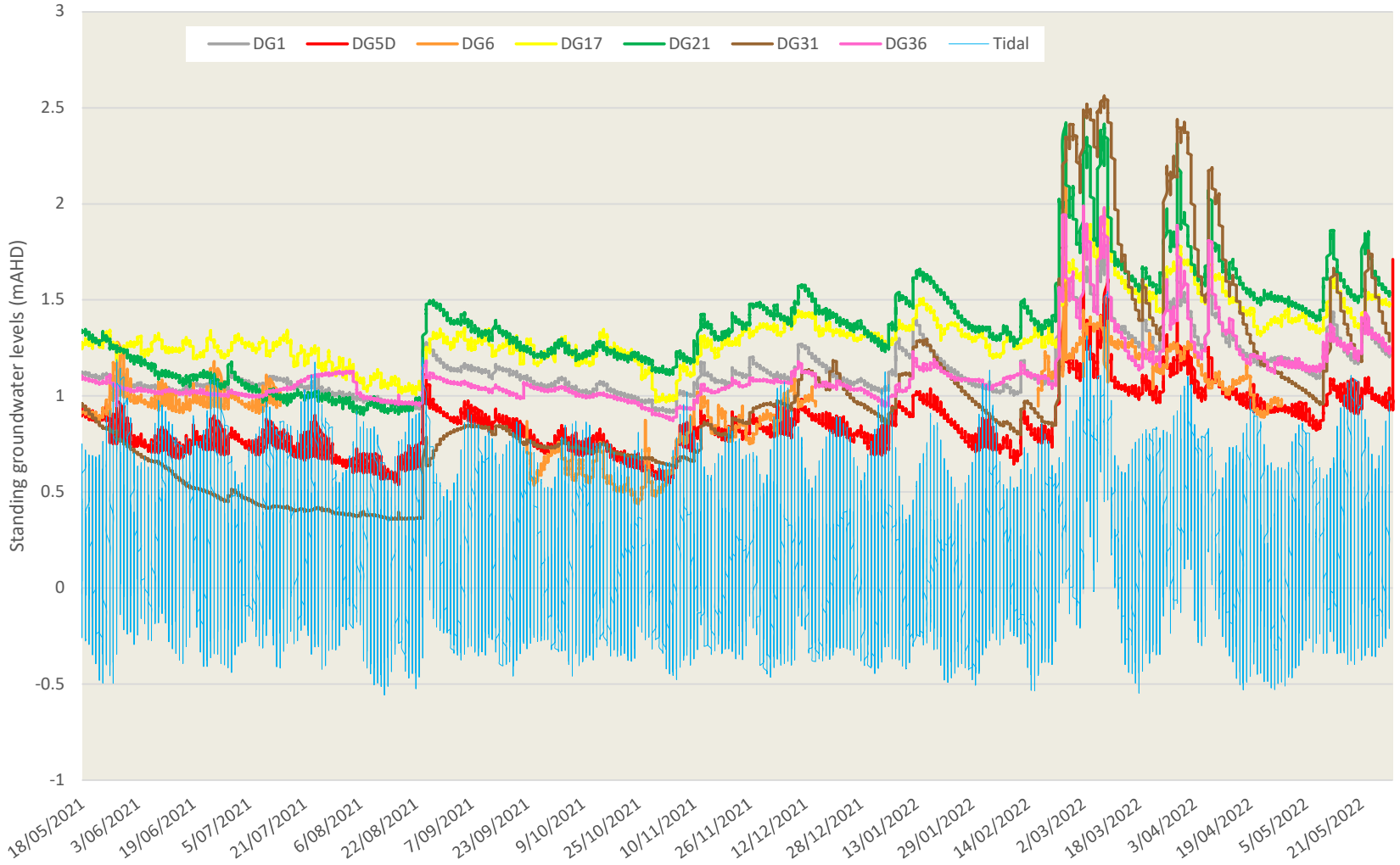
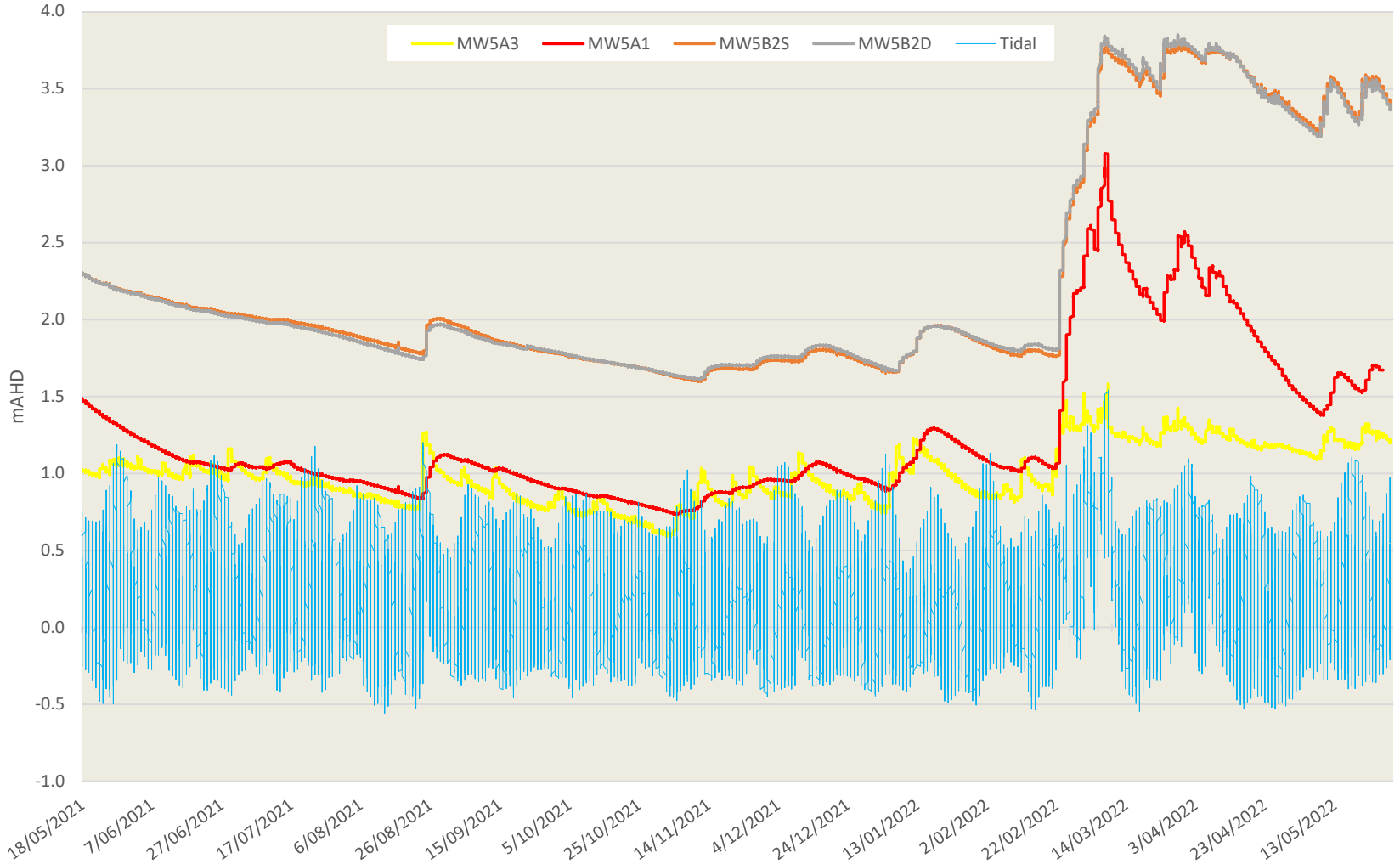


Chart 2b - Tidal data compared to groundwater levels at Stage 5



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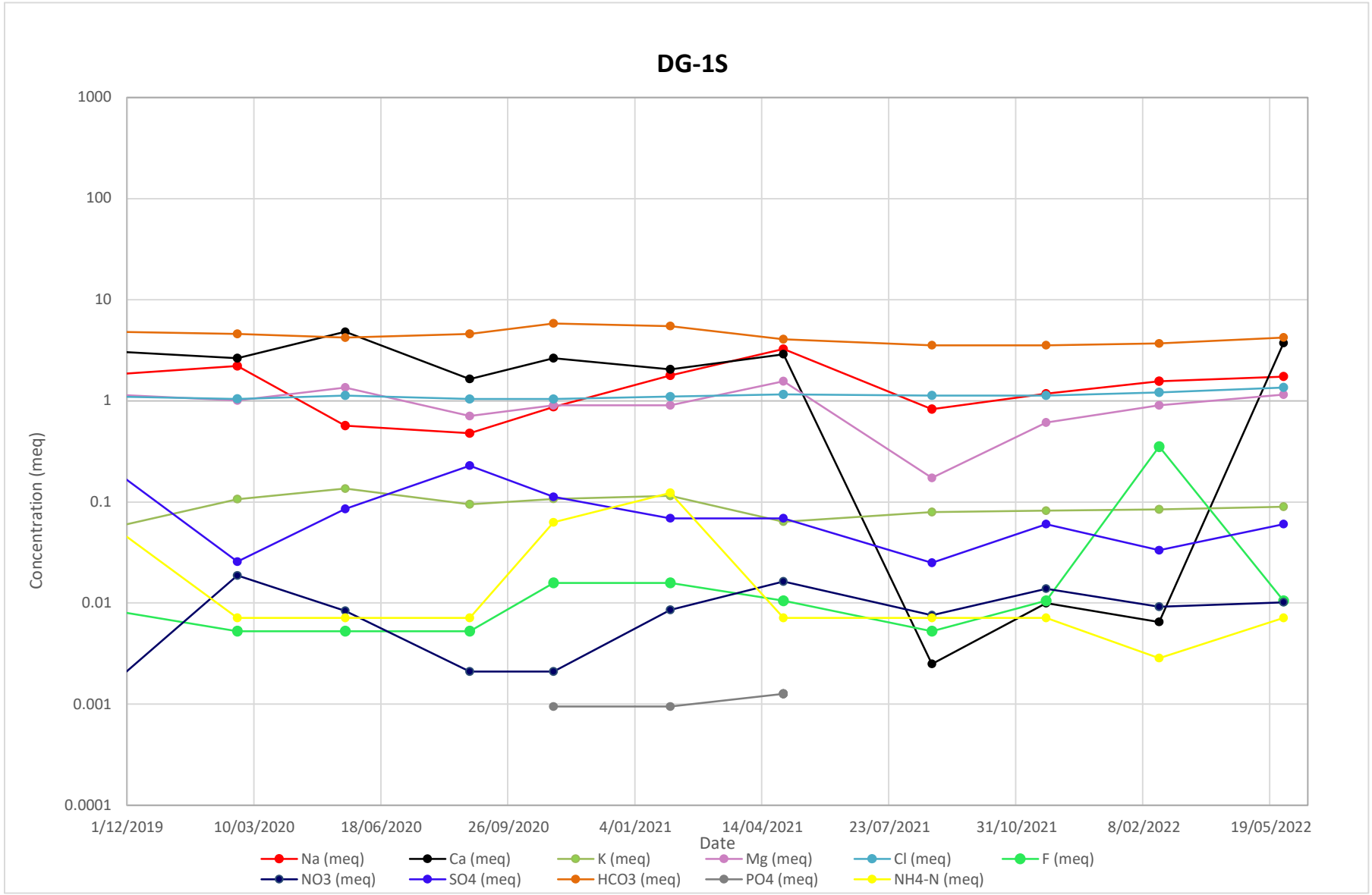
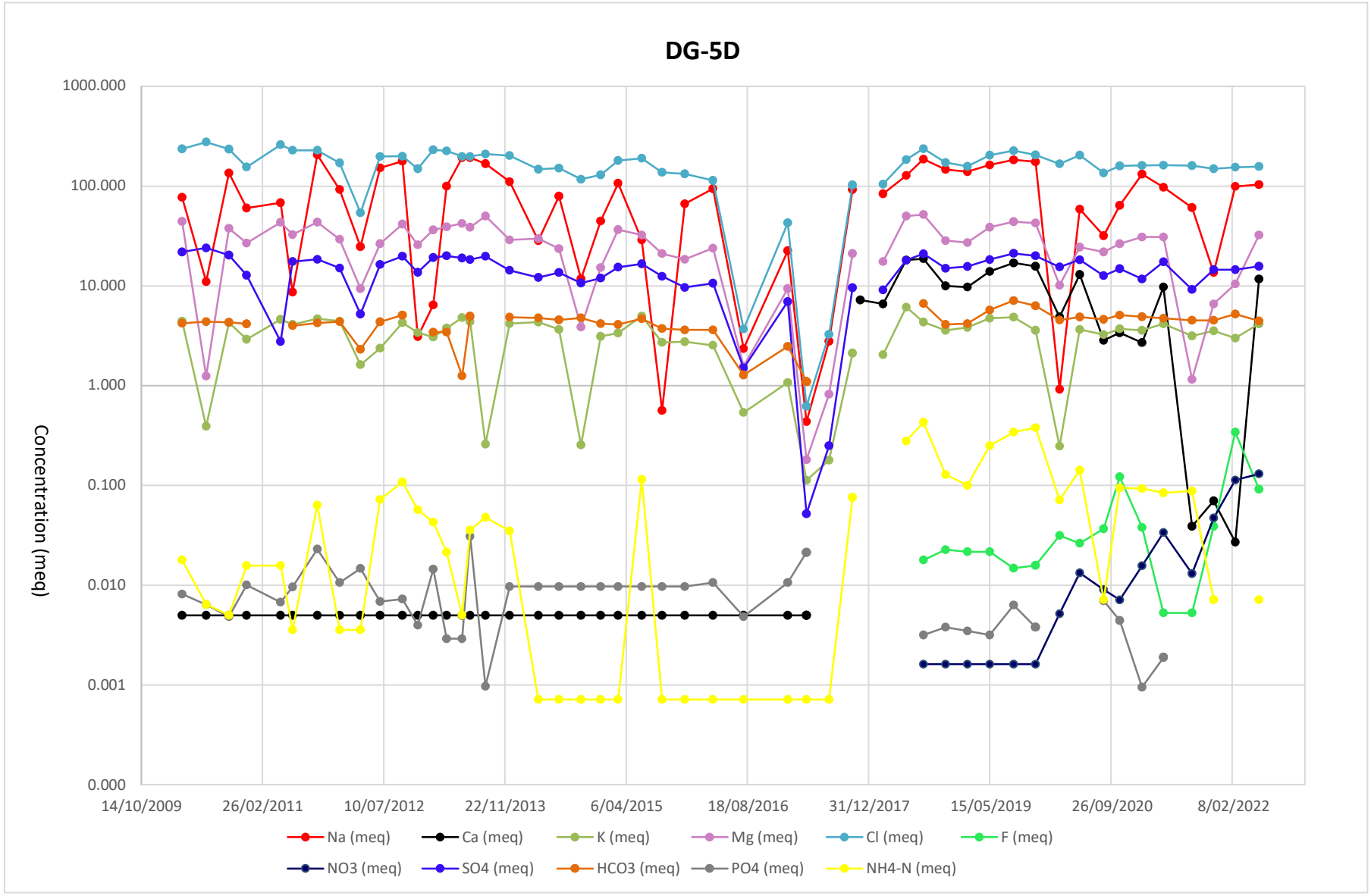
APPENDIX B: SHOELLER PLOTS


DG-1S
1000
100
10
1
0.1
0.01
0.001
0.0001
Concentration (meq)
1/12/2019
10/03/2020
18/06/2020
26/09/2020
4/01/2021
14/04/2021
23/07/2021
31/10/2021
8/02/2022
19/05/2022
Date
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


DG-5D
Concentration (meq)
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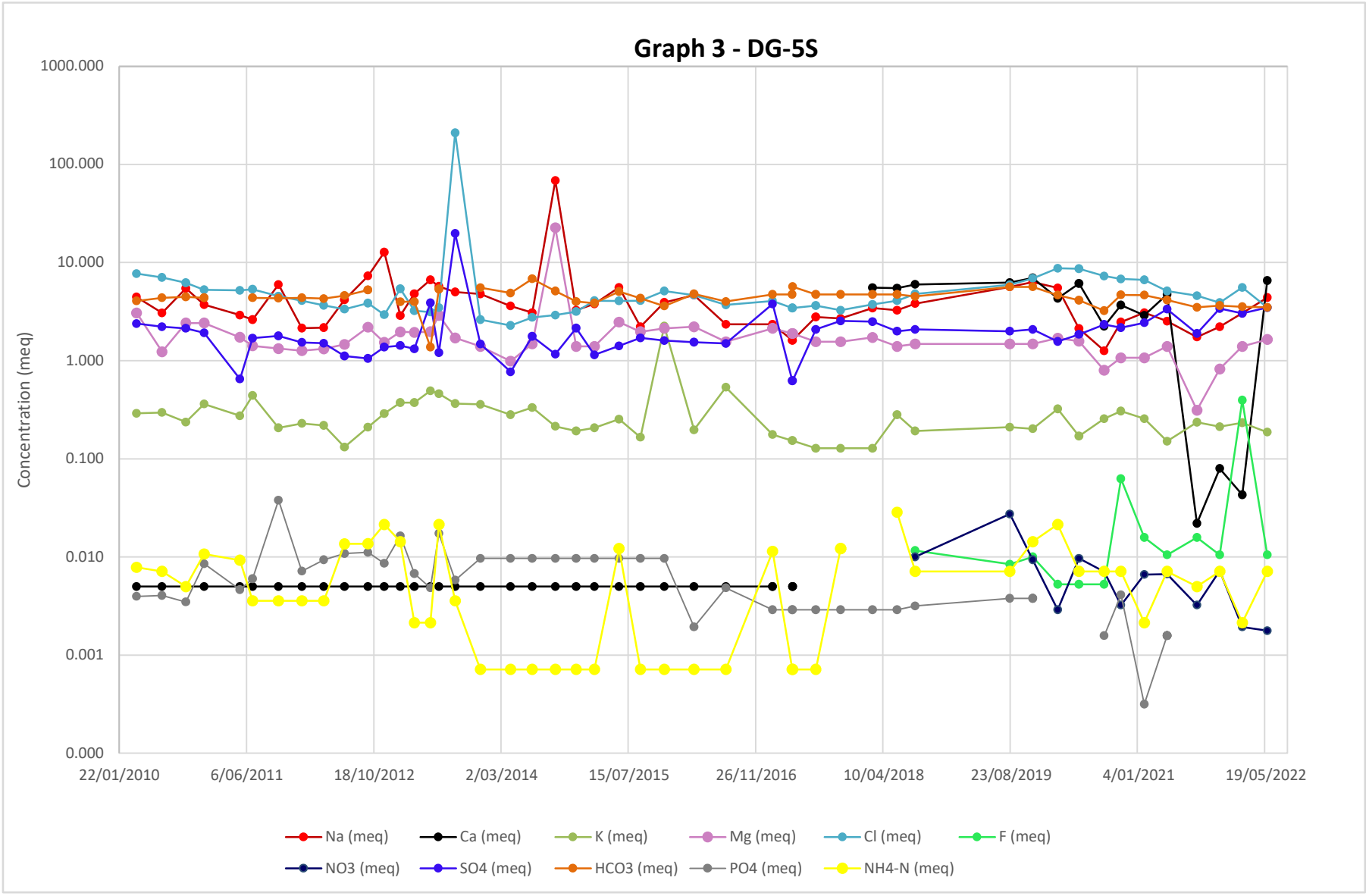
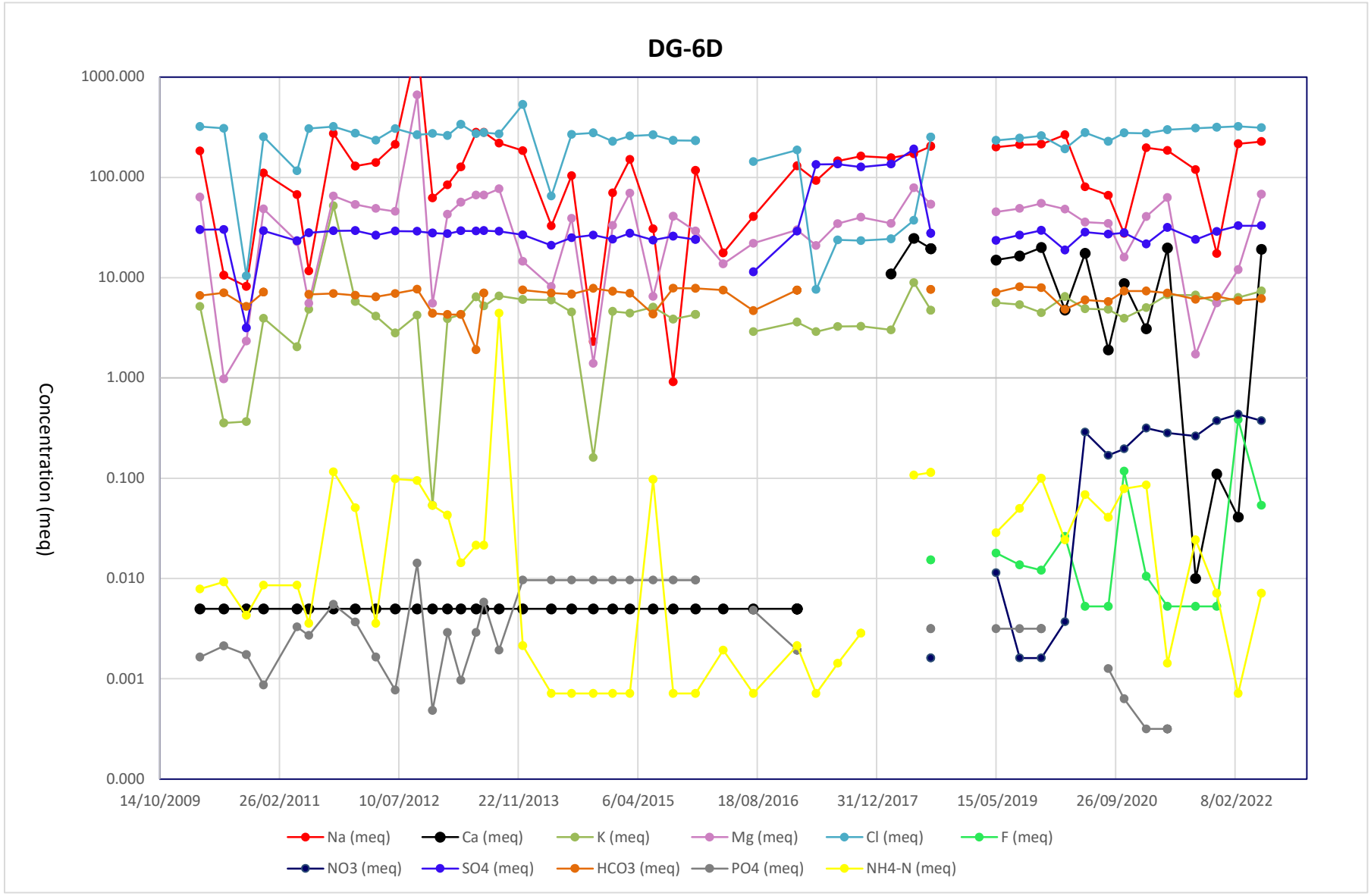
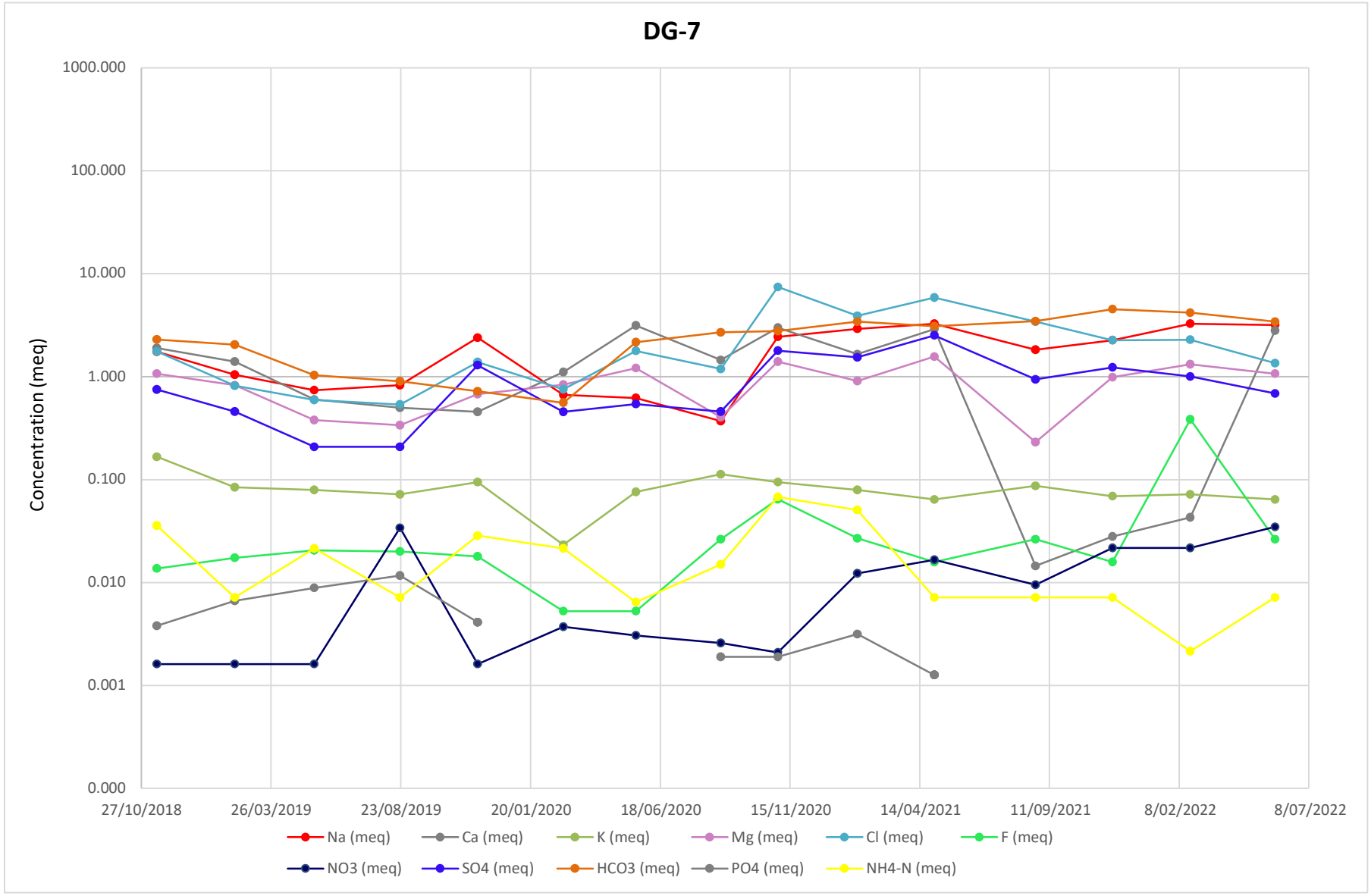
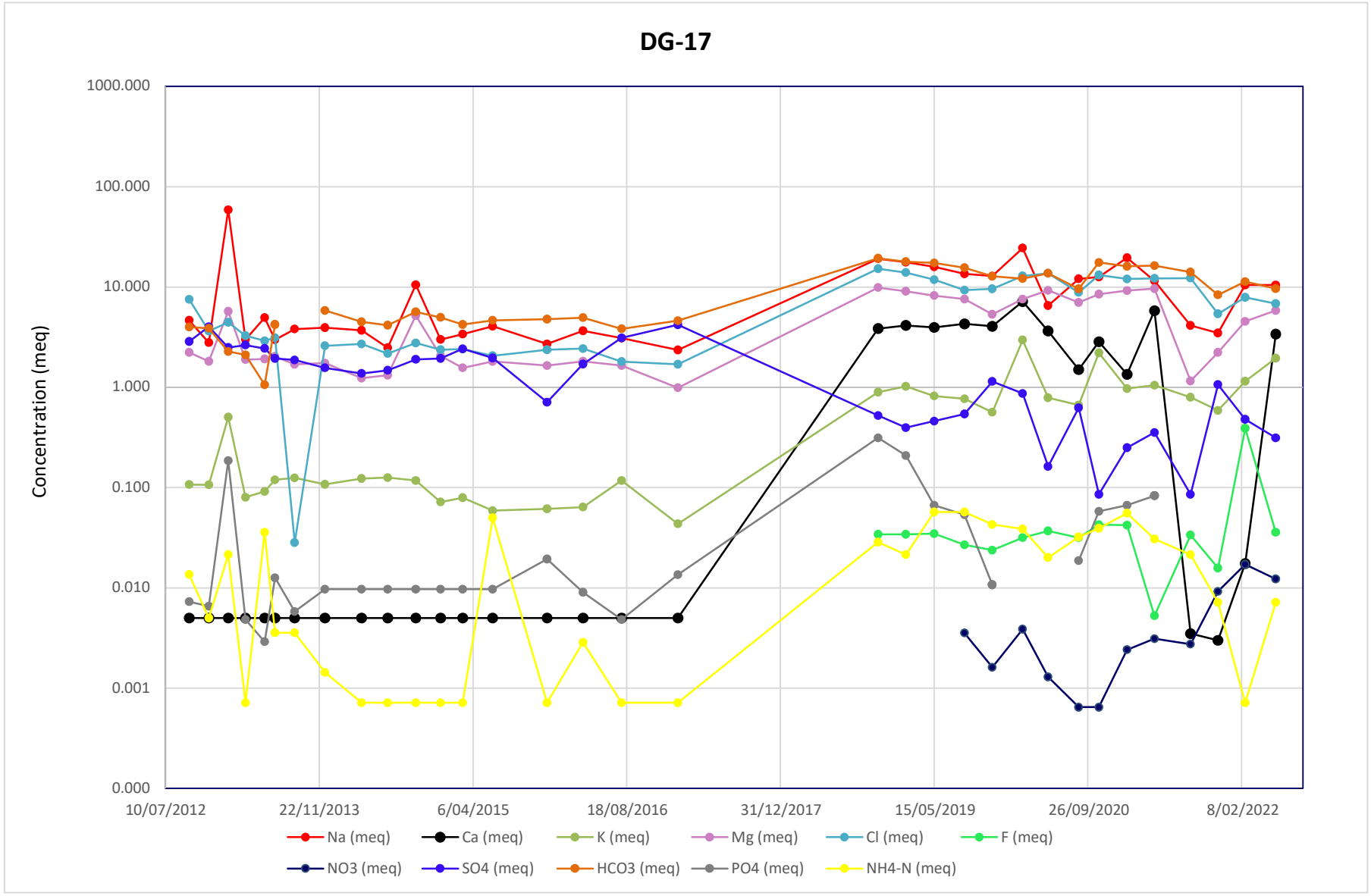
100.000
10.000
1.000
0.100
0.010
0.001
0.000
14/10/2009
26/02/2011
10/07/2012
22/11/2013
6/04/2015
18/08/2016
31/12/2017
15/05/2019
26/09/2020
8/02/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


Graph 3 - DG-5S
Concentration (meq)
1000.000
100.000
10.000
1.000
0.100
0.010
0.001
0.000
22/01/2010
6/06/2011
18/10/2012
2/03/2014
15/07/2015
26/11/2016
10/04/2018
23/08/2019
4/01/2021
19/05/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


DG-6D
Concentration (meq)
1000.000
100.000
10.000
1.000
0.100
0.010
0.001
0.000
14/10/2009
26/02/2011
10/07/2012
22/11/2013
6/04/2015
18/08/2016
31/12/2017
15/05/2019
26/09/2020
8/02/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


DG-7
Concentration (meq)
1000.000
100.000
10.000
1.000
0.100
0.010
0.001
0.000
27/10/2018
26/03/2019
23/08/2019
20/01/2020
18/06/2020
15/11/2020
14/04/2021
11/09/2021
8/02/2022
8/07/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


DG-17
Concentration (meq)
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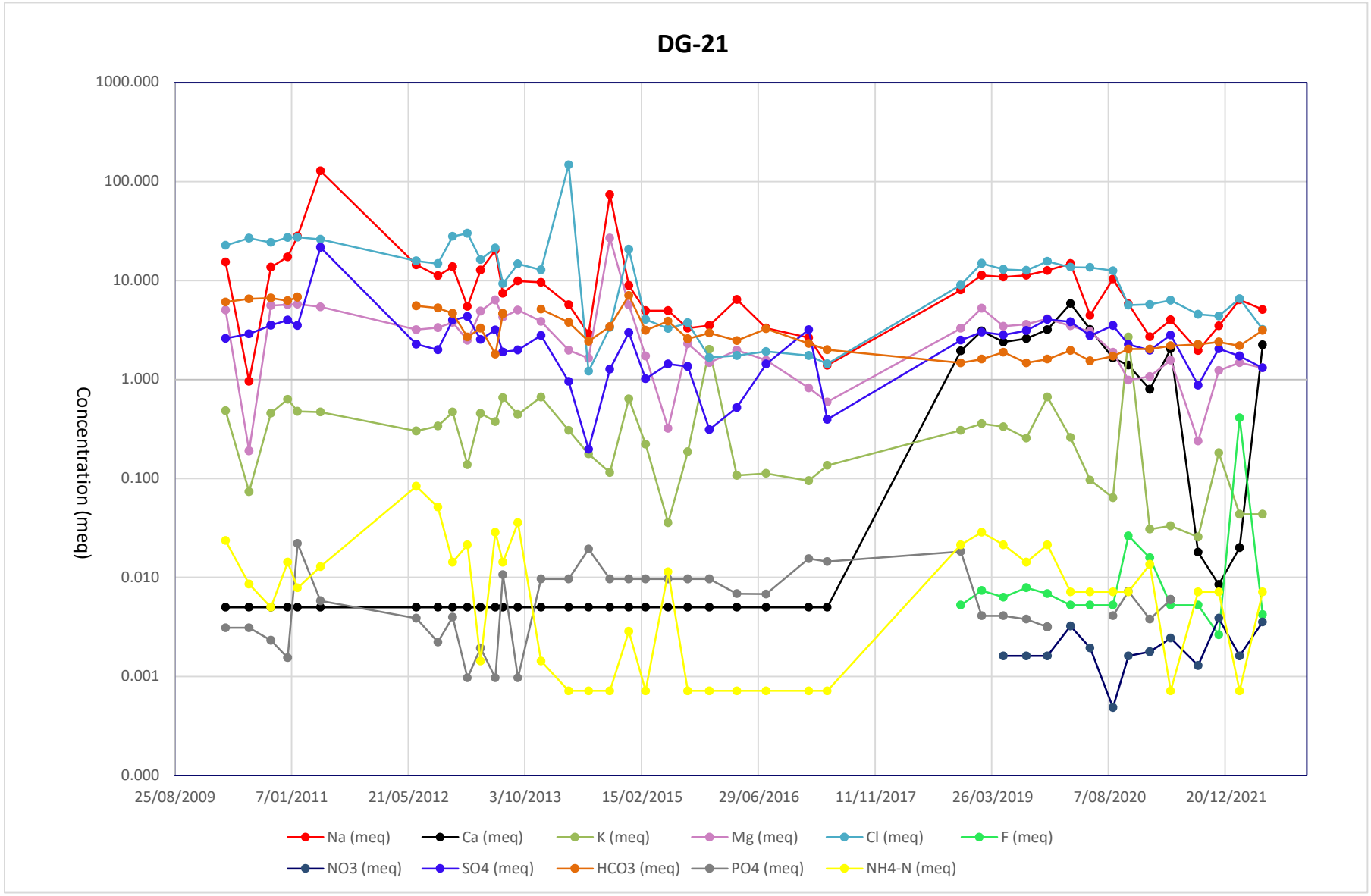
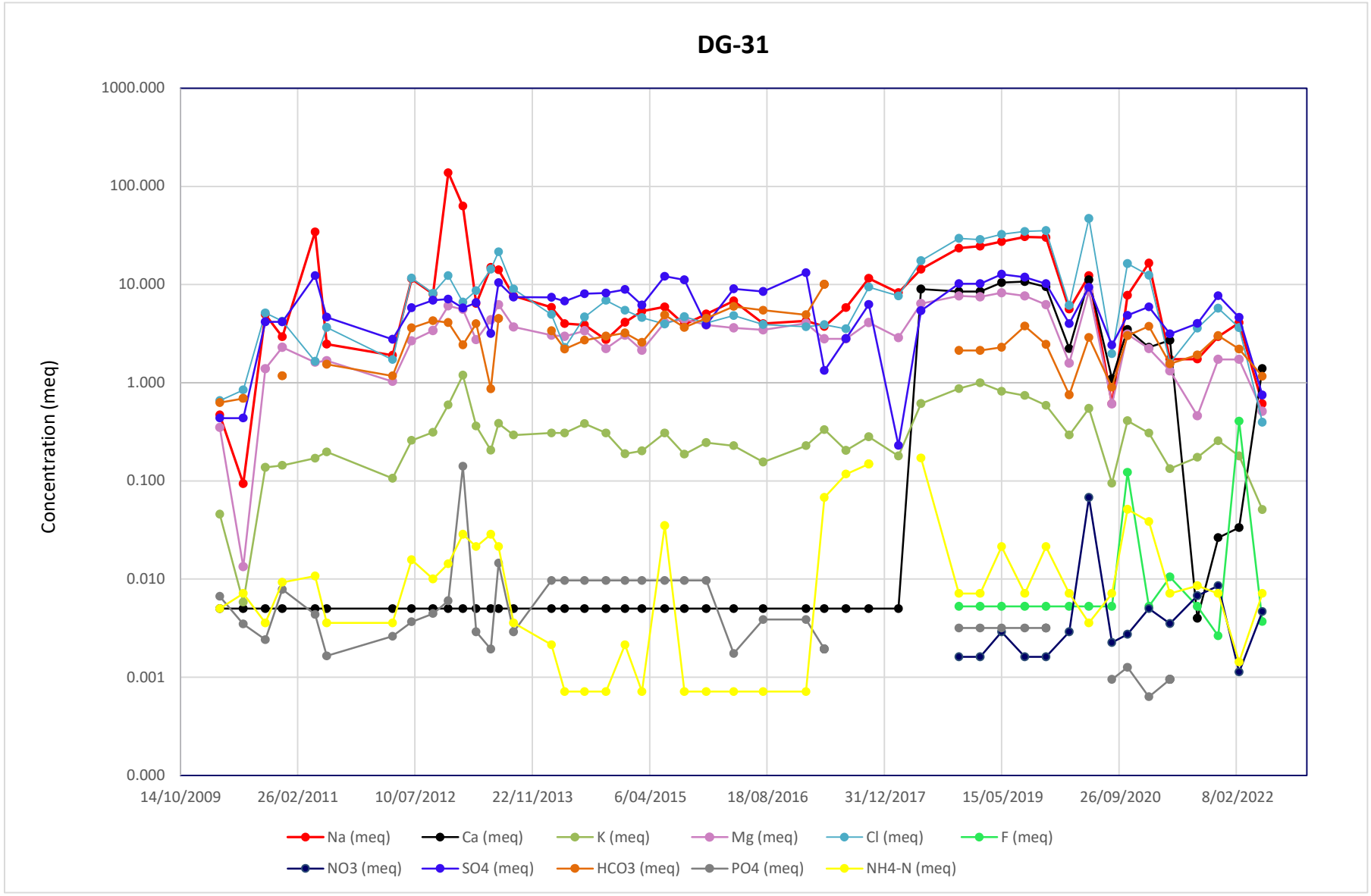
100.000
10.000
1.000
0.100
0.010
0.001
0.000
10/07/2012
22/11/2013
6/04/2015
18/08/2016
31/12/2017
15/05/2019
26/09/2020
8/02/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)


DG-21
1000.000
100.000
10.000
1.000
0.100
0.010
0.001
0.000
Concentration (meq)
25/08/2009
7/01/2011
21/05/2012
3/10/2013
15/02/2015
29/06/2016
11/11/2017
26/03/2019
7/08/2020
20/12/2021
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)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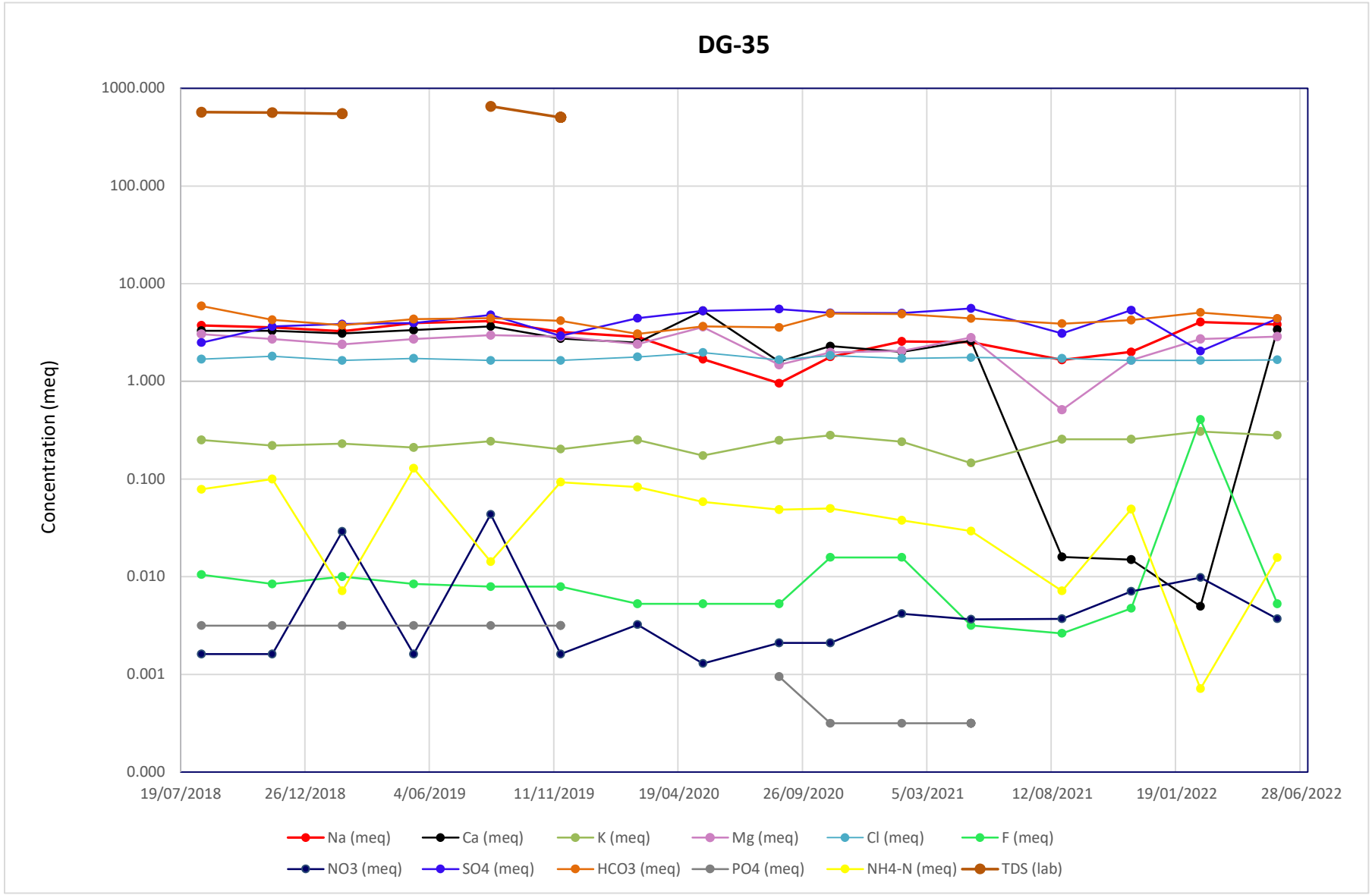
100.000
10.000
1.000
0.100
0.010
0.001
0.000
14/10/2009
26/02/2011
10/07/2012
22/11/2013
6/04/2015
18/08/2016
31/12/2017
15/05/2019
26/09/2020
8/02/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)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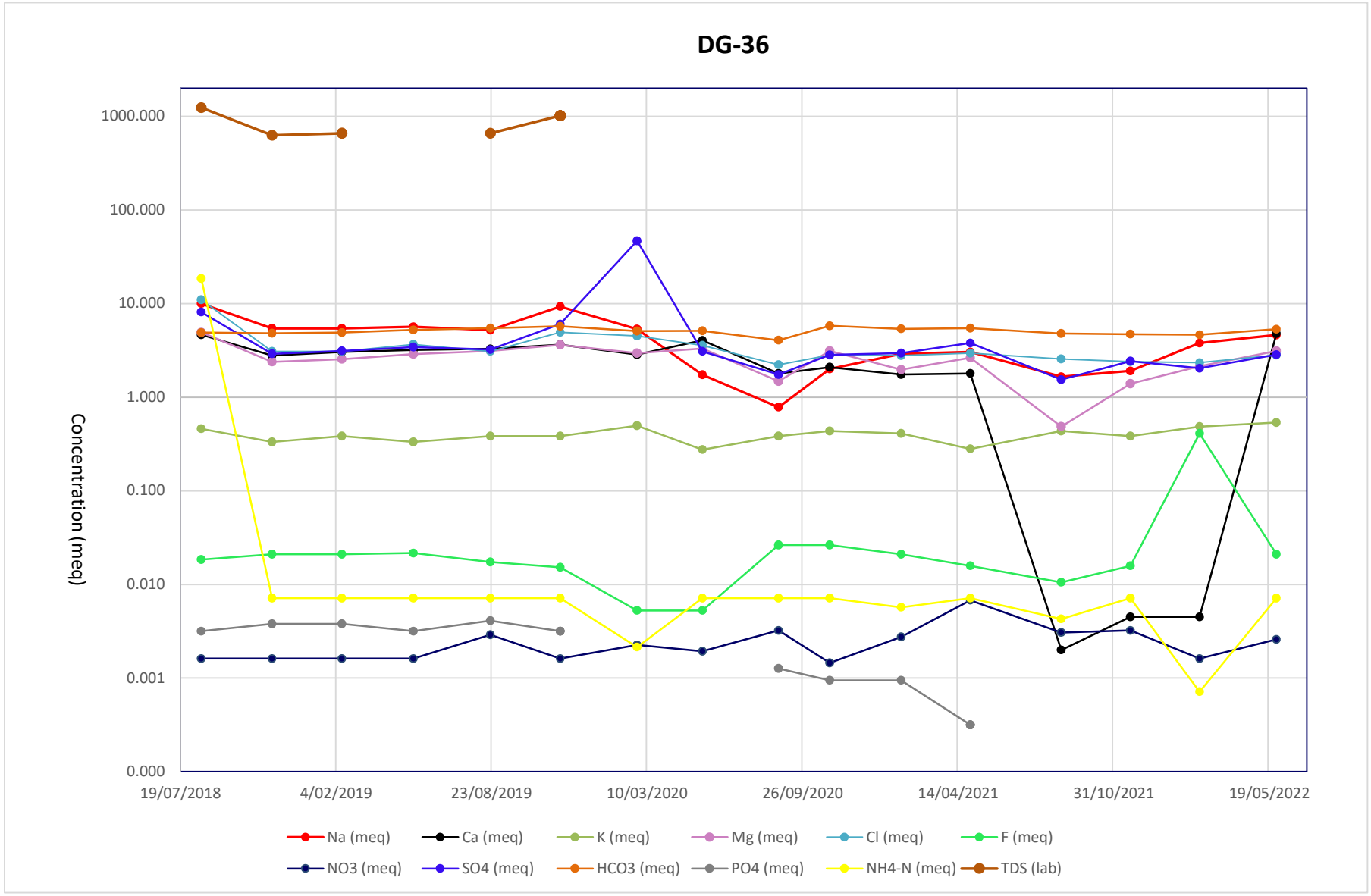
0.001
0.000
19/07/2018
26/12/2018
4/06/2019
11/11/2019
19/04/2020
26/09/2020
5/03/2021
12/08/2021
19/01/2022
28/06/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)
TDS (lab)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0.000
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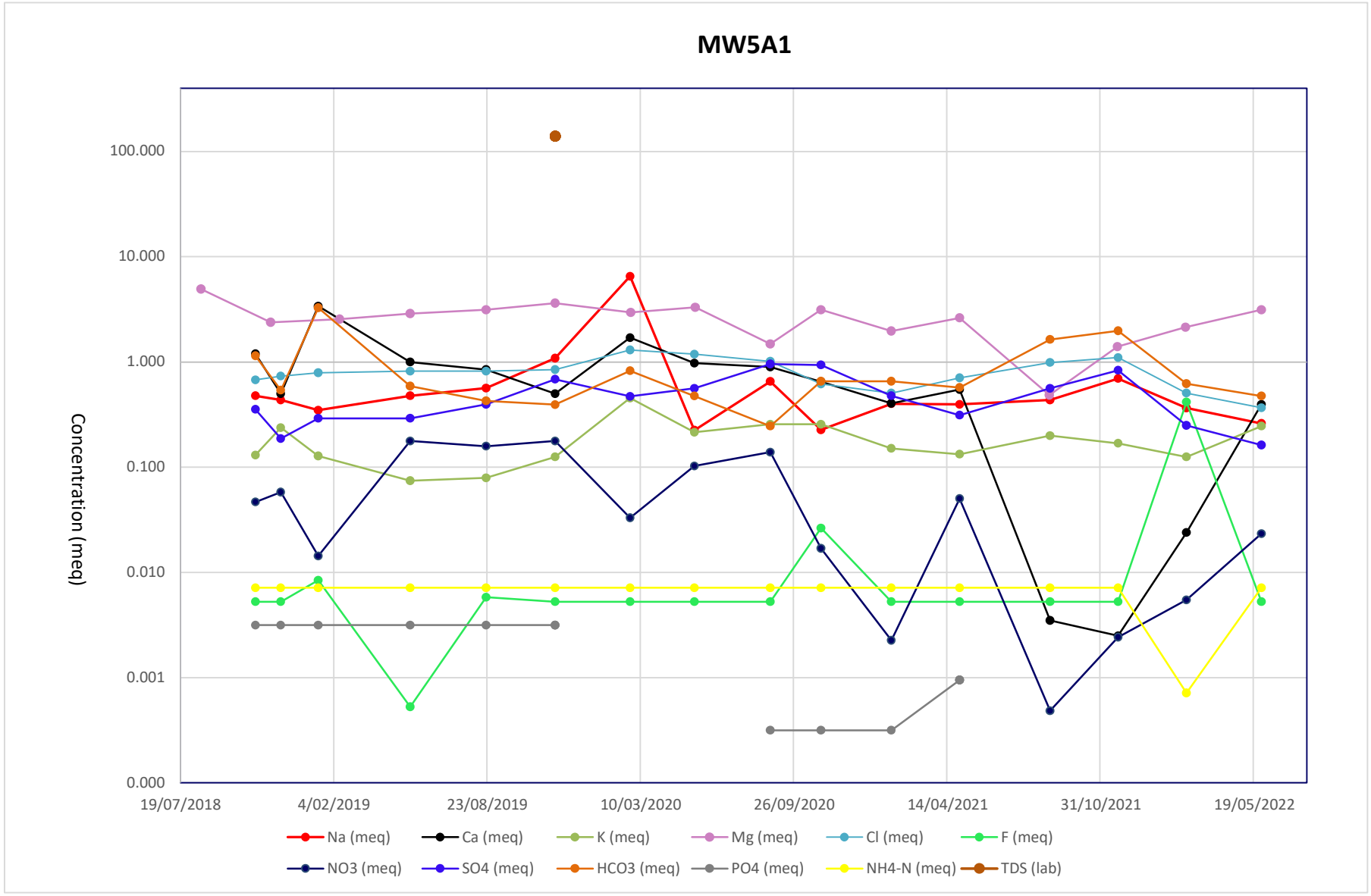
4/02/2019
23/08/2019
10/03/2020
26/09/2020
14/04/2021
31/10/2021
19/05/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)
TDS (lab)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Concentration (meq)
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1.000
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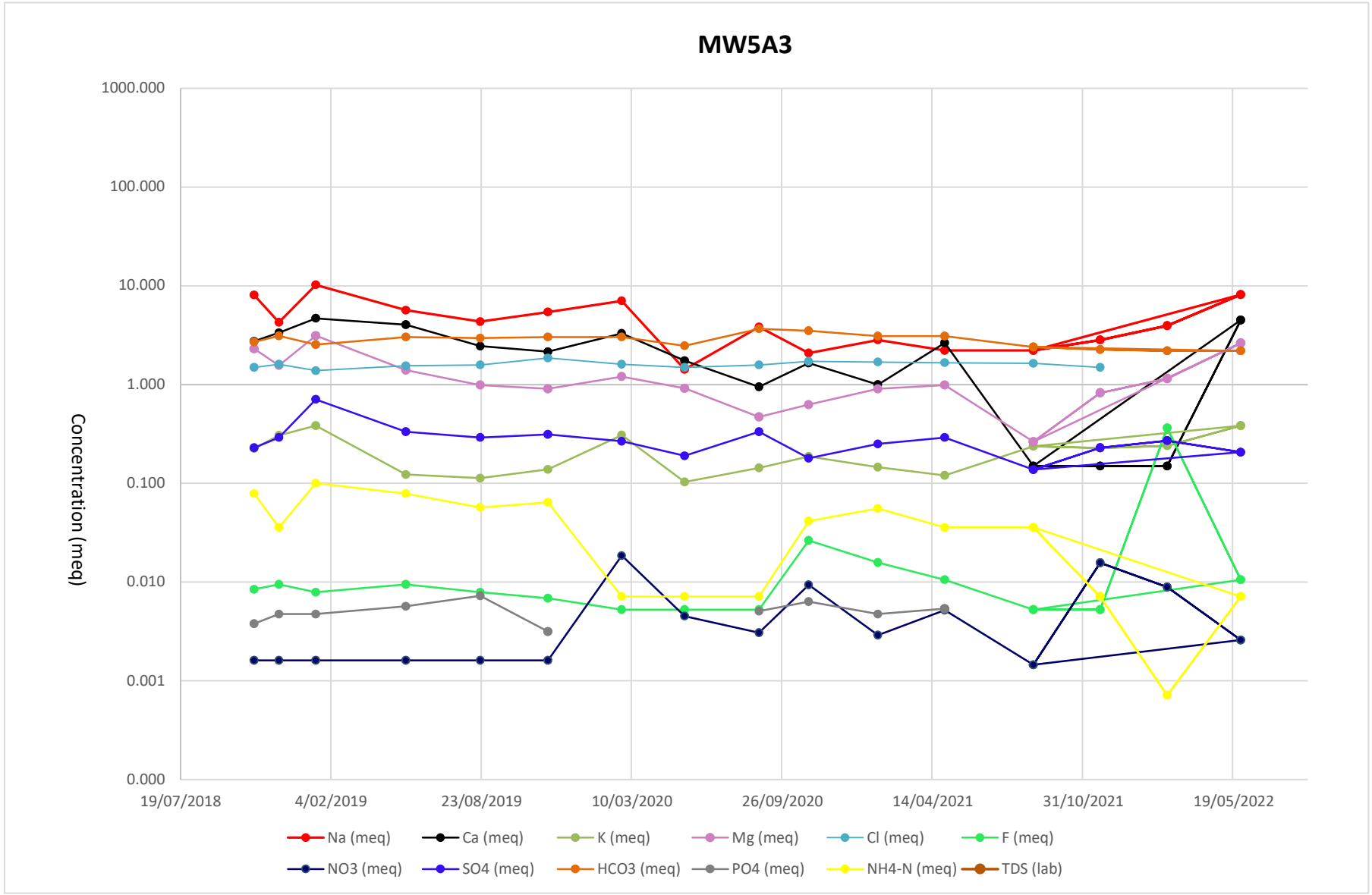
0.010
0.001
0.000
19/07/2018
4/02/2019
23/08/2019
10/03/2020
26/09/2020
14/04/2021
31/10/2021
19/05/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)
TDS (lab)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1.000
0.100
0.010
0.001
0.000
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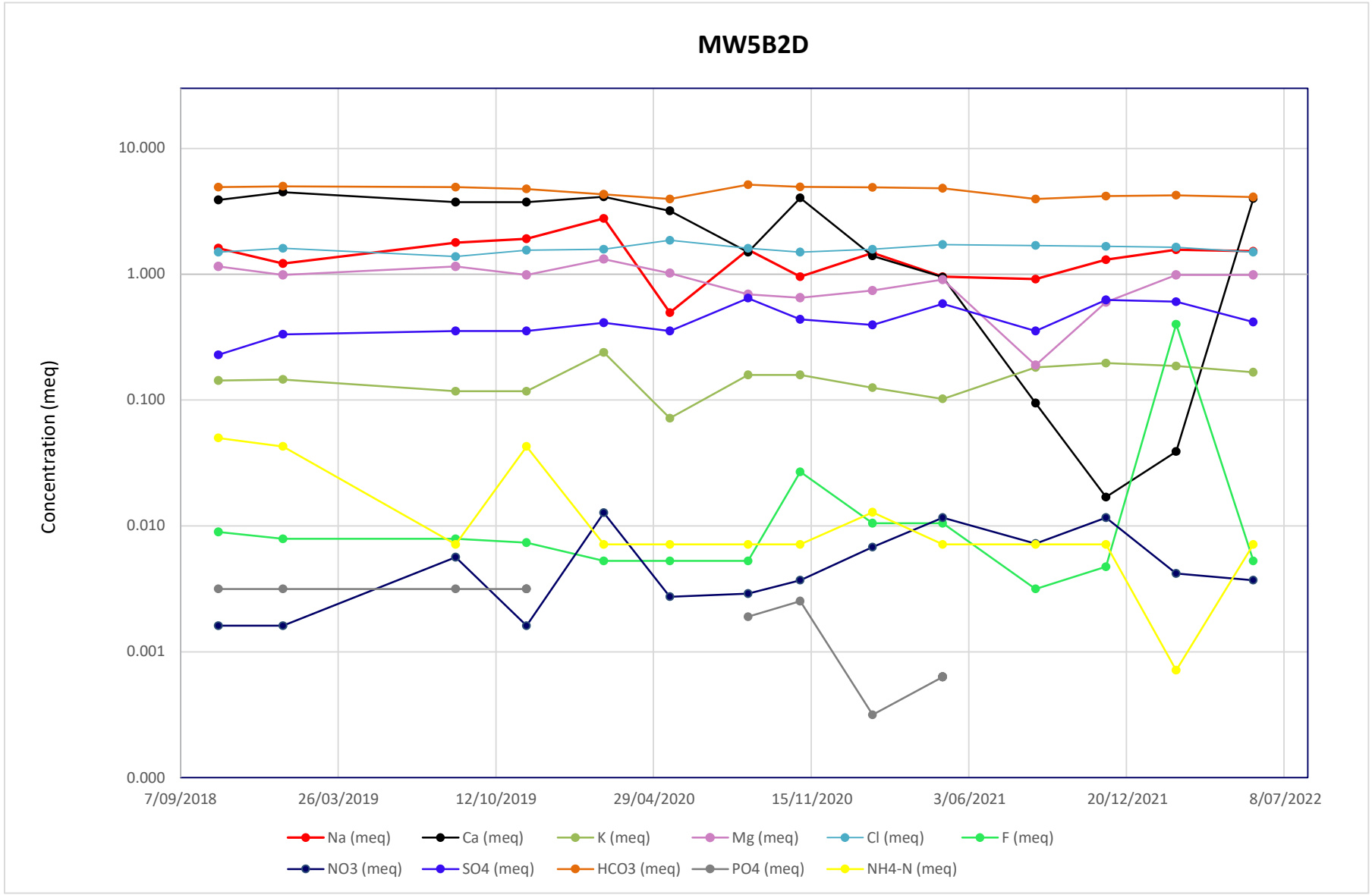
4/02/2019
23/08/2019
10/03/2020
26/09/2020
14/04/2021
31/10/2021
19/05/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)
TDS (lab)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0.001
0.000
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12/10/2019
29/04/2020
15/11/2020
3/06/2021
20/12/2021
8/07/2022
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Ca (meq)
K (meq)
Mg (meq)
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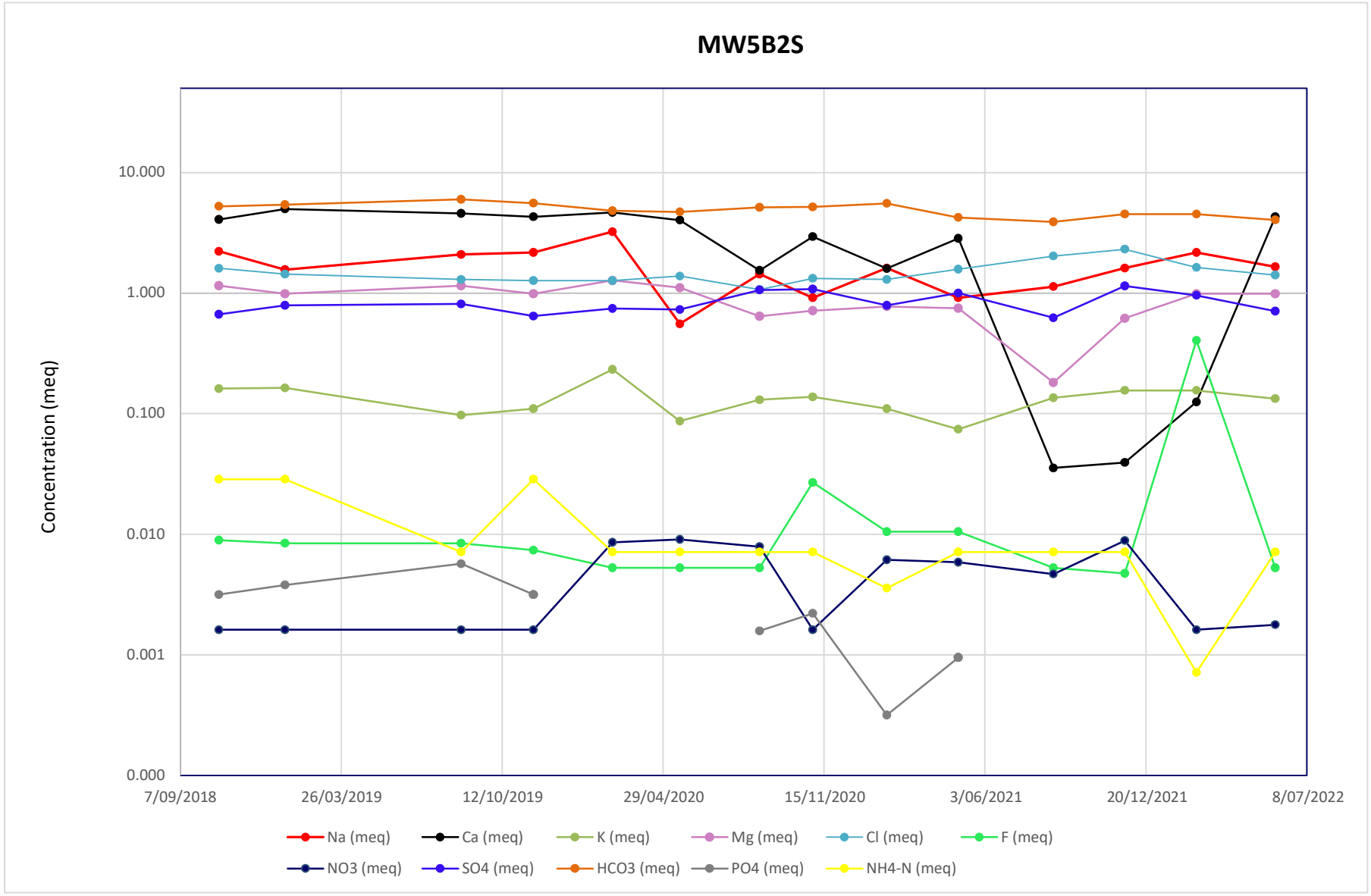
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)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0.000
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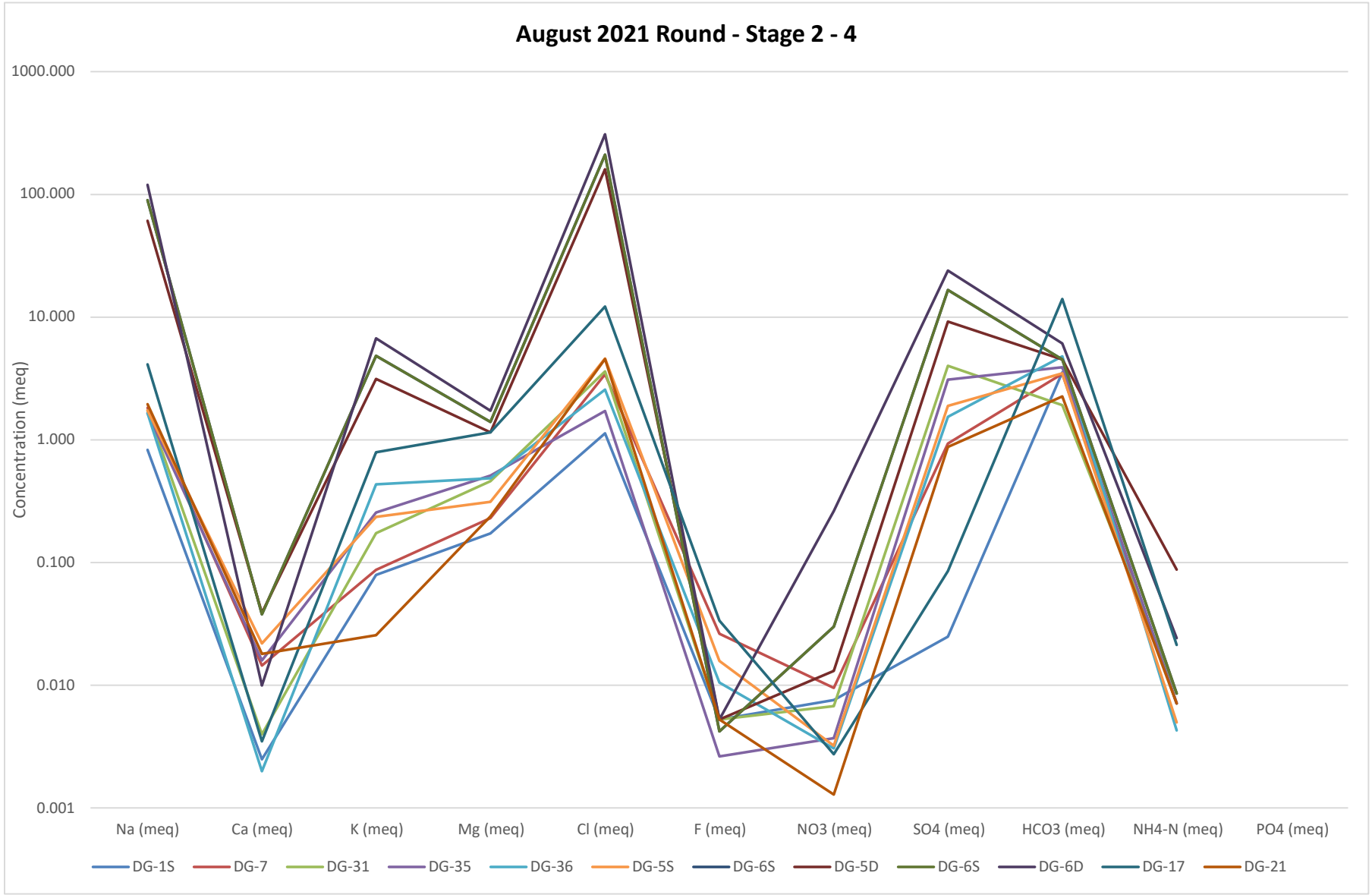
26/03/2019
12/10/2019
29/04/2020
15/11/2020
3/06/2021
20/12/2021
8/07/2022
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
PO4 (meq)
NH4-N (meq)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10.000
1.000
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0.010
0.001
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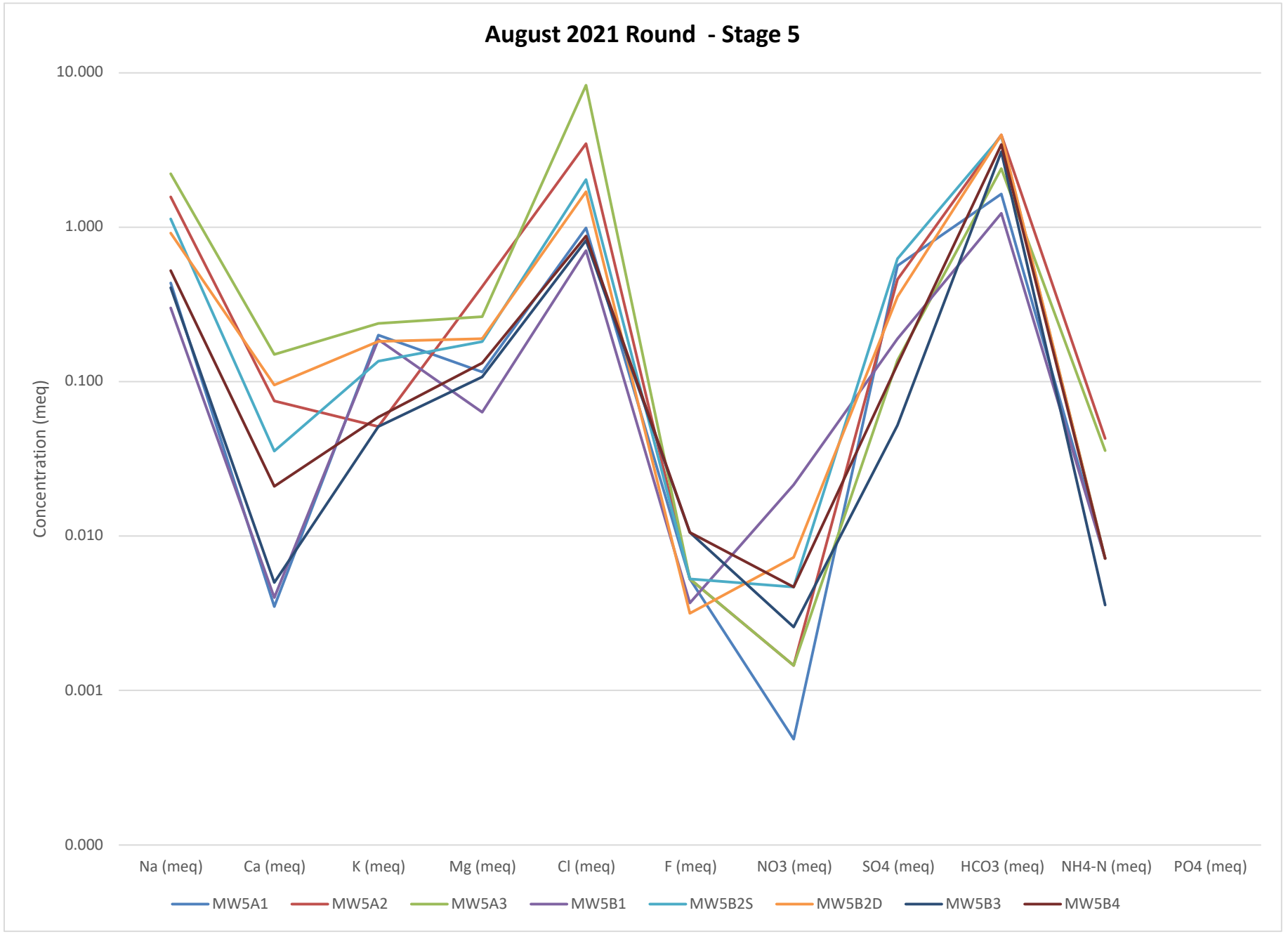
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
DG-1S
DG-7
DG-31
DG-35
DG-36
DG-5S
DG-6S
DG-5D
DG-6S
DG-6D
DG-17
DG-21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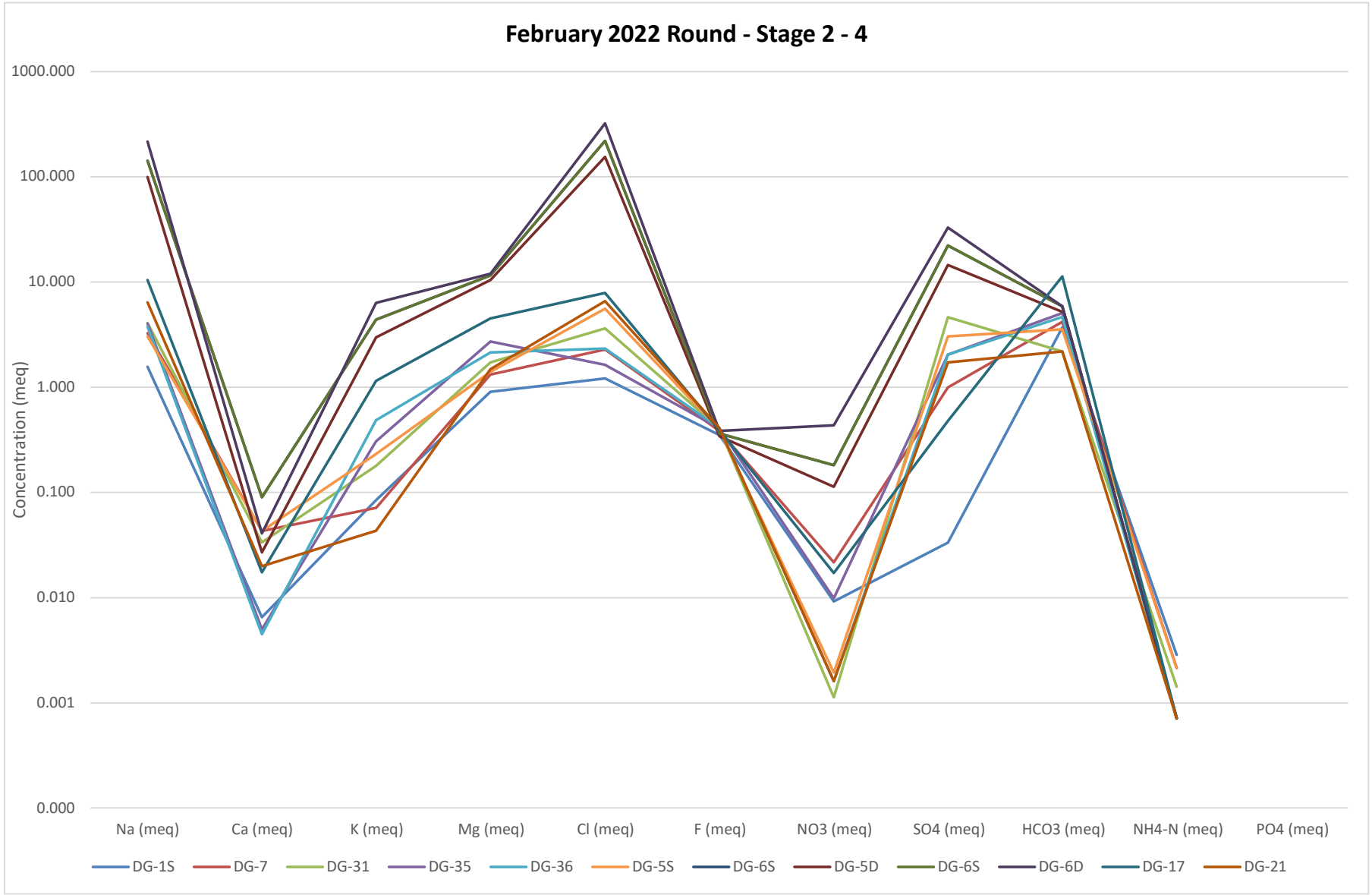
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
MW5A1
MW5A2
MW5A3
MW5B1
MW5B2S
MW5B2D
MW5B3
MW5B4


February 2022 Round - Stage 2 - 4
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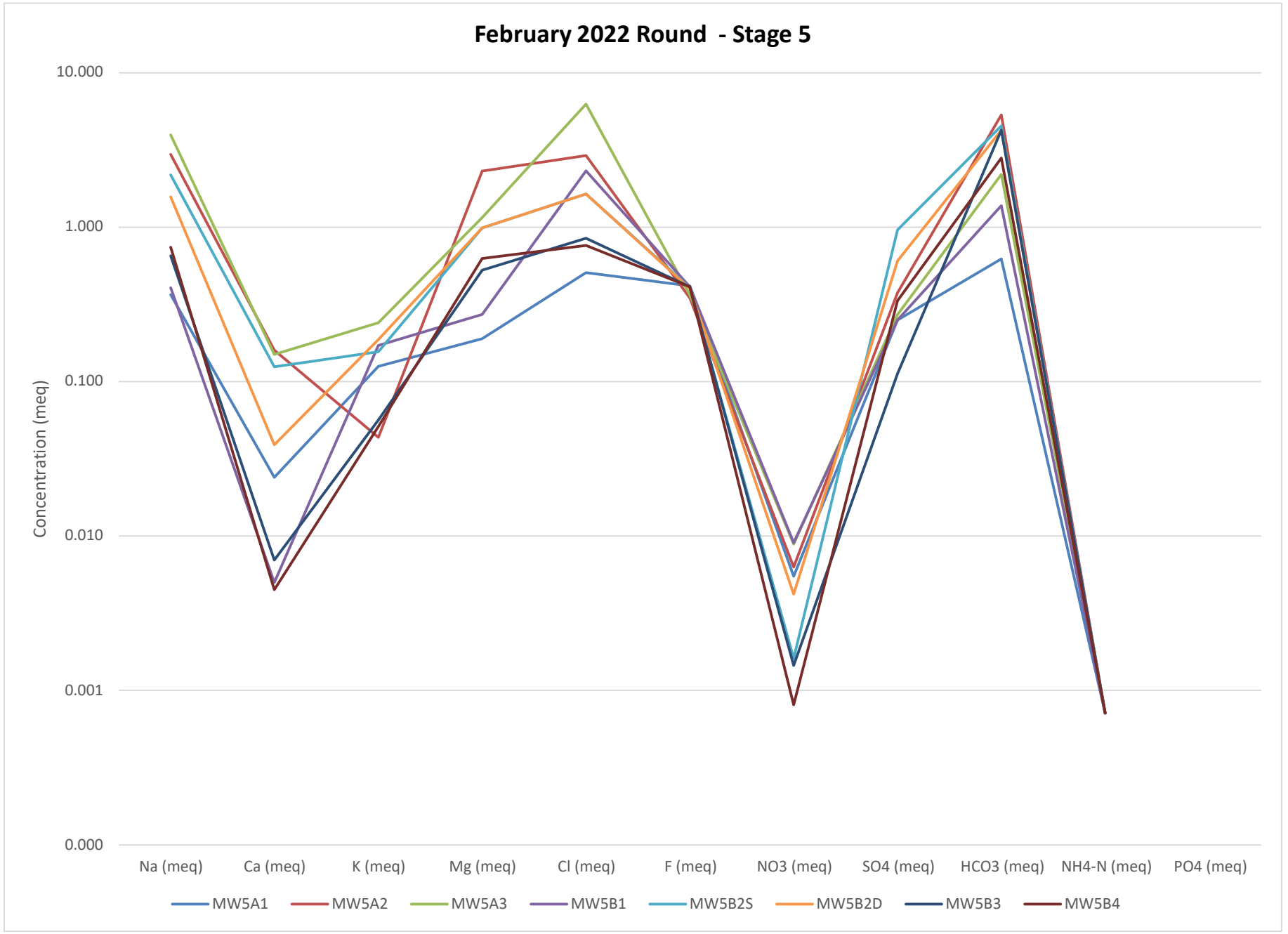
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
DG-1S
DG-7
DG-31
DG-35
DG-36
DG-5S
DG-6S
DG-5D
DG-6S
DG-6D
DG-17
DG-21


February 2022 Round - Stage 5
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1.000
0.100
0.010
0.001
0.000
Concentration (meq)
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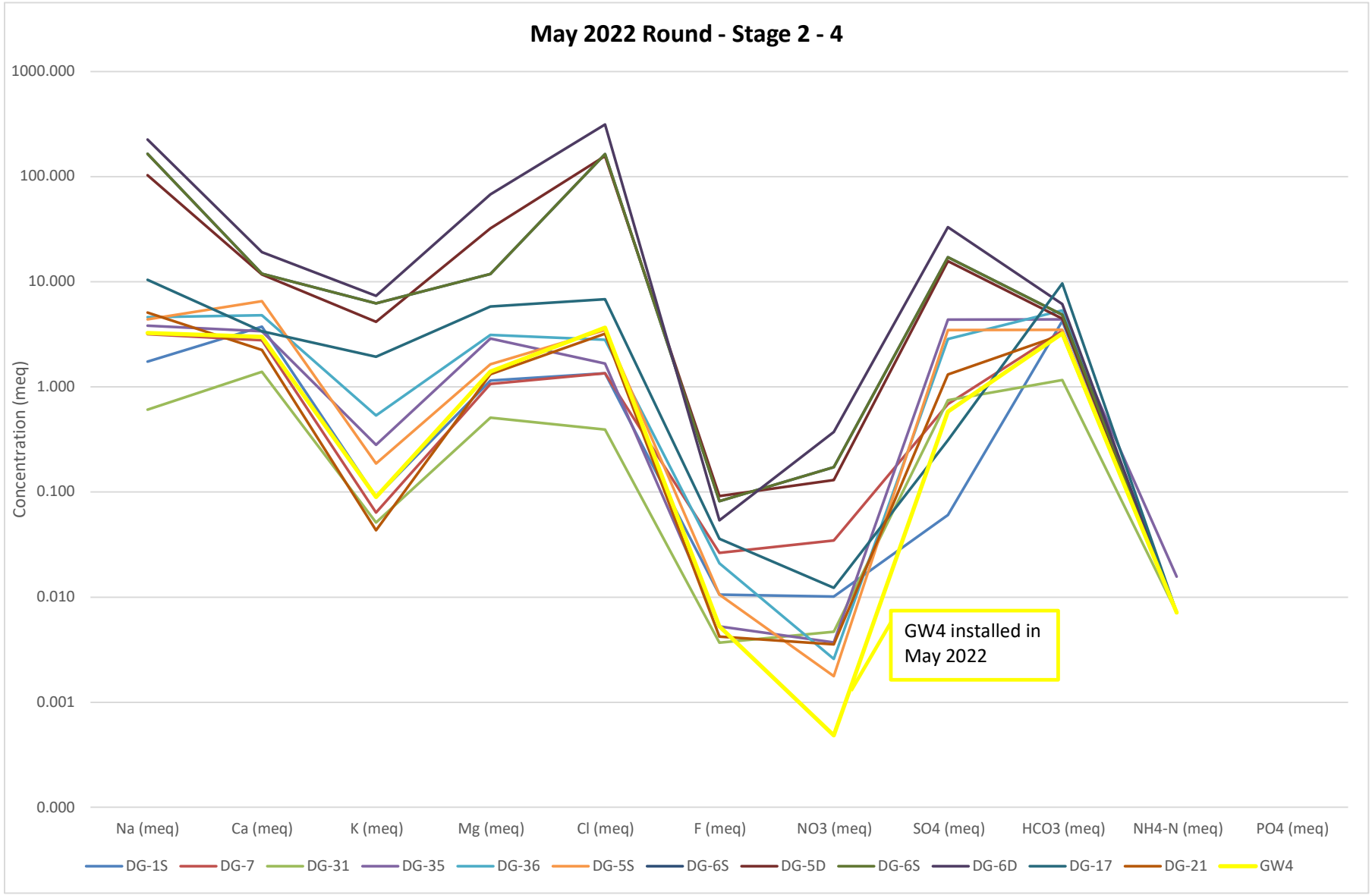
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
MW5A1
MW5A2
MW5A3
MW5B1
MW5B2S
MW5B2D
MW5B3
MW5B4


May 2022 Round - Stage 2 - 4
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10.000
1.000
0.100
0.010
0.001
0.000
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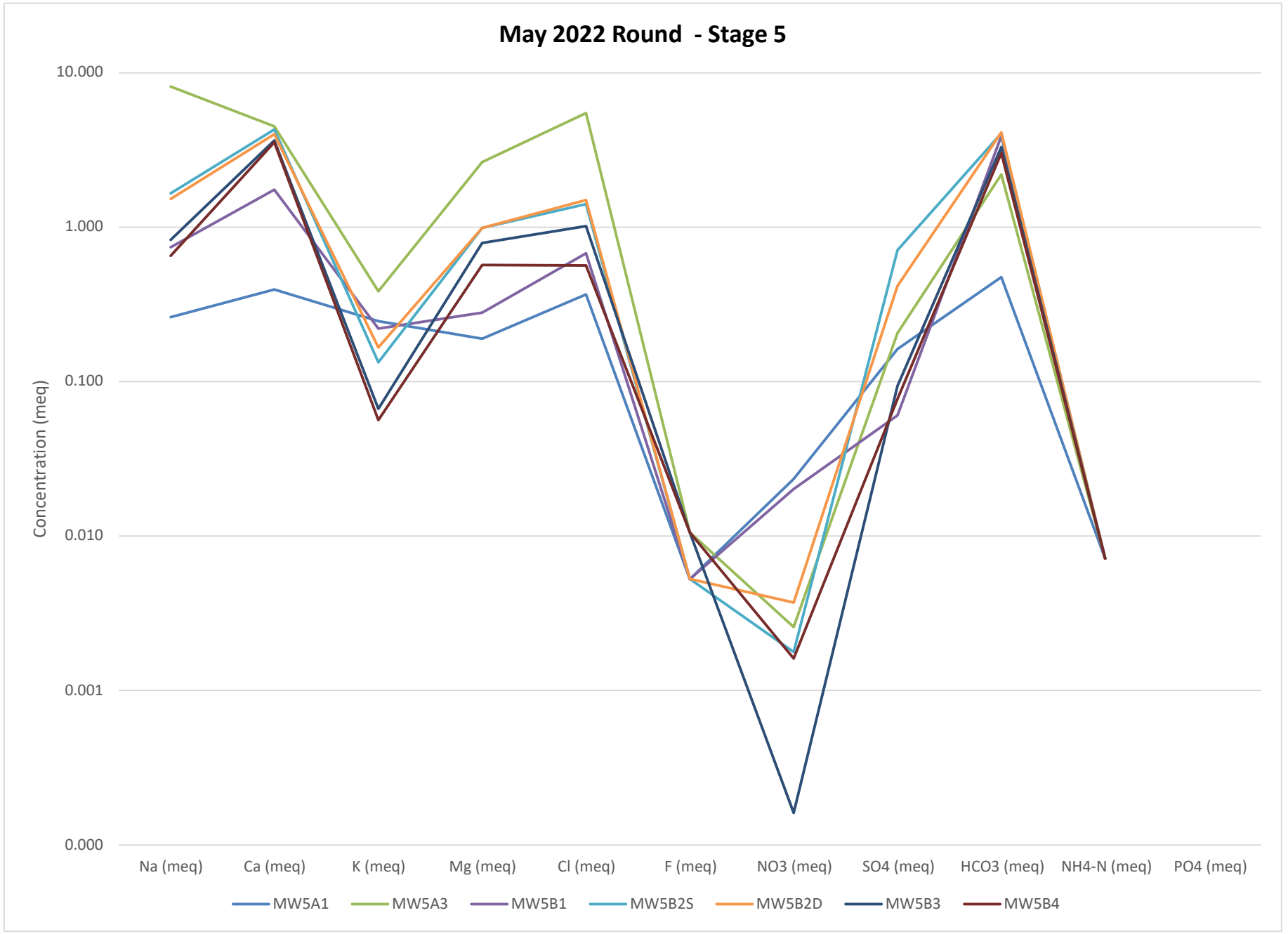
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
GW4 installed in May 2022
DG-1S
DG-7
DG-31
DG-35
DG-36
DG-5S
DG-6S
DG-5D
DG-6S
DG-6D
DG-17
DG-21
GW4


May 2022 Round - Stage 5
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1.000
0.100
0.010
0.001
0.000
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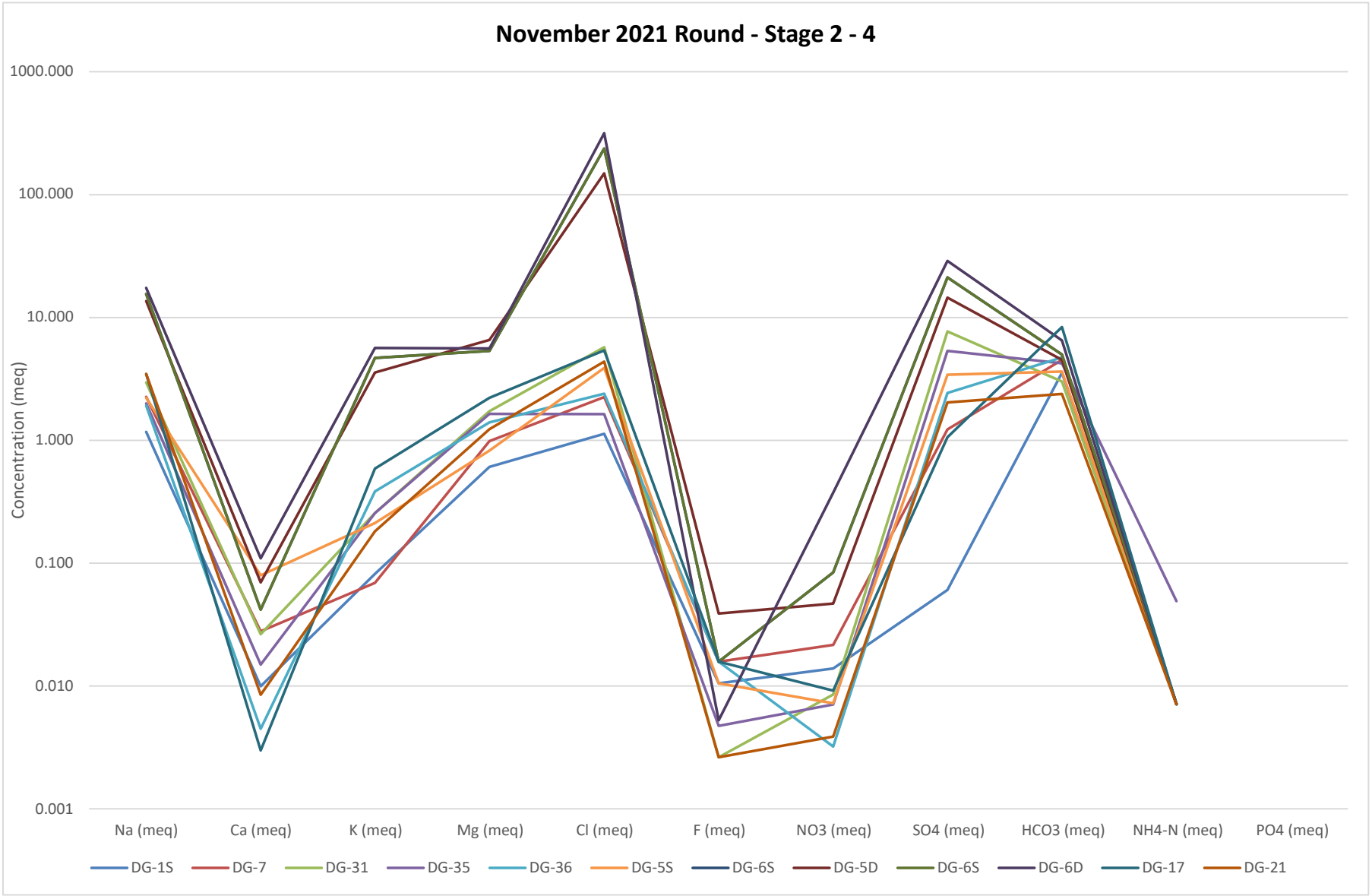
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
MW5A1
MW5A3
MW5B1
MW5B2S
MW5B2D
MW5B3
MW5B4


November 2021 Round - Stage 2 - 4
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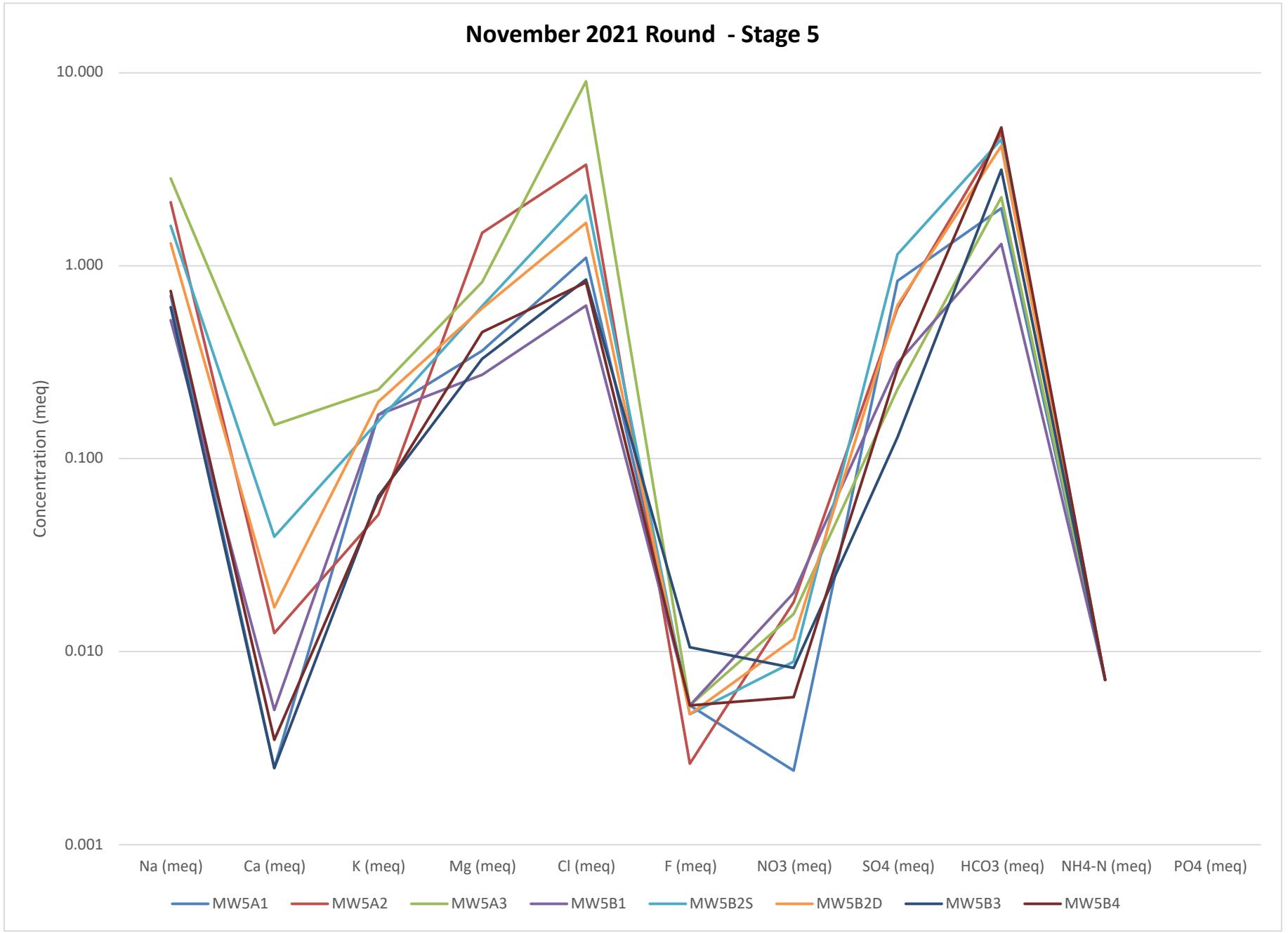
100.000
10.000
1.000
0.100
0.010
0.001
Concentration (meq)
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
DG-1S
DG-7
DG-31
DG-35
DG-36
DG-5S
DG-6S
DG-5D
DG-6S
DG-6D
DG-17
DG-21


November 2021 Round - Stage 5
10.000
1.000
0.100
0.010
0.001
Concentration (meq)
Na (meq)
Ca (meq)
K (meq)
Mg (meq)
Cl (meq)
F (meq)
NO3 (meq)
SO4 (meq)
HCO3 (meq)
NH4-N (meq)
PO4 (meq)
MW5A1
MW5A2
MW5A3
MW5B1
MW5B2S
MW5B2D
MW5B3
MW5B4

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX C: LABORATORY CERTIFICATES

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257750	257751	257752	257753
Date Sampled:	26/08/2021	26/08/2021	26/08/2021	26/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water - DG1S – 09:00	Water - DG7 – 13:45	Water - DG31S – 13:00	Water - DG35- 12:30
Field No.:	1	2	3	4
TEST RESULTS:				
pH*	7.3	7.3	6.9	6.6
Conductivity (µS/cm)	543	897	1171	1034
Sulfate as SO_4^{2-} (mg/L)	1.2	45	193	149
Chloride as Cl^- (mg/L)	40	121	128	61
Calcium (mg/L)	19	19	31	24
Iron (mg/L)	0.05	0.29	0.08	0.32
Potassium (mg/L)	3.1	3.4	6.8	10
Magnesium (mg/L)	2.1	2.8	5.6	6.2
Sodium (mg/L)	19	42	40	38
Phosphorus (mg/L)*	0.04	0.08	0.01	0.03
Total Phosphorus (mg/L)	0.14	0.16	0.08	0.09
Ammonia – N (mg/L)*	0.10	< 0.01	0.12	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Approved Signatory _____ Nanthini Selvadurai

Date 28-10-21 Serial No. CHEM96116.NS.1

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory

Number: 9968

Boral Construction Materials
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Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

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F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257750	257751	257752	257753
Date Sampled:	26/08/2021	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – DG1S - 9:00	Water – DG7 – 13:45	Water – DG31S – 13:00	Water – DG35 – 12:30
Field No.:	1	2	3	4

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	217	211	117	238
ORP (mv)^	476	479	477	455
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.47	0.59	0.42	0.23
TKN (mg/L)^	0.86	0.98	0.41	0.73
Total Nitrogen (mg/L)^	1.33	1.57	0.83	0.96

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257754	257755	257756	257757
Date Sampled:	26/08/2021	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – DG36 – 12:00	Water – DG5S – 13:00	Water – DG5D – 13:15	Water – DG6S- 13:30
Field No.:	5	6	7	8
TEST RESULTS:				
pH*	7.2	7.6	7.4	6.4
Conductivity (µS/cm)	1036	1170	15360	20800
Sulfate as SO_4^{2-} (mg/L)	74	91	441	802
Chloride as Cl^- (mg/L)	91	163	5686	7464
Calcium (mg/L)	22	36	53	57
Iron (mg/L)	0.04	0.44	0.78	0.76
Potassium (mg/L)	17	9.2	123	189
Magnesium (mg/L)	5.9	3.8	14	17
Sodium (mg/L)	38	40	1399	2068
Phosphorus (mg/L)*	0.02	0.08	0.17	0.09
Total Phosphorus (mg/L)	0.07	0.14	0.21	0.10
Ammonia – N (mg/L)*	0.06	0.07	1.23	0.12

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257754	257755	257756	257757
Date Sampled:	26/08/2021	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – DG36 - 12:00	Water – DG5S – 13:00	Water – DG5D – 13:15	Water – DG6S – 13:30
Field No.:	5	6	7	8

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	293	213	276	276
ORP (mv)^	377	430	404	435
Nitrite -N (mg/L)	< 0.01	< 0.01	0.53	0.02
Nitrate -N (mg/L)*	0.19	0.20	0.81	1.86
TKN (mg/L)^	< 0.01	< 0.01	0.04	0.12
Total Nitrogen (mg/L)^	0.19	0.20	1.38	2.00

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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PO Box 400, Winston Hills NSW 2153

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F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257758	257759	257760	257761
Date Sampled:	27/08/2021	26/08/2021	26/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – DG6D – 13:45	Water – DG17 – 11:00	Water – DG21 – 13:15	Water – MW5A1- 9:15
Field No.:	9	10	11	12
TEST RESULTS:				
pH*	6.8	7.2	6.5	7.2
Conductivity (µS/cm)	29800	2710	923	397
Sulfate as SO_4^{2-} (mg/L)	1154	4.1	42	27
Chloride as Cl^- (mg/L)	10982	434	162	35
Calcium (mg/L)	59	29	13	18
Iron (mg/L)	0.20	0.07	0.36	0.07
Potassium (mg/L)	262	31	1.0	7.8
Magnesium (mg/L)	21	14	2.9	1.4
Sodium (mg/L)	2751	95	45	10
Phosphorus (mg/L)*	0.02	2.47	0.17	0.03
Total Phosphorus (mg/L)	0.09	3.02	0.27	0.09
Ammonia – N (mg/L)*	0.34	0.30	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257758	257759	257760	257761
Date Sampled:	27/08/2021	26/08/2021	26/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – DG6D - 13:45	Water – DG17 – 11:00	Water – DG21 – 13:15	Water – MW5A1 – 9:15
Field No.:	9	10	11	12

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	372	857	138	100
ORP (mv)^	433	417	425	532
Nitrite -N (mg/L)	< 0.01	1.11	0.03	< 0.01
Nitrate -N (mg/L)*	16.30	0.17	0.08	0.03
TKN (mg/L)^	0.03	0.23	< 0.01	< 0.01
Total Nitrogen (mg/L)^	16.33	1.51	0.11	0.03

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257762	257763	257764	257765
Date Sampled:	27/08/2021	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – MW5A2 – 9:30	Water – MW5A3 – 9:45	Water – MW5B1 – 10:30	Water – MW5B2S- 11:00
Field No.:	13	14	15	16
TEST RESULTS:				
pH*	6.3	6.9	7.2	7.3
Conductivity (µS/cm)	910	1234	262	745
Sulfate as SO_4^{2-} (mg/L)	22	6.6	9.1	30
Chloride as Cl^- (mg/L)	123	294	25	72
Calcium (mg/L)	22	24	12	28
Iron (mg/L)	1.5	3.0	0.08	0.71
Potassium (mg/L)	2.0	9.3	7.3	5.3
Magnesium (mg/L)	5.0	3.2	0.77	2.2
Sodium (mg/L)	36	51	6.9	26
Phosphorus (mg/L)*	0.23	0.13	0.03	0.06
Total Phosphorus (mg/L)	0.29	0.21	0.10	0.11
Ammonia – N (mg/L)*	0.60	0.50	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257762	257763	257764	257765
Date Sampled:	27/08/2021	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021	
Sample Description:	Water – MW5A2 - 9:30	Water – MW5A3 – 9:45	Water – MW5B1 – 10:30	Water – MW5B2 – 11:00
Field No.:	13	14	15	16

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	242	146	75	238
ORP (mv)^	464	457	442	444
Nitrite -N (mg/L)	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.09	0.08	1.33	0.29
TKN (mg/L)^	< 0.01	0.20	< 0.01	< 0.01
Total Nitrogen (mg/L)^	0.09	0.28	1.33	0.29

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257766	257767	257768
Date Sampled:	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021
Sample Description:	Water – MW5B2D – 11:15	Water – MW5B3 – 11:45	Water – MW5B4 – 10:45
Field No.:	17	18	19

TEST RESULTS:

pH*	7.5	7.8	7.7
Conductivity (µS/cm)	698	444	575
Sulfate as SO_4^{2-} (mg/L)	17	2.5	6.2
Chloride as Cl^- (mg/L)	60	29	31
Calcium (mg/L)	27	23	29
Iron (mg/L)	1.9	0.10	0.42
Potassium (mg/L)	7.1	2.0	2.3
Magnesium (mg/L)	2.3	1.3	1.6
Sodium (mg/L)	21	9.3	12
Phosphorus (mg/L)*	0.09	0.08	0.11
Total Phosphorus (mg/L)	0.10	0.15	0.15
Ammonia – N (mg/L)*	< 0.01	0.05	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

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F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257766	257767	257768
Date Sampled:	27/08/2021	27/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021	06/09/2021
Date Tested:	06/09/2021	to	20/10/2021
Sample Description:	Water – MW5B2D - 11:15	Water – MW5B3 – 11:45	Water – MW5B4 – 10:45
Field No.:	17	18	19

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	242	188	209
ORP (mv)^	362	406	358
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.45	0.16	0.29
TKN (mg/L)^	< 0.01	< 0.01	< 0.01
Total Nitrogen (mg/L)^	0.45	0.16	0.29

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	257752 Duplicate	257763 Duplicate
Date Sampled:	26/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021
Date Tested:	06/09/2021 to 20/10/2021	
Sample Description:	Water – DG31S – 13:00	Water – MW5A3 – 9:45
Field No.:	3	14

TEST RESULTS:

pH*	6.8	6.9
Conductivity (µS/cm)	1172	1238
Sulfate as SO_4^{2-} (mg/L)	196	6.6
Chloride as Cl^- (mg/L)	127	294
Calcium (mg/L)	31	24
Iron (mg/L)	0.07	2.9
Potassium (mg/L)	6.7	9.1
Magnesium (mg/L)	5.5	2.9
Sodium (mg/L)	40	49
Phosphorus (mg/L)*	0.01	0.13
Total Phosphorus (mg/L)	0.08	0.21
Ammonia – N (mg/L)*	0.13	0.51

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of August 2021.

REQUEST No.:96116

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method

Laboratory Sample No.:	257752 Duplicate	257763 Duplicate
Date Sampled:	26/08/2021	27/08/2021
Date Received:	06/09/2021	06/09/2021
Date Tested:	06/09/2021 to	20/10/2021
Sample Description:	Water – DG31S - 13:00	Water – MW5A3 – 9:45
Field No.:	3	14

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	48	33
ORP (mv)^	478	456
Nitrite -N (mg/L)*	< 0.01	0.01
Nitrate -N (mg/L)	0.40	0.09
TKN (mg/L)^	0.40	0.20
Total Nitrogen (mg/L)^	0.80	0.30

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1074967-A [R00]	Page	1/2
Client	Boral Material Technical Services	Registering Laboratory	Sydney
Contact	Muans Abdulnebe	Contact	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	Address	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	Telephone	1300 703 166
Order Number	6433880	Date Samples Received	20/09/2021
Job Description	Water - Site: Dunmore Sand & Soil	Date Analysis Commenced	20/09/2021
Client Job Reference	---	Issue Date	29/09/2021
No. of Samples Registered	21 | Sampler: Customer	Receipt Temperature (°C)	20
Priority	Normal	Storage Temperature (°C)	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | -: Not Received/Not Requested | | ^ Subcontracted Analysis | NA:Not Applicable | [NT]:Not Tested | LOR:Limit of Reporting | TBA:To Be Advised | ND:Not Detected | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | iH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology
Melissa Gan	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1074967-A/1	Sample Date:2021-08-26 09:00; LSN 257750 - Water - DG1S	
S1074967-A/2	Sample Date:2021-08-26 13:45; LSN 257751 - Water - DG7	
S1074967-A/3	Sample Date:2021-08-26 13:00; *LSN 257752 - Water - DG31S	
S1074967-A/4	Sample Date:2021-08-26 13:00; *LSN 257752 - Water - DG31S Duplicate	
S1074967-A/5	Sample Date:2021-08-26 12:30; LSN 257753 - Water - DG35	
S1074967-A/6	Sample Date:2021-08-26 12:00; LSN 257754 - Water - DG36	
S1074967-A/7	Sample Date:2021-08-27 13:00; LSN 257755 - Water - DG5S	
S1074967-A/8	Sample Date:2021-08-27 13:15; LSN 257756 - Water - DG5D	
S1074967-A/9	Sample Date:2021-08-27 13:30; LSN 257757 - Water - DG6S	
S1074967-A/10	Sample Date:2021-08-27 13:45; LSN 257758 - Water - DG6D	
S1074967-A/11	Sample Date:2021-08-26 11:00; LSN 257759 - Water - DG17	
S1074967-A/12	Sample Date:2021-08-26 13:15; LSN 257760 - Water - DG21	
S1074967-A/13	Sample Date:2021-08-27 09:15; LSN 257761 - Water - MW5A1	
S1074967-A/14	Sample Date:2021-08-27 09:30; LSN 257762 - Water - MW5A2	
S1074967-A/15	Sample Date:2021-08-27 09:45; *LSN 257763 - Water - MW5A3	
S1074967-A/16	Sample Date:2021-08-27 09:45; *LSN 257763 - Water - MW5A3 Duplicate	
S1074967-A/17	Sample Date:2021-08-27 10:30; LSN 257764 - Water - MW5B1	
S1074967-A/18	Sample Date:2021-08-27 11:00; LSN 257765 - Water - MW5B2S	
S1074967-A/19	Sample Date:2021-08-27 11:15; LSN 257766 - Water - MW5B2D	
S1074967-A/20	Sample Date:2021-08-27 11:45; LSN 257767 - Water - MW5B3	
S1074967-A/21	Sample Date:2021-08-27 10:45; LSN 257768 - Water - MW5B4	

Symbio
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Analytical Results

Compound/Analyte	Method	LOR	Units	S1074967-A/1	S1074967-A/2	S1074967-A/3	S1074967-A/4	S1074967-A/5
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-A/6	S1074967-A/7	S1074967-A/8	S1074967-A/9	S1074967-A/10
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-A/11	S1074967-A/12	S1074967-A/13	S1074967-A/14	S1074967-A/15
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	4	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	4	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-A/16	S1074967-A/17	S1074967-A/18	S1074967-A/19	S1074967-A/20
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-A/21
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1

Analysis Location

The following analysis was completed by Symbio Laboratories - Brisbane: M23_4.
The following analysis was completed by Symbio Laboratories - Sydney: M8_5.

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1074967-B [R00]	Page	1/2
Client	Boral Material Technical Services	Registering Laboratory	Sydney
Contact	Muans Abdulnebe	Contact	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	Address	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	Telephone	1300 703 166
Order Number	---	Date Samples Received	21/09/2021
Job Description	Water - Site: Dunmore Sand & Soil	Date Analysis Commenced	21/09/2021 12:00
Client Job Reference	---	Issue Date	29/09/2021
No. of Samples Registered	21 | Sampler: Customer	Receipt Temperature (°C)	20
Priority	Normal	Storage Temperature (°C)	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis | NA:Not Applicable | [NT]:Not Tested | LOR:Limit of Reporting | TBA:To Be Advised | ND:Not Detected | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1074967-B/1	LSN 257750 - Water - DG1S	
S1074967-B/2	LSN 257751 - Water - DG7	
S1074967-B/3	*LSN 257752 - Water - DG31S	
S1074967-B/4	*LSN 257752 - Water - DG31S Duplicate	
S1074967-B/5	LSN 257753 - Water - DG35	
S1074967-B/6	LSN 257754 - Water - DG36	
S1074967-B/7	LSN 257755 - Water - DG5S	
S1074967-B/8	LSN 257756 - Water - DG5D	
S1074967-B/9	LSN 257757 - Water - DG6S	
S1074967-B/10	LSN 257758 - Water - DG6D	
S1074967-B/11	LSN 257759 - Water - DG17	
S1074967-B/12	LSN 257760 - Water - DG21	
S1074967-B/13	LSN 257761 - Water - MW5A1	
S1074967-B/14	LSN 257762 - Water - MW5A2	
S1074967-B/15	*LSN 257763 - Water - MW5A3	
S1074967-B/16	*LSN 257763 - Water - MW5A3 Duplicate	
S1074967-B/17	LSN 257764 - Water - MW5B1	
S1074967-B/18	LSN 257765 - Water - MW5B2S	
S1074967-B/19	LSN 257766 - Water - MW5B2D	
S1074967-B/20	LSN 257767 - Water - MW5B3	
S1074967-B/21	LSN 257768 - Water - MW5B4	

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Analytical Results

Compound/Analyte	Method	LOR	Units	S1074967-B/1	S1074967-B/2	S1074967-B/3	S1074967-B/4	S1074967-B/5
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-B/6	S1074967-B/7	S1074967-B/8	S1074967-B/9	S1074967-B/10
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-B/11	S1074967-B/12	S1074967-B/13	S1074967-B/14	S1074967-B/15
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-B/16	S1074967-B/17	S1074967-B/18	S1074967-B/19	S1074967-B/20
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1074967-B/21
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Brisbane.

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1074967-C [R00]	Page	1/2
Client	Boral Material Technical Services	Registering Laboratory	Sydney
Contact	Muans Abdulnebe	Contact	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	Address	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	Telephone	1300 703 166
Order Number	---	Date Samples Received	21/09/2021
Job Description	Water - Site: Dunmore Sand & Soil	Date Analysis Commenced	21/09/2021
Client Job Reference	---	Issue Date	29/09/2021
No. of Samples Registered	21 | Sampler: Customer	Receipt Temperature (°C)	20
Priority	Normal	Storage Temperature (°C)	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | ^ Subcontracted Analysis | NA:Not Applicable | [NT]:Not Tested | LOR:Limit of Reporting | TBA:To Be Advised | ND:Not Detected | * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample inhomogeneity

Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1074967-C/1	LSN 257750 - Water - DG1S	
S1074967-C/2	LSN 257751 - Water - DG7	
S1074967-C/3	*LSN 257752 - Water - DG31S	
S1074967-C/4	*LSN 257752 - Water - DG31S Duplicate	
S1074967-C/5	LSN 257753 - Water - DG35	
S1074967-C/6	LSN 257754 - Water - DG36	
S1074967-C/7	LSN 257755 - Water - DG5S	
S1074967-C/8	LSN 257756 - Water - DG5D	
S1074967-C/9	LSN 257757 - Water - DG6S	
S1074967-C/10	LSN 257758 - Water - DG6D	
S1074967-C/11	LSN 257759 - Water - DG17	
S1074967-C/12	LSN 257760 - Water - DG21	
S1074967-C/13	LSN 257761 - Water - MW5A1	
S1074967-C/14	LSN 257762 - Water - MW5A2	
S1074967-C/15	*LSN 257763 - Water - MW5A3	
S1074967-C/16	*LSN 257763 - Water - MW5A3 Duplicate	
S1074967-C/17	LSN 257764 - Water - MW5B1	
S1074967-C/18	LSN 257765 - Water - MW5B2S	
S1074967-C/19	LSN 257766 - Water - MW5B2D	
S1074967-C/20	LSN 257767 - Water - MW5B3	
S1074967-C/21	LSN 257768 - Water - MW5B4	

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Analytical Results

Compound/Analyte	Method	LOR	Units	S1074967-C/1	S1074967-C/2	S1074967-C/3	S1074967-C/4	S1074967-C/5
Dissolved Oxygen	EFF022 - Dissolved Oxygen in Water	0.1	mg/L	7.8	7.8	7.6	7.6	7.9
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.1	0.5	<0.05	<0.05	0.05

Compound/Analyte	Method	LOR	Units	S1074967-C/6	S1074967-C/7	S1074967-C/8	S1074967-C/9	S1074967-C/10
Dissolved Oxygen	EFF022 - Dissolved Oxygen in Water	0.1	mg/L	8.1	8.2	8.0	7.7	8.0
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2	0.3	<0.05	0.08	<0.05

Compound/Analyte	Method	LOR	Units	S1074967-C/11	S1074967-C/12	S1074967-C/13	S1074967-C/14	S1074967-C/15
Dissolved Oxygen	EFF022 - Dissolved Oxygen in Water	0.1	mg/L	7.2	8.0	8.1	7.8	8.0
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.64	<0.05	0.1	<0.05	0.1

Compound/Analyte	Method	LOR	Units	S1074967-C/16	S1074967-C/17	S1074967-C/18	S1074967-C/19	S1074967-C/20
Dissolved Oxygen	EFF022 - Dissolved Oxygen in Water	0.1	mg/L	8.0	7.9	8.2	8.0	7.9
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.09	0.07	0.1	0.06	0.2

Compound/Analyte	Method	LOR	Units	S1074967-C/21
Dissolved Oxygen	EFF022 - Dissolved Oxygen in Water	0.1	mg/L	8.0
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Brisbane.

Report Comments

Laboratory results for pH, chlorine or dissolved oxygen are for information purpose only - testing conducted outside recommended storage time of 0.25hr from sampling

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261093	261094	261095	261096
Date Sampled:	24/11/2021	23/11/2021	23/11/2021	23/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water - DG1S – 09:00	Water - DG7 – 11:45	Water - DG31S – 11:00	Water - DG35- 9:40
Field No.:	1	2	3	4
TEST RESULTS:				
pH*	7.2	7.0	6.8	6.5
Conductivity (µS/cm)	540	497	1638	1107
Sulfate as SO_4^{2-} (mg/L)	2.9	59	370	257
Chloride as Cl^- (mg/L)	40	80	203	58
Calcium (mg/L)	35	38	57	42
Iron (mg/L)	0.20	0.56	0.53	0.30
Potassium (mg/L)	3.2	2.7	10	10
Magnesium (mg/L)	7.4	12	21	20
Sodium (mg/L)	27	52	68	46
Phosphorus (mg/L)*	0.07	0.09	0.05	0.01
Total Phosphorus (mg/L)*	0.25	0.23	0.05	0.52
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	0.69

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Approved Signatory NSD Nanthini Selvadurai

Date 24 - 01 - 2022 Serial No. CHEM97273.NS.1

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory Number: 9968

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261093	261094	261095	261096
Date Sampled:	24/11/2021	23/11/2021	23/11/2021	23/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – DG1S - 09:00	Water – DG7 – 11:45	Water – DG31S – 11:00	Water – DG35 – 09:40
Field No.:	1	2	3	4

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	217	276	184	259
ORP (mv)^	415	430	439	289
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.86	1.34	0.53	0.44
TKN (mg/L)^	0.11	2.81	3.32	0.96
Total Nitrogen (mg/L)^	0.97	4.15	3.85	1.40
Dissolved Oxygen (mg/L) ^	4.2	7.5	7.4	6.9

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261097	261098	261099	261100
Date Sampled:	23/11/2021	24/11/2021	24/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – DG36 – 09:15	Water – DG5S – 09:30	Water – DG5D – 09:45	Water – DG6S- 10:00
Field No.:	5	6	7	8
TEST RESULTS:				
pH*	6.8	7.3	7.4	6.4
Conductivity (µS/cm)	996	1091	15100	20200
Sulfate as SO_4^{2-} (mg/L)	117	164	698	1017
Chloride as Cl^- (mg/L)	85	138	5287	8429
Calcium (mg/L)	37	59	54	57
Iron (mg/L)	0.09	1.6	1.4	0.84
Potassium (mg/L)	15	8.3	139	184
Magnesium (mg/L)	17	10	80	65
Sodium (mg/L)	44	51	313	357
Phosphorus (mg/L)*	0.06	0.16	0.27	0.06
Total Phosphorus (mg/L)*	0.14	0.23	0.54	0.07
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261097	261098	261099	261100
Date Sampled:	23/11/2021	24/11/2021	24/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – DG36 - 09:15	Water – DG5S – 09:30	Water – DG5D – 09:45	Water – DG6S – 10:00
Field No.:	5	6	7	8

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	288	222	276	305
ORP (mv)^	301	335	373	405
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.20	0.45	2.92	5.23
TKN (mg/L)^	0.65	0.62	1.14	0.71
Total Nitrogen (mg/L)^	0.85	1.07	4.06	5.94
Dissolved Oxygen (mg/L) ^	7.3	7.6	7.5	7.1

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261101	261102	261103	261104
Date Sampled:	24/11/2021	23/11/2021	23/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – DG6D – 10:15	Water – DG17 – 14:00	Water – DG21 – 11:20	Water – MW5A1- 11:15
Field No.:	9	10	11	12
TEST RESULTS:				
pH*	6.7	7.1	6.4	7.1
Conductivity (µS/cm)	29500	1515	892	424
Sulfate as SO_4^{2-} (mg/L)	1388	51	98	40
Chloride as Cl^- (mg/L)	11201	191	155	39
Calcium (mg/L)	66	37	28	32
Iron (mg/L)	2.2	0.06	0.17	0.05
Potassium (mg/L)	221	23	7.1	6.6
Magnesium (mg/L)	68	27	15	4.4
Sodium (mg/L)	399	80	80	16
Phosphorus (mg/L)*	0.01	1.38	0.13	0.02
Total Phosphorus (mg/L)*	0.06	1.64	0.20	0.04
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261101	261102	261103	261104
Date Sampled:	24/11/2021	23/11/2021	23/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – DG6D - 10:15	Water – DG17 – 14:00	Water – DG21 – 11:20	Water – MW5A1 – 11:15
Field No.:	9	10	11	12

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	397	510	146	121
ORP (mv)^	370	322	333	346
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	23.20	0.57	0.24	0.15
TKN (mg/L)^	0.30	< 0.01	0.04	0.29
Total Nitrogen (mg/L)^	23.50	0.57	0.28	0.44
Dissolved Oxygen (mg/L) ^	7.7	3.3	7.1	7.6

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

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F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.: 457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261105	261106	261107	261108
Date Sampled:	24/11/2021	24/11/2021	24/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – MW5A2 – 11:00	Water – MW5A3 – 11:30	Water – MW5B1 – 12:15	Water – MW5B2S- 11:30
Field No.:	13	14	15	16
TEST RESULTS:				
pH*	6.3	6.5	6.8	7.2
Conductivity (µS/cm)	942	1274	258	841
Sulfate as SO_4^{2-} (mg/L)	29	11	15	55
Chloride as Cl^- (mg/L)	118	320	22	82
Calcium (mg/L)	41	35	22	55
Iron (mg/L)	0.25	3.0	0.10	0.79
Potassium (mg/L)	2.0	8.9	6.6	6.1
Magnesium (mg/L)	18	10	3.3	7.5
Sodium (mg/L)	49	65	12	37
Phosphorus (mg/L)*	0.06	0.10	0.05	0.04
Total Phosphorus (mg/L)*	1.02	0.16	0.06	0.14
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261105	261106	261107	261108
Date Sampled:	24/11/2021	24/11/2021	24/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022	
Sample Description:	Water – MW5A2 - 11:00	Water – MW5A3 – 11:30	Water – MW5B1 – 12:15	Water – MW5B2 – 11:30
Field No.:	13	14	15	16

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	297	138	79	276
ORP (mv)^	303	348	338	352
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	1.12	0.97	1.25	0.55
TKN (mg/L)^	0.32	0.26	< 0.01	0.08
Total Nitrogen (mg/L)^	1.44	1.23	1.25	0.63
Dissolved Oxygen (mg/L) ^	6.6	7.5	7.8	7.2

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/21

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261109	261110	261111
Date Sampled:	24/11/2021	24/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022
Sample Description:	Water – MW5B2D – 12:40	Water – MW5B3 – 13:00	Water – MW5B4 – 13:15
Field No.:	17	18	19

TEST RESULTS:

pH*	7.4	7.6	7.4
Conductivity (µS/cm)	684	458	654
Sulfate as SO_4^{2-} (mg/L)	30	6.2	14
Chloride as Cl^- (mg/L)	59	30	29
Calcium (mg/L)	47	40	54
Iron (mg/L)	0.34	0.05	0.07
Potassium (mg/L)	7.7	2.5	2.4
Magnesium (mg/L)	7.3	4.0	5.5
Sodium (mg/L)	30	14	17
Phosphorus (mg/L)*	0.03	0.05	0.04
Total Phosphorus (mg/L)*	0.19	0.12	0.16
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261109	261110	261111
Date Sampled:	24/11/2021	24/11/2021	21/11/2021
Date Received:	29/11/2021	29/11/2021	29/11/2021
Date Tested:	29/11/2021	to	11/01/2022
Sample Description:	Water – MW5B2D - 12:40	Water – MW5B3 – 13:00	Water – MW5B4 – 13:15
Field No.:	17	18	19

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	255	192	318
ORP (mv)^	350	342	353
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.72	0.51	0.36
TKN (mg/L)^	0.15	0.02	< 0.01
Total Nitrogen (mg/L)^	0.87	0.53	0.36
Dissolved Oxygen (mg/L) ^	7.1	7.2	7.2

NOTE:
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Samples submitted by the Client.

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TEST REPORT

FILE No.: 457/21

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	261096 Duplicate	261107 Duplicate
Date Sampled:	23/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021
Date Tested:	29/11/2021 to 11/01/2022	
Sample Description:	Water – DG35 – 09:40	Water – MW5B1 – 12:15
Field No.:	4	15

TEST RESULTS:

pH*	6.6	6.8
Conductivity (µS/cm)	1112	264
Sulfate as SO_4^{2-} (mg/L)	252	15
Chloride as Cl^- (mg/L)	58	22
Calcium (mg/L)	42	22
Iron (mg/L)	0.28	0.10
Potassium (mg/L)	9.9	6.6
Magnesium (mg/L)	19	3.3
Sodium (mg/L)	45	12
Phosphorus (mg/L)*	0.01	0.05
Total Phosphorus (mg/L)*	0.53	0.07
Ammonia – N (mg/L)*	0.69	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/21

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of November 2021.

REQUEST No.:97273

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	261096 Duplicate	261107 Duplicate
Date Sampled:	23/11/2021	24/11/2021
Date Received:	29/11/2021	29/11/2021
Date Tested:	29/11/2021 to 11/01/2022	
Sample Description:	Water – DG35 - 09:40	Water – MW5B1 – 12:15
Field No.:	4	15

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	255	84
ORP (mv)^	285	340
Nitrite -N (mg/L)*	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.44	1.24
TKN (mg/L)^	0.93	< 0.01
Total Nitrogen (mg/L)^	1.37	1.24
Dissolved Oxygen (mg/L) ^	7.0	7.8

NOTE:
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Samples submitted by the Client.

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Nanthini Selvadurai

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1102150 [R00]	**Page**	1/2
Client	Boral Material Technical Services	**Registering Laboratory**	Sydney
Contact	Muans Abdulnebe	**Contact**	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	**Address**	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	**Telephone**	1300 703 166
Order Number	6468346	**Date Samples Received**	06/12/2021
Job Description	Water - Site: Dunmore Sand & Soil	**Date Analysis Commenced**	06/12/2021
Client Job Reference	---	**Issue Date**	06/01/2022
No. of Samples Registered	21 | Sampler: Customer	**Receipt Temperature (°C)**	19
Priority	Normal	**Storage Temperature (°C)**	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology
Melissa Gan	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1102150/1	Sample Date:2021-11-24 09:00; LSN 261093-WATER-DG1S	
S1102150/2	Sample Date:2021-11-23 11:45; LSN 261094-WATER-DG7	
S1102150/3	Sample Date:2021-11-23 11:00; LSN 261095-WATER-DG31S	
S1102150/4	Sample Date:2021-11-23 09:40; LSN 261096-WATER-DG35	
S1102150/5	Sample Date:2021-11-23 09:40; LSN 261096-WATER-DG35	
S1102150/6	Sample Date:2021-11-23 09:15; LSN 261097-WATER-DG36	
S1102150/7	Sample Date:2021-11-24 09:30; LSN 261098-WATER-DG5S	
S1102150/8	Sample Date:2021-11-24 09:45; LSN 261099-WATER-DG5D	
S1102150/9	Sample Date:2021-11-24 10:00; LSN 261100-WATER-DG6S	
S1102150/10	Sample Date:2021-11-24 10:15; LSN 261101-WATER-DG6D	
S1102150/11	Sample Date:2021-11-23 14:00; LSN 261102-WATER-DG17	
S1102150/12	Sample Date:2021-11-23 11:20; LSN 261103-WATER-DG21	
S1102150/13	Sample Date:2021-11-24 11:15; LSN 261104-WATER-MW5A1	
S1102150/14	Sample Date:2021-11-24 11:00; LSN 261105-WATER-MW5A2	
S1102150/15	Sample Date:2021-11-24 11:30; LSN 261106-WATER-MW5A3	
S1102150/16	Sample Date:2021-11-24 12:15; LSN 261107-WATER-MW5B1	
S1102150/17	Sample Date:2021-11-24 12:15; LSN 261107-WATER-MW5B1	
S1102150/18	Sample Date:2021-11-24 11:30; LSN 261108-WATER-MW5B2S	
S1102150/19	Sample Date:2021-11-24 12:40; LSN 261109-WATER-MW5B2D	
S1102150/20	Sample Date:2021-11-24 13:00; LSN 261110-WATER-MW5B3	
S1102150/21	Sample Date:2021-11-24 13:15; LSN 261111-WATER-MW5B4	

Analytical Results

Compound/Analyte	Method	LOR	Units	S1102150/1	S1102150/2	S1102150/3	S1102150/4	S1102150/5
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2	0.3	0.05	0.09	0.1

Compound/Analyte	Method	LOR	Units	S1102150/6	S1102150/7	S1102150/8	S1102150/9	S1102150/10
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.3	0.2	0.74	0.3	<0.05

Compound/Analyte	Method	LOR	Units	S1102150/11	S1102150/12	S1102150/13	S1102150/14	S1102150/15
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.3	0.05	<0.05	0.05	<0.05

Compound/Analyte	Method	LOR	Units	S1102150/16	S1102150/17	S1102150/18	S1102150/19	S1102150/20
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1
Fluoride	ENV002 - Anions by IC	0.05	mg/L	<0.05	0.05	0.09	0.09	0.2

Compound/Analyte	Method	LOR	Units	S1102150/21
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.1

Analysis Location

The following analysis was completed by Symbio Laboratories - Brisbane: ENV002;M23_4.
The following analysis was completed by Symbio Laboratories - Sydney: M8_5.

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
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T: +61 (02) 9624 9900
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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263809	263810	263811	263812
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water - DG1S – 12:45	Water - DG7 – 13:45	Water - DG31S – 13:15	Water - DG35- 9:00
Field No.:	1	2	3	4
TEST RESULTS:				
pH*	7.3	7.1	6.9	6.7
Conductivity (µS/cm)	573	821	1091	1137
Sulfate as SO_4^{2-} (mg/L)	1.6	48	223	98
Chloride as Cl^- (mg/L)	43	81	129	58
Calcium (mg/L)	49	49	54	57
Iron (mg/L)	0.13	0.86	0.67	0.10
Potassium (mg/L)	3.3	2.8	7.0	12
Magnesium (mg/L)	11	16	21	33
Sodium (mg/L)	36	75	94	93
Phosphorus (mg/L)*	< 0.01	0.08	0.02	< 0.01
Total Phosphorus (mg/L)*	0.11	0.09	0.05	< 0.01
Ammonia – N (mg/L)*	0.04	0.03	0.02	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Approved Signatory _____ Nanthini Selvadurai

Date 28-03-22 Serial No. CHEM98226.NS.1

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory

Number: 9968

Boral Construction Materials
Materials Technical Services

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APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263809	263810	263811	263812
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – DG1S - 12:45	Water – DG7 – 13:45	Water – DG31S – 13:15	Water – DG35 – 09:00
Field No.:	1	2	3	4

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	226	255	134	309
ORP (mv)^	501	455	493	484
Nitrite -N (mg/L)*	0.60	0.35	0.16	0.30
Nitrate -N (mg/L)*	0.57	1.34	0.07	0.61
TKN (mg/L)^	0.50	0.15	0.34	0.21
Total Nitrogen (mg/L)^	1.67	1.84	0.57	1.12
Dissolved Oxygen (mg/L) ^	6.7	7.3	7.7	7.7

NOTE:
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^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263813	263814	263815	263816
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – DG36 – 08:30	Water – DG5S – 10:30	Water – DG5D – 10:45	Water – DG6S- 11:15
Field No.:	5	6	7	8
TEST RESULTS:				
pH*	7.0	7.3	7.4	6.3
Conductivity (µS/cm)	990	1097	15570	19960
Sulfate as SO_4^{2-} (mg/L)	98	146	699	1072
Chloride as Cl^- (mg/L)	83	198	5501	7800
Calcium (mg/L)	42	73	117	103
Iron (mg/L)	0.09	0.86	0.54	1.8
Potassium (mg/L)	19	9.1	117	172
Magnesium (mg/L)	26	17	127	141
Sodium (mg/L)	87	70	2290	3272
Phosphorus (mg/L)*	< 0.01	0.04	0.06	0.04
Total Phosphorus (mg/L)*	0.02	0.05	0.14	0.05
Ammonia – N (mg/L)*	0.01	0.03	0.02	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Shoanne Labowitch, Sharon Makin, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263813	263814	263815	263816
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – DG36 - 08:30	Water – DG5S – 10:30	Water – DG5D – 10:45	Water – DG6S – 11:15
Field No.:	5	6	7	8

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	284	217	318	360
ORP (mv)^	441	402	372	415
Nitrite -N (mg/L)*	0.01	< 0.01	1.40	0.07
Nitrate -N (mg/L)*	< 0.01	0.12	7.01	11.30
TKN (mg/L)^	< 0.01	< 0.01	0.17	0.11
Total Nitrogen (mg/L)^	0.01	0.12	8.58	11.48
Dissolved Oxygen (mg/L) ^	7.8	7.5	6.5	6.9

NOTE:
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^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263817	263818	263819	263820
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – DG6D – 11:00	Water – DG17 – 09:15	Water – DG21 – 13:30	Water – MW5A1-10:05
Field No.:	9	10	11	12
TEST RESULTS:				
pH*	6.7	7.1	6.5	6.4
Conductivity (µS/cm)	29200	2010	1228	176
Sulfate as SO_4^{2-} (mg/L)	1585	23	83	12
Chloride as Cl^- (mg/L)	11443	280	233	18
Calcium (mg/L)	196	54	28	14
Iron (mg/L)	0.82	0.35	0.40	0.48
Potassium (mg/L)	248	45	1.7	4.9
Magnesium (mg/L)	146	55	18	2.3
Sodium (mg/L)	4987	240	147	8.4
Phosphorus (mg/L)*	< 0.01	1.73	0.20	0.02
Total Phosphorus (mg/L)*	0.01	2.29	0.22	0.04
Ammonia – N (mg/L)*	0.01	0.01	0.01	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263817	263818	263819	263820
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – DG6D - 11:00	Water – DG17 – 09:15	Water – DG21 – 13:30	Water – MW5A1 – 10:05
Field No.:	9	10	11	12

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	360	690	134	38
ORP (mv)^	398	379	439	519
Nitrite -N (mg/L)*	0.01	0.48	0.01	< 0.01
Nitrate -N (mg/L)*	26.9	1.06	< 0.01	0.34
TKN (mg/L)^	< 0.01	< 0.01	< 0.01	< 0.01
Total Nitrogen (mg/L)^	26.91	1.54	0.01	0.34
Dissolved Oxygen (mg/L) ^	7.3	7.4	7.8	7.9

NOTE:
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^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263821	263822	263823	263824
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – MW5A2 – 09:45	Water – MW5A3 – 09:40	Water – MW5B1 – 11:30	Water – MW5B2S- 11:45
Field No.:	13	14	15	16
TEST RESULTS:				
pH*	6.4	6.5	6.7	7.1
Conductivity (µS/cm)	906	1034	252	844
Sulfate as SO_4^{2-} (mg/L)	18	13	12	46
Chloride as Cl^- (mg/L)	103	222	82	58
Calcium (mg/L)	51	55	22	65
Iron (mg/L)	3.2	3.0	0.10	2.5
Potassium (mg/L)	1.7	9.4	6.7	6.1
Magnesium (mg/L)	28	14	3.3	12
Sodium (mg/L)	68	91	9.3	50
Phosphorus (mg/L)*	0.38	0.10	< 0.01	0.08
Total Phosphorus (mg/L)*	0.48	0.12	0.03	0.13
Ammonia – N (mg/L)*	0.01	0.01	0.01	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263821	263822	263823	263824
Date Sampled:	17/02/2022	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022	
Sample Description:	Water – MW5A2 - 09:45	Water – MW5A3 – 09:40	Water – MW5B1 – 11:30	Water – MW5B2 – 11:45
Field No.:	13	14	15	16

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	326	134	84	276
ORP (mv)^	466	449	461	438
Nitrite -N (mg/L)*	1.03	0.78	0.04	< 0.01
Nitrate -N (mg/L)*	0.39	0.55	0.56	0.10
TKN (mg/L)^	< 0.01	< 0.01	< 0.01	< 0.01
Total Nitrogen (mg/L)^	1.42	1.33	0.60	0.10
Dissolved Oxygen (mg/L) ^	6.6	6.9	7.8	7.7

NOTE:
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^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263825	263826	263827
Date Sampled:	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022
Sample Description:	Water – MW5B2D – 11:50	Water – MW5B3 – 12:15	Water – MW5B4 – 12:05
Field No.:	17	18	19

TEST RESULTS:

pH*	7.3	7.0	7.4
Conductivity (µS/cm)	714	468	566
Sulfate as SO_4^{2-} (mg/L)	29	5.4	16
Chloride as Cl^- (mg/L)	58	30	27
Calcium (mg/L)	53	51	63
Iron (mg/L)	0.78	0.14	0.09
Potassium (mg/L)	7.3	2.2	2.0
Magnesium (mg/L)	12	6.4	7.6
Sodium (mg/L)	36	15	17
Phosphorus (mg/L)*	< 0.01	0.05	< 0.01
Total Phosphorus (mg/L)*	0.03	0.06	0.05
Ammonia – N (mg/L)*	0.01	0.01	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of February 2022.

REQUEST No.:98226

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263825	263826	263827
Date Sampled:	17/02/2022	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022	22/02/2022
Date Tested:	22/02/2022	to	24/03/2022
Sample Description:	Water – MW5B2D - 11:50	Water – MW5B3 – 12:15	Water – MW5B4 – 12:05
Field No.:	17	18	19

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	259	259	171
ORP (mv)^	441	438	409
Nitrite -N (mg/L)*	0.60	0.39	0.12
Nitrate -N (mg/L)*	0.26	0.09	0.05
TKN (mg/L)^	< 0.01	< 0.01	< 0.01
Total Nitrogen (mg/L)^	0.86	0.48	0.17
Dissolved Oxygen (mg/L) ^	7.6	7.8	7.8

NOTE:
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TEST REPORT

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REQUEST No.:98226

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
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APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	263813 Duplicate	263824 Duplicate
Date Sampled:	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022
Date Tested:	22/02/2022 to 24/03/2022	
Sample Description:	Water – DG36 – 12:45	Water – MW5B2S – 13:45
Field No.:	5	16

TEST RESULTS:

pH*	7.0	7.0
Conductivity (µS/cm)	995	843
Sulfate as SO_4^{2-} (mg/L)	99	47
Chloride as Cl^- (mg/L)	85	82
Calcium (mg/L)	41	72
Iron (mg/L)	0.09	2.5
Potassium (mg/L)	19	6.2
Magnesium (mg/L)	26	12
Sodium (mg/L)	88	50
Phosphorus (mg/L)*	< 0.01	0.08
Total Phosphorus (mg/L)*	0.02	0.13
Ammonia – N (mg/L)*	0.01	0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

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APHA 2580 B – Oxidation-Reduction Potential in Clean water
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APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	263813 Duplicate	263824 Duplicate
Date Sampled:	17/02/2022	17/02/2022
Date Received:	22/02/2022	22/02/2022
Date Tested:	22/02/2022 to 24/03/2022	
Sample Description:	Water – DG36 - 08:30	Water – MW5B2S – 11:45
Field No.:	5	16

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	293	272
ORP (mv)^	438	437
Nitrite -N (mg/L)*	0.01	< 0.01
Nitrate -N (mg/L)*	< 0.01	0.10
TKN (mg/L)^	< 0.01	< 0.01
Total Nitrogen (mg/L)^	0.01	0.10
Dissolved Oxygen (mg/L) ^	7.9	7.8

NOTE:
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^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

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Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1126140-A [R00]	**Page**	1/2
Client	Boral Material Technical Services	**Registering Laboratory**	Sydney
Contact	Muans Abdulnebe	**Contact**	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	**Address**	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	**Telephone**	1300 703 166
Order Number	TBA	**Date Samples Received**	24/02/2022
Job Description	Water - Site: Dunmore Sand & Soil	**Date Analysis Commenced**	24/02/2022
Client Job Reference	---	**Issue Date**	01/03/2022
No. of Samples Registered	21 | Sampler: Customer	**Receipt Temperature (°C)**	16
Priority	Normal	**Storage Temperature (°C)**	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology
Melissa Gan	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1126140-A/1	Sample Date:2022-02-17 12:45; LSN 263809-Water-DG1S	
S1126140-A/2	Sample Date:2022-02-17 13:45; LSN 263810-Water-DG7	
S1126140-A/3	Sample Date:2022-02-17 13:15; LSN 263811-Water-DG31S	
S1126140-A/4	Sample Date:2022-02-17 09:00; LSN 263812-Water-DG35	
S1126140-A/5	Sample Date:2022-02-17 08:30; LSN 263813-Water-DG36	
S1126140-A/6	Sample Date:2022-02-17 08:30; LSN 263813-Water-DG36	
S1126140-A/7	Sample Date:2022-02-17 10:30; LSN 263814-Water-DG5S	
S1126140-A/8	Sample Date:2022-02-17 10:45; LSN 263815-Water-DG5D	
S1126140-A/9	Sample Date:2022-02-17 11:15; LSN 263816-Water-DG6S	
S1126140-A/10	Sample Date:2022-02-17 11:00; LSN 263817-Water-DG6D	
S1126140-A/11	Sample Date:2022-02-17 09:15; LSN 263818-Water-DG17	
S1126140-A/12	Sample Date:2022-02-17 10:30; LSN 263819-Water-DG21	
S1126140-A/13	Sample Date:2022-02-17 10:05; LSN 263820-Water-MW5A1	
S1126140-A/14	Sample Date:2022-02-17 09:45; LSN 263821-Water-MW5A2	
S1126140-A/15	Sample Date:2022-02-17 09:40; LSN 263822-Water-MW5A3	
S1126140-A/16	Sample Date:2022-02-17 11:30; LSN 263823-Water-MW5B1	
S1126140-A/17	Sample Date:2022-02-17 11:45; LSN 263824-Water-MW5B2S	
S1126140-A/18	Sample Date:2022-02-17 11:45; LSN 263824-Water-MW5B2S	
S1126140-A/19	Sample Date:2022-02-17 11:50; LSN 263825-Water-MW5B2D	
S1126140-A/20	Sample Date:2022-02-17 12:15; LSN 263826-Water-MW5B3	
S1126140-A/21	Sample Date:2022-02-17 12:05; LSN 263827-Water-MW5B4	

Client	Boral Material Technical Services	**Certificate Number**	S1126140-A [R00]
Page	2/2		

Analytical Results

Compound/Analyte	Method	LOR	Units	S1126140-A/1	S1126140-A/2	S1126140-A/3	S1126140-A/4	S1126140-A/5
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<10	<1

Compound/Analyte	Method	LOR	Units	S1126140-A/6	S1126140-A/7	S1126140-A/8	S1126140-A/9	S1126140-A/10
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	36	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<10	<10	<10

Compound/Analyte	Method	LOR	Units	S1126140-A/11	S1126140-A/12	S1126140-A/13	S1126140-A/14	S1126140-A/15
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	1	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<10	<1

Compound/Analyte	Method	LOR	Units	S1126140-A/16	S1126140-A/17	S1126140-A/18	S1126140-A/19	S1126140-A/20
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	18	20	<1	<1

Compound/Analyte	Method	LOR	Units	S1126140-A/21
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<10

Analysis Location

The following analysis was completed by Symbio Laboratories - Brisbane: M23_4.
The following analysis was completed by Symbio Laboratories - Sydney: M8_5.

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1126140-B [R00]	**Page**	1/2
Client	Boral Material Technical Services	**Registering Laboratory**	Sydney
Contact	Muans Abdulnebe	**Contact**	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	**Address**	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	**Telephone**	1300 703 166
Order Number	TBA	**Date Samples Received**	25/02/2022
Job Description	Water - Site: Dunmore Sand & Soil	**Date Analysis Commenced**	25/02/2022
Client Job Reference	---	**Issue Date**	01/03/2022
No. of Samples Registered	21 | Sampler: Customer	**Receipt Temperature (°C)**	8
Priority	Normal	**Storage Temperature (°C)**	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1126140-B/1	Sample Date:2022-02-17 12:45; LSN 263809-Water-DG1S	
S1126140-B/2	Sample Date:2022-02-17 13:45; LSN 263810-Water-DG7	
S1126140-B/3	Sample Date:2022-02-17 13:15; LSN 263811-Water-DG31S	
S1126140-B/4	Sample Date:2022-02-17 09:00; LSN 263812-Water-DG35	
S1126140-B/5	Sample Date:2022-02-17 08:30; LSN 263813-Water-DG36	
S1126140-B/6	Sample Date:2022-02-17 08:30; LSN 263813-Water-DG36	
S1126140-B/7	Sample Date:2022-02-17 10:30; LSN 263814-Water-DG5S	
S1126140-B/8	Sample Date:2022-02-17 10:45; LSN 263815-Water-DG5D	
S1126140-B/9	Sample Date:2022-02-17 11:15; LSN 263816-Water-DG6S	
S1126140-B/10	Sample Date:2022-02-17 11:00; LSN 263817-Water-DG6D	
S1126140-B/11	Sample Date:2022-02-17 09:15; LSN 263818-Water-DG17	
S1126140-B/12	Sample Date:2022-02-17 13:30; LSN 263819-Water-DG21	
S1126140-B/13	Sample Date:2022-02-17 10:05; LSN 263820-Water-MW5A1	
S1126140-B/14	Sample Date:2022-02-17 09:45; LSN 263821-Water-MW5A2	
S1126140-B/15	Sample Date:2022-02-17 09:40; LSN 263822-Water-MW5A3	
S1126140-B/16	Sample Date:2022-02-17 11:30; LSN 263823-Water-MW5B1	
S1126140-B/17	Sample Date:2022-02-17 11:45; LSN 263824-Water-MW5B2S	
S1126140-B/18	Sample Date:2022-02-17 11:45; LSN 263824-Water-MW5B2S	
S1126140-B/19	Sample Date:2022-02-17 11:50; LSN 263825-Water-MW5B2D	
S1126140-B/20	Sample Date:2022-02-17 12:15; LSN 263826-Water-MW5B3	
S1126140-B/21	Sample Date:2022-02-17 12:05; LSN 263827-Water-MW5B4	

Analytical Results

Compound/Analyte	Method	LOR	Units	S1126140-B/1	S1126140-B/2	S1126140-B/3	S1126140-B/4	S1126140-B/5
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2	0.4	0.07	0.1	0.4

Compound/Analyte	Method	LOR	Units	S1126140-B/6	S1126140-B/7	S1126140-B/8	S1126140-B/9	S1126140-B/10
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.4	0.2	1.27	<0.05	<0.05

Compound/Analyte	Method	LOR	Units	S1126140-B/11	S1126140-B/12	S1126140-B/13	S1126140-B/14	S1126140-B/15
Fluoride	ENV002 - Anions by IC	0.05	mg/L	<0.05	0.07	<0.05	0.09	0.09

Compound/Analyte	Method	LOR	Units	S1126140-B/16	S1126140-B/17	S1126140-B/18	S1126140-B/19	S1126140-B/20
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.06	0.1	0.1	0.1	0.2

Compound/Analyte	Method	LOR	Units	S1126140-B/21
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Brisbane.

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No..457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268240	268241	268242	268243
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water - DG1S – 15:00	Water - DG7 – 09:50	Water - DG31S – 09:30	Water - DG35- 09:10
Field No.:	1	2	3	4
TEST RESULTS:				
pH*	7.4	7.2	7.0	6.7
Conductivity (µS/cm)	647	584	258	979
Sulfate as SO_4^{2-} (mg/L)	2.9	33	36	210
Chloride as Cl^- (mg/L)	48	48	14	59
Calcium (mg/L)	75	56	28	68
Iron (mg/L)	0.03	1.0	0.06	0.02
Potassium (mg/L)	3.5	2.5	2.0	11
Magnesium (mg/L)	14	13	6.2	35
Sodium (mg/L)	40	73	14	88
Phosphorus (mg/L)*	0.03	0.17	0.03	0.01
Total Phosphorus (mg/L)*	0.07	0.19	0.03	0.03
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	0.22

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Approved Signatory _____ Nanthini Selvadurai

Date 03-08-22 Serial No. CHEM99905.NS.1

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory
Number: 9968

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Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268240	268241	268242	268243
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – DG1S - 15:00	Water – DG7 – 09:50	Water – DG31S – 09:30	Water – DG35 – 09:10
Field No.:	1	2	3	4

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	259	209	71	268
ORP (mv)^	490	427	422	421
Nitrite -N (mg/L)*	0.02	< 0.01	< 0.01	0.46
Nitrate -N (mg/L)*	0.63	2.15	0.29	0.23
TKN (mg/L)^	0.15	0.49	0.06	0.32
Total Nitrogen (mg/L)^	0.80	2.64	0.35	1.01
Dissolved Oxygen (mg/L) ^	8.5	8.1	8.1	7.8

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268244	268245	268246	268247
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – DG36 – 9:00	Water – DG5S – 14:05	Water – DG5D – 14:10	Water – DG6S- 14:20
Field No.:	5	6	7	8
TEST RESULTS:				
pH*	6.9	7.5	7.4	6.4
Conductivity (µS/cm)	1135	1029	14920	16060
Sulfate as SO_4^{2-} (mg/L)	137	167	757	821
Chloride as Cl^- (mg/L)	100	123	5588	5826
Calcium (mg/L)	96	131	235	239
Iron (mg/L)	0.02	0.02	0.03	1.0
Potassium (mg/L)	21	7.3	163	244
Magnesium (mg/L)	38	20	393	144
Sodium (mg/L)	106	101	2383	3798
Phosphorus (mg/L)*	0.01	0.01	0.06	0.10
Total Phosphorus (mg/L)*	0.06	0.06	0.20	0.16
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268244	268245	268246	268247
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – DG36 - 09:00	Water – DG5S – 14:05	Water – DG5D – 14:10	Water – DG6S – 14:20
Field No.:	5	6	7	8

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	326	213	272	297
ORP (mv)^	421	375	395	401
Nitrite -N (mg/L)*	0.02	< 0.01	1.54	0.10
Nitrate -N (mg/L)*	0.16	0.11	8.10	10.70
TKN (mg/L)^	0.18	0.21	0.63	1.86
Total Nitrogen (mg/L)^	0.36	0.32	10.27	12.66
Dissolved Oxygen (mg/L) ^	7.8	8.2	8.1	7.5

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
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PO Box 400, Winston Hills NSW 2153

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F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268248	268249	268250	268251
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – DG6D – 14:30	Water – DG17 – 08:40	Water – DG21 – 09:40	Water – MW5A1-12:50
Field No.:	9	10	11	12
TEST RESULTS:				
pH*	6.7	7.1	6.6	6.0
Conductivity (µS/cm)	28000	1714	919	128
Sulfate as SO_4^{2-} (mg/L)	1589	15	63	7.8
Chloride as Cl^- (mg/L)	11117	242	114	13
Calcium (mg/L)	385	68	45	7.9
Iron (mg/L)	0.02	0.01	0.18	0.61
Potassium (mg/L)	288	76	1.7	9.6
Magnesium (mg/L)	827	71	16	2.3
Sodium (mg/L)	5224	240	117	6.0
Phosphorus (mg/L)*	0.01	1.81	0.25	0.03
Total Phosphorus (mg/L)*	0.01	1.98	0.31	0.04
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268248	268249	268250	268251
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – DG6D - 14:30	Water – DG17 – 08:40	Water – DG21 – 09:40	Water – MW5A1 – 12:50
Field No.:	9	10	11	12

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	376	589	192	29
ORP (mv)^	396	351	332	333
Nitrite -N (mg/L)*	0.21	0.03	0.06	0.01
Nitrate -N (mg/L)*	23.20	0.76	0.22	1.45
TKN (mg/L)^	0.15	0.79	0.21	0.03
Total Nitrogen (mg/L)^	23.56	1.58	0.49	1.49
Dissolved Oxygen (mg/L) ^	7.4	7.5	7.9	8.0

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

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Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

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F: +61 (02) 9624 9999

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TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268252	268253	268254	268255
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – MW5A3 – 13:00	Water – MW5B1 – 11:50	Water – MW5B2S – 12:05	Water – MW5B2D- 12:00
Field No.:	13	14	15	16
TEST RESULTS:				
pH*	6.4	6.5	7.4	7.3
Conductivity (µS/cm)	1750	209	640	622
Sulfate as SO_4^{2-} (mg/L)	9.9	2.9	34	20
Chloride as Cl^- (mg/L)	194	24	50	53
Calcium (mg/L)	90	35	86	80
Iron (mg/L)	2.6	3.2	0.87	0.32
Potassium (mg/L)	15	8.6	5.2	6.5
Magnesium (mg/L)	32	3.4	12	12
Sodium (mg/L)	187	17	38	35
Phosphorus (mg/L)*	0.04	0.03	0.04	0.02
Total Phosphorus (mg/L)*	0.09	0.06	0.08	0.05
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

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Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268252	268253	268254	268255
Date Sampled:	30/05/2022	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022	
Sample Description:	Water – MW5A3 - 13:00	Water – MW5B1 – 11:50	Water – MW5B2S – 12:05	Water – MW5B2D – 12:00
Field No.:	13	14	15	16

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	134	238	247	251
ORP (mv)^	327	290	282	282
Nitrite -N (mg/L)*	< 0.01	0.52	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.16	1.25	0.11	0.23
TKN (mg/L)^	0.69	0.74	< 0.01	0.05
Total Nitrogen (mg/L)^	0.85	2.51	0.11	0.28
Dissolved Oxygen (mg/L) ^	9.4	7.6	8.2	8.6

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

TEST REPORT

FILE No.:457/22

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268256	268257	268258
Date Sampled:	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022
Sample Description:	Water – MW5B3 – 12:20	Water – MW5B4 – 12:30	Water – GW4 – 11:30
Field No.:	17	18	19
TEST RESULTS:			
pH*	7.4	7.3	7.5
Conductivity (µS/cm)	609	434	799
Sulfate as SO_4^{2-} (mg/L)	4.5	3.7	28
Chloride as Cl^- (mg/L)	36	20	130
Calcium (mg/L)	73	71	60
Iron (mg/L)	0.02	0.07	0.11
Potassium (mg/L)	2.6	2.2	3.5
Magnesium (mg/L)	9.6	6.9	17
Sodium (mg/L)	19	15	75
Phosphorus (mg/L)*	0.06	0.04	0.03
Total Phosphorus (mg/L)*	0.09	0.07	0.05
Ammonia – N (mg/L)*	< 0.01	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268256	268257	268258
Date Sampled:	30/05/2022	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022	06/06/2022
Date Tested:	06/06/2022	to	28/07/2022
Sample Description:	Water – MW5B3 - 12:20	Water – MW5B4 – 12:30	Water – GW4 – 11:30
Field No.:	17	18	19

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	201	184	197
ORP (mv)^	272	261	237
Nitrite -N (mg/L)*	< 0.01	< 0.01	< 0.01
Nitrate -N (mg/L)*	0.01	0.10	0.03
TKN (mg/L)^	0.05	0.08	< 0.01
Total Nitrogen (mg/L)^	0.06	0.18	0.03
Dissolved Oxygen (mg/L) ^	8.7	7.9	8.1

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boralconcrete.com

TEST REPORT

CLIENT: Dunmore Sand & Soil Pty Ltd (Dunmore)

FILE No.:457/22

PROJECT: Testing of Groundwater samples from Dunmore Sand & Soil for the month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 4500 H^+ B - pH Value - Electrometric Method
APHA 2510 B - Conductivity - Laboratory Method
APHA 4500 SO_4^{2-} C - Sulfate - Gravimetric Method with Ignition of Residue
APHA 4500 Cl^- D - Chloride - Potentiometric Method
APHA 3120 B - Metals - Inductively Coupled Plasma (ICP) Method
APHA 4500 NH_3 D - Ammonia - Selective Electrode Method
APHA 4500 P Method B & D - Phosphorus - Stannous Chloride Method

Laboratory Sample No.:	268250 Duplicate	268258 Duplicate
Date Sampled:	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022
Date Tested:	06/06/2022 to 28/07/2022	
Sample Description:	Water – DG21 – 09:40	Water – GW4 – 11:30
Field No.:	11	19

TEST RESULTS:

pH*	6.6	7.5
Conductivity (µS/cm)	918	800
Sulfate as SO_4^{2-} (mg/L)	64	28
Chloride as Cl^- (mg/L)	115	132
Calcium (mg/L)	48	61
Iron (mg/L)	0.20	0.10
Potassium (mg/L)	1.8	3.4
Magnesium (mg/L)	16	17
Sodium (mg/L)	119	76
Phosphorus (mg/L)*	0.25	0.04
Total Phosphorus (mg/L)*	0.31	0.05
Ammonia – N (mg/L)*	< 0.01	< 0.01

NOTE: * Sample has not met the specified holding time indicated by the test method.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Boral Construction Materials
Materials Technical Services

Unit 4, 3-5 Gibbon Road
Baulkham Hills NSW 2153 Australia
PO Box 400, Winston Hills NSW 2153

T: +61 (02) 9624 9900
F: +61 (02) 9624 9999

www.boral.com.au

Test Report

CLIENT: DUNMORE SAND & SOIL PTY LTD

FILE No.: 457/22

PROJECT: Testing of Groundwater Samples from Dunmore Sand & Soil for the Month of May 2022.

REQUEST No.:99905

TEST PROCEDURE: APHA 2320 B - Alkalinity -Titration Method.
APHA 2580 B – Oxidation-Reduction Potential in Clean water
APHA 4500 - N_{org} B/D - Organic Nitrogen Ammonia Macro-Kjeldahl and Selective Electrode Method
APHA 4500 NO_2^- B - Nitrite - Colorimetric Method
APHA 4500 NO_3^- D - Nitrate Electrode Method
APHA 4500-O G- Membrane-Electrode Method

Laboratory Sample No.:	268250 Duplicate	268258 Duplicate
Date Sampled:	30/05/2022	30/05/2022
Date Received:	06/06/2022	06/06/2022
Date Tested:	06/06/2022 to	28/07/2022
Sample Description:	Water – DG21 - 09:40	Water – GW4– 11:30
Field No.:	11	19

TEST RESULTS

Bicarbonate Alkalinity as $CaCO_3$ (mg/ /L)^	196	186
ORP (mv)^	326	236
Nitrite -N (mg/L)*	0.06	< 0.01
Nitrate -N (mg/L)*	0.21	0.03
TKN (mg/L)^	0.20	< 0.01
Total Nitrogen (mg/L)^	0.47	0.03
Dissolved Oxygen (mg/L) ^	7.9	8.2

NOTE:
* Sample has not met the specified holding time indicated by the test method.
^Test method is not in the current scope of NATA Accreditation for the Boral MTS Laboratory.

Samples submitted by the Client.

Ben Williams, Rod Johnson, Sharon Makin, Nadine Nasser, Mat. File, File.

Nanthini Selvadurai

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1162363-A [R00]	**Page**	1/2
Client	Boral Material Technical Services	**Registering Laboratory**	Sydney
Contact	Muans Abdulnebe	**Contact**	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	**Address**	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	**Telephone**	1300 703 166
Order Number	6544334	**Date Samples Received**	09/06/2022
Job Description	Water - Site: Dunmore Sand & Soil	**Date Analysis Commenced**	09/06/2022
Client Job Reference	---	**Issue Date**	12/06/2022
No. of Samples Registered	21 | Sampler: Customer	**Receipt Temperature (°C)**	10
Priority	Normal	**Storage Temperature (°C)**	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous revision with this reference. This document must not be reproduced, except in full. If samples were provided by the customer, results apply only to the samples 'as received' and responsibility for representative sampling rests with the customer. Results are reported on as 'as is' basis unless otherwise indicated in the 'Report Comments' section. Measurement Uncertainty is available upon request. If the laboratory was authorised to conduct testing on samples received outside of the specified conditions, all test results may be impacted. Details of samples received outside of the specified conditions are mentioned in the sample description section of this test report.

Definitions

| <: Less Than | >: Greater Than | RP: Result Pending | ~: Estimated | MPN: Most Probable Number | CFU: Colony Forming Units | ---: Not Received/Not Requested | | ^ Subcontracted Analysis| NA:Not Applicable| [NT]:Not Tested| LOR:Limit of Reporting| TBA:To Be Advised| ND:Not Detected| * Test not covered by NATA scope of accreditation | # Result derived from a calculation and includes results equal to or greater than the LOR | IH: Inconsistent results possibly caused by sample homogeneity

Authorised By

Name	Position	Accreditation Category
Laurel Mak	Laboratory Manager – Microbiology	Environmental and Food Microbiology
Melissa Gan	Laboratory Manager – Microbiology	Environmental and Food Microbiology

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1162363-A/1	Sample Date:2022-05-30 15:00; LSN 268240-WATER-DG1S	
S1162363-A/2	Sample Date:2022-05-30 09:50; LSN 268241-WATER-DG7	
S1162363-A/3	Sample Date:2022-05-30 09:30; LSN 268242-WATER-DG31S	
S1162363-A/4	Sample Date:2022-05-30 09:10; LSN 268243-WATER-DG35	
S1162363-A/5	Sample Date:2022-05-30 09:00; LSN 268244-WATER-DG36	
S1162363-A/6	Sample Date:2022-05-30 14:05; LSN 268245-WATER-DG5S	
S1162363-A/7	Sample Date:2022-05-30 14:10; LSN 268246-WATER-DG5D	
S1162363-A/8	Sample Date:2022-05-30 14:20; LSN 268247-WATER-DG6S	
S1162363-A/9	Sample Date:2022-05-30 14:30; LSN 268248-WATER-DG6D	
S1162363-A/10	Sample Date:2022-05-30 08:40; LSN 268249-WATER-DG17	
S1162363-A/11	Sample Date:2022-05-30 09:40; LSN 268250-WATER-DG21	
S1162363-A/12	Sample Date:2022-05-30 09:40; LSN 268250-WATER-DG21	
S1162363-A/13	Sample Date:2022-05-30 12:50; LSN 268251-WATER-MW5A1	
S1162363-A/14	Sample Date:2022-05-30 13:00; LSN 268252-WATER-MW5A3	
S1162363-A/15	Sample Date:2022-05-30 11:50; LSN 268253-WATER-MW5B1	
S1162363-A/16	Sample Date:2022-05-30 12:05; LSN 268254-WATER-MW5B2S	
S1162363-A/17	Sample Date:2022-05-30 12:00; LSN 268255-WATER-MW5B2D	
S1162363-A/18	Sample Date:2022-05-30 12:20; LSN 268256-WATER-MW5B3	
S1162363-A/19	Sample Date:2022-05-30 12:30; LSN 268257-WATER-MW5B4	
S1162363-A/20	Sample Date:2022-05-30 11:30; LSN 268258-WATER-GW4	
S1162363-A/21	Sample Date:2022-05-30 11:30; LSN 268258-WATER-GW4	

Client	Boral Material Technical Services	Certificate Number	S1162363-A [R00]
Page	2/2		

Analytical Results

Compound/Analyte	Method	LOR	Units	S1162363-A/1	S1162363-A/2	S1162363-A/3	S1162363-A/4	S1162363-A/5
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	2	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	2	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1162363-A/6	S1162363-A/7	S1162363-A/8	S1162363-A/9	S1162363-A/10
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	13	<1	<1	<1
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1162363-A/11	S1162363-A/12	S1162363-A/13	S1162363-A/14	S1162363-A/15
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	240
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1162363-A/16	S1162363-A/17	S1162363-A/18	S1162363-A/19	S1162363-A/20
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	4
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1	<1	<1	<1	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1	<1	<1	<1	<1

Compound/Analyte	Method	LOR	Units	S1162363-A/21
Thermotolerant Coliforms	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	2
Escherichia coli	M8.5 - AS/NZS 4276.7	1	CFU/100 mL	<1
Intestinal Enterococci	M23.4 - AS 4276.9	1	CFU/100 mL	<1

Analysis Location

The following analysis was completed by Symbio Laboratories - Brisbane: M23_4.
The following analysis was completed by Symbio Laboratories - Sydney: M8_5.

Symbio LABORATORIES

CERTIFICATE OF ANALYSIS

Symbio LABORATORIES Proudly AUSTRALIAN

ABN: 82 079 645 015

Certificate Number	S1162363-B [R00]	**Page**	1/2
Client	Boral Material Technical Services	**Registering Laboratory**	Sydney
Contact	Muans Abdulnebe	**Contact**	Customer Service Team
Address	Unit 4, 3-5 Gibbon Rd Winston Hills NSW 2153	**Address**	2 Sirius Rd, Lane Cove West, NSW 2066
		Email	admin@symbiolabs.com.au
Telephone	02 9624 9917	**Telephone**	1300 703 166
Order Number	6544334	**Date Samples Received**	10/06/2022
Job Description	Water -Site: Dunmore Sand & Soil	**Date Analysis Commenced**	10/06/2022
Client Job Reference	---	**Issue Date**	16/06/2022
No. of Samples Registered	21 | Sampler: Customer	**Receipt Temperature (°C)**	6
Priority	Normal	**Storage Temperature (°C)**	4

NATA

Accreditation No: 2455
Accredited for compliance with ISO/IEC 17025 - Testing

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Authorised By

Name	Position	Accreditation Category
Glen Rangott	Environmental Laboratory Manager, Brisbane	Environmental Chemistry

Sample Information - *Client/Sampler Supplied*

Sample ID	Sample Description	Remarks
S1162363-B/1	Sample Date:2022-05-30 15:00; LSN 268240 - Water - DG15	
S1162363-B/2	Sample Date:2022-05-30 09:50; LSN 268241 - Water - DG7	
S1162363-B/3	Sample Date:2022-05-30 09:30; LSN 268242 - Water - DG315	
S1162363-B/4	Sample Date:2022-05-30 09:10; LSN 268243 - Water - DG35	
S1162363-B/5	Sample Date:2022-05-30 09:00; LSN 268244 - Water - DG36	
S1162363-B/6	Sample Date:2022-05-30 14:05; LSN 268245 - Water - DG5S	
S1162363-B/7	Sample Date:2022-05-30 14:10; LSN 268246 - Water - DG5D	
S1162363-B/8	Sample Date:2022-05-30 14:20; LSN 268247 - Water - DG6S	
S1162363-B/9	Sample Date:2022-05-30 14:30; LSN 268248 - Water - DG6D	
S1162363-B/10	Sample Date:2022-05-30 08:40; LSN 268249 - Water - DG17	
S1162363-B/11	Sample Date:2022-05-30 09:40; LSN 268250 - Water - DG21	
S1162363-B/12	Sample Date:2022-05-30 09:40; LSN 268250 - Water - DG21	
S1162363-B/13	Sample Date:2022-05-30 12:50; LSN 268251 - Water - MW5A1	
S1162363-B/14	Sample Date:2022-05-30 13:00; LSN 268252 - Water - MW5A3	
S1162363-B/15	Sample Date:2022-05-30 11:50; LSN 268253 - Water - MW5B1	
S1162363-B/16	Sample Date:2022-05-30 12:05; LSN 268254 - Water - MW5B2S	
S1162363-B/17	Sample Date:2022-05-30 12:00; LSN 268255 - Water - MW5B2D	
S1162363-B/18	Sample Date:2022-05-30 12:20; LSN 268256 - Water - MW5B3	
S1162363-B/19	Sample Date:2022-05-30 12:30; LSN 268257 - Water - MW5B4	
S1162363-B/20	Sample Date:2022-05-30 11:30; LSN 268258 - Water - GW4	
S1162363-B/21	Sample Date:2022-05-30 11:30; LSN 268258 - Water - GW4	

Analytical Results

Compound/Analyte	Method	LOR	Units	S1162363-B/1	S1162363-B/2	S1162363-B/3	S1162363-B/4	S1162363-B/5
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2	0.5	0.07	0.1	0.4

Compound/Analyte	Method	LOR	Units	S1162363-B/6	S1162363-B/7	S1162363-B/8	S1162363-B/9	S1162363-B/10
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.2	1.74	1.56	1.02	0.68

Compound/Analyte	Method	LOR	Units	S1162363-B/11	S1162363-B/12	S1162363-B/13	S1162363-B/14	S1162363-B/15
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.08	0.06	<0.05	0.2	<0.05

Compound/Analyte	Method	LOR	Units	S1162363-B/16	S1162363-B/17	S1162363-B/18	S1162363-B/19	S1162363-B/20
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.1	0.1	0.2	0.2	0.1

Compound/Analyte	Method	LOR	Units	S1162363-B/21
Fluoride	ENV002 - Anions by IC	0.05	mg/L	0.1

Analysis Location

All in-house analysis was completed by Symbio Laboratories - Brisbane.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX D: RPD TABLES

August 2021 round

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	**DG31S**	**257752 Dup**	
pH	6.9	6.8	1.5
Conductivity (µS/cm)	1171	1172	0.1
Sulfate (mg/L)	193	196	1.5
Chloride (mg/L)	128	127	0.8
Calcium (mg/L)	31	31	0.0
Iron (mg/L)	0.08	0.07	13.3
Potassium(mg/L)	6.8	6.7	1.5
Magnesium(mg/L)	5.6	5.5	1.8
Soduim(mg/L)	40	40	0.0
Phosphorus(mg/L)	0.01	0.01	0.0
Total Phosphorus(mg/L)	0.08	0.08	0.0
Ammonia -N (mg/L)	0.12	0.13	8.0
Bicarbonate Alkalinity(mg/L)	117	48	83.6
ORP (mv)	477	478	0.2
Nitrite - N(mg/L)	< 0.01	< 0.01	NC
Nitrate - N(mg/L)	0.42	0.4	4.9
TKN(mg/L)	0.41	0.4	2.5
Total Nitrogen(mg/L)	0.83	0.8	3.7
Fluoride (mg/L)*	< 0.05	< 0.05	NC
Dissolved Oxygen(mg/L)*	7.6	7.6	0.0
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	**MW5A3**	**257763 Dup**	
pH	6.9	6.9	0.0
Conductivity (µS/cm)	1234	1238	0.3
Sulfate (mg/L)	6.6	6.6	0.0
Chloride (mg/L)	294	294	0.0
Calcium (mg/L)	24	24	0.0
Iron (mg/L)	3	2.9	3.4
Potassium(mg/L)	9.3	9.1	2.2
Magnesium(mg/L)	3.2	2.9	9.8
Soduim(mg/L)	51	49	4.0
Phosphorus(mg/L)	0.13	0.13	0.0
Total Phosphorus(mg/L)	0.21	0.21	0.0
Ammonia -N (mg/L)	0.5	0.51	2.0
Bicarbonate Alkalinity(mg/L)	146	33	126.3
ORP (mv)	457	456	0.2
Nitrite - N(mg/L)	< 0.01	0.01	NC
Nitrate - N(mg/L)	0.09	0.09	0.0
TKN(mg/L)	0.2	0.2	0.0
Total Nitrogen(mg/L)	0.28	0.3	6.9
Fluoride (mg/L)*	0.1	0.09	10.5
Dissolved Oxygen(mg/L)*	8	8	0.0
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Notes:

1. results are expressed in mg/L;
2. RPD - Relative Percentage Difference;
3. NC - RPD not calculable due to non-detect values
4. values above the guidelines are **bolded**

Acceptable RPDs for each LOR multiplier range are: 80 (5-10 x LOR); 50 (10-30 x LOR); 30 (> 30 x LOR)

Highest concentration < 5 x LOR = PASS

RPD exceeds acceptable limits

November 2021 round

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	DG35	261096 Dup	
pH	6.5	6.6	1.5
Conductivity (µS/cm)	1107	1112	0.5
Sulfate (mg/L)	257	252	2.0
Chloride (mg/L)	58	58	0.0
Calcium (mg/L)	42	42	0.0
Iron (mg/L)	0.3	0.28	6.9
Potassium(mg/L)	10	9.9	1.0
Magnesium(mg/L)	20	19	5.1
Soduim(mg/L)	46	45	2.2
Phosphorus(mg/L)	0.01	0.01	0.0
Total Phosphorus(mg/L)	0.52	0.53	1.9
Ammonia -N (mg/L)	0.69	0.69	0.0
Bicarbonate Alkalinity(mg/L)	259	255	1.6
ORP (mv)	289	285	1.4
Nitrite - N(mg/L)	< 0.01	< 0.01	NC
Nitrate - N(mg/L)	0.44	0.44	0.0
TKN(mg/L)	0.96	0.93	3.2
Total Nitrogen(mg/L)	1.4	1.37	2.2
Fluoride (mg/L)*	0.09	0.1	10.5
Dissolved Oxygen(mg/L)*	6.9	7	1.4
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	MW5B1	2601107 Dup	
pH	6.8	6.8	0.0
Conductivity (µS/cm)	258	264	2.3
Sulfate (mg/L)	15	15	0.0
Chloride (mg/L)	22	22	0.0
Calcium (mg/L)	22	22	0.0
Iron (mg/L)	0.1	0.1	0.0
Potassium(mg/L)	6.6	6.6	0.0
Magnesium(mg/L)	3.3	3.3	0.0
Soduim(mg/L)	12	12	0.0
Phosphorus(mg/L)	0.05	0.05	0.0
Total Phosphorus(mg/L)	0.06	0.07	15.4
Ammonia -N (mg/L)	< 0.01	< 0.01	NC
Bicarbonate Alkalinity(mg/L)	79	84	6.1
ORP (mv)	338	340	0.6
Nitrite - N(mg/L)	< 0.01	< 0.01	NC
Nitrate - N(mg/L)	1.25	1.24	0.8
TKN(mg/L)	< 0.01	< 0.01	NC
Total Nitrogen(mg/L)	1.25	1.24	0.8
Fluoride (mg/L)*	< 0.05	0.05	NC
Dissolved Oxygen(mg/L)*	7.8	7.8	0.0
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Notes:

1. results are expressed in mg/L;
2. RPD - Relative Percentage Difference;
3. NC - RPD not calculable due to non-detect values
4. values above the guidelines are **bolded**

Acceptable RPDs for each LOR multiplier range are: 80 (5-10 x LOR); 50 (10-30 x LOR); 30 (> 30 x LOR)

Highest concentration < 5 x LOR = PASS

RPD exceeds acceptable limits

February 2022 round

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	DG36	263813 Dup	
pH	7	7	0.0
Conductivity (µS/cm)	990	995	0.5
Sulfate (mg/L)	98	99	1.0
Chloride (mg/L)	83	85	2.4
Calcium (mg/L)	42	41	2.4
Iron (mg/L)	0.09	0.09	0.0
Potassium(mg/L)	19	19	0.0
Magnesium(mg/L)	26	26	0.0
Soduim(mg/L)	87	88	1.1
Phosphorus(mg/L)	<0.01	<0.01	NC
Total Phosphorus(mg/L)	0.02	0.02	0.0
Ammonia -N (mg/L)	0.01	0.01	0.0
Bicarbonate Alkalinity(mg/L)	284	293	3.1
ORP (mv)	441	438	0.7
Nitrite - N(mg/L)	0.01	0.01	0.0
Nitrate - N(mg/L)	<0.01	<0.01	NC
TKN(mg/L)	<0.01	<0.01	NC
Total Nitrogen(mg/L)	0.01	0.01	0.0
Fluoride (mg/L)*	7.8	7.9	1.3
Dissolved Oxygen(mg/L)*	0.4	0.4	0.0
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	MW5B2S	263824 Dup	
pH	7.1	7	1.42
Conductivity (µS/cm)	844	843	0.1
Sulfate (mg/L)	46	47	2.2
Chloride (mg/L)	58	82	34.3
Calcium (mg/L)	65	72	10.2
Iron (mg/L)	2.5	2.5	0.0
Potassium(mg/L)	6.1	6.2	1.6
Magnesium(mg/L)	12	12	0.0
Soduim(mg/L)	50	50	0.0
Phosphorus(mg/L)	0.08	0.08	0.0
Total Phosphorus(mg/L)	0.13	0.13	0.0
Ammonia -N (mg/L)	0.01	0.01	0.0
Bicarbonate Alkalinity(mg/L)	276	272	1.5
ORP (mv)	438	437	0.2
Nitrite - N(mg/L)	<0.01	<0.01	NC
Nitrate - N(mg/L)	0.1	0.1	0.0
TKN(mg/L)	<0.01	<0.01	NC
Total Nitrogen(mg/L)	0.1	0.1	0.0
Fluoride (mg/L)*	7.7	7.8	1.3
Dissolved Oxygen(mg/L)*	0.1	0.1	0.0
E.Coli (MPN/100mL)*	<1	1	NC
Faecal Coliforms(MPN/100mL)*	<1	1	NC
Enterococci(MPN/100mL)*	18	20	10.5

Notes:

1. results are expressed in mg/L;
2. RPD - Relative Percentage Difference;
3. NC - RPD not calculable due to non-detect values
4. values above the guidelines are **bolded**

Acceptable RPDs for each LOR multiplier range are: 80 (5-10 x LOR); 50 (10-30 x LOR); 30 (> 30 x LOR)

Highest concentration < 5 x LOR = PASS

RPD exceeds acceptable limits

May 2022 Round

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	DG21	268250 Dup	
pH	6.6	6.6	0.00
Conductivity (µS/cm)	919	918	0.1
Sulfate (mg/L)	63	64	1.6
Chloride (mg/L)	114	115	0.9
Calcium (mg/L)	45	48	NC
Iron (mg/L)	0.18	0.2	10.5
Potassium(mg/L)	1.7	1.8	5.7
Magnesium(mg/L)	16	16	0.0
Soduim(mg/L)	117	119	1.7
Phosphorus(mg/L)	0.25	0.25	0.0
Total Phosphorus(mg/L)	0.31	0.31	0.0
Ammonia -N (mg/L)	< 0.01	< 0.01	NC
Bicarbonate Alkalinity(mg/L)	192	196	2.1
ORP (mv)	332	326	1.8
Nitrite - N(mg/L)	0.06	0.06	0.0
Nitrate - N(mg/L)	0.22	0.21	4.7
TKN(mg/L)	0.21	0.2	4.9
Total Nitrogen(mg/L)	0.49	0.47	4.2
Fluoride (mg/L)*	7.9	7.9	0.0
Dissolved Oxygen(mg/L)*	0.08	0.06	28.6
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	<1	<1	NC
Enterococci(MPN/100mL)*	<1	<1	NC

Sample ID:	Primary	Duplicate	RPD (%)
Analyte	GW4	268258 Dup	
pH	7.5	7.5	0.00
Conductivity (µS/cm)	799	800	0.1
Sulfate (mg/L)	28	28	0.0
Chloride (mg/L)	130	132	1.5
Calcium (mg/L)	60	61	NC
Iron (mg/L)	0.11	0.1	9.5
Potassium(mg/L)	3.5	3.4	2.9
Magnesium(mg/L)	17	17	0.0
Soduim(mg/L)	75	76	1.3
Phosphorus(mg/L)	0.03	0.04	28.6
Total Phosphorus(mg/L)	0.05	0.05	0.0
Ammonia -N (mg/L)	< 0.01	< 0.01	NC
Bicarbonate Alkalinity(mg/L)	197	186	5.7
ORP (mv)	237	236	0.4
Nitrite - N(mg/L)	< 0.01	< 0.01	NC
Nitrate - N(mg/L)	0.03	0.03	0.0
TKN(mg/L)	< 0.01	< 0.01	NC
Total Nitrogen(mg/L)	0.03	0.03	0.0
Fluoride (mg/L)*	8.1	8.2	1.2
Dissolved Oxygen(mg/L)*	0.1	0.1	0.0
E.Coli (MPN/100mL)*	<1	<1	NC
Faecal Coliforms(MPN/100mL)*	4	2	66.7
Enterococci(MPN/100mL)*	<1	<1	NC

Notes:

1. results are expressed in mg/L;
2. RPD - Relative Percentage Difference;
3. NC - RPD not calculable due to non-detect values
4. values above the guidelines are **bolded**

Acceptable RPDs for each LOR multiplier range are: 80 (5-10 x LOR); 50 (10-30 x LOR); 30 (> 30 x LOR)

Highest concentration < 5 x LOR = PASS

RPD exceeds acceptable limits