MALABAR

Maxwell Underground Project

Environmental Monitoring Data

Quarter 2 2022

INTRODUCTION

This report has been compiled to present environmental monitoring data for the Maxwell Underground Coal Mine Project (the project) in accordance with:

- Schedule 2, Condition E17 (a) (vii) of SSD-9526; and
- Condition 5 of EPBC 2018/8287. Specifically this requires the inclusion of hydrographs for all monitoring bores and an explanation of what the data means in relation to the groundwater performance measures specified in the State development consent (SSD 9526).

This report covers the reporting period 1 April to 30 June 2022. Summaries of historic environmental monitoring data (prior to this report) can be found on the Malabar Resources website.

MONITORING RESULTS

Deposited dust monitoring results are provided in **Table 1**.

Continuous TEOM PM_{10} monitoring results are provided in **Figure 1**.

Continuous TEOM $PM_{2.5}$ monitoring results are provided in **Figure 1**.

Mine storage surface water quality monitoring results are provided in **Table 2**.

Downstream surface water quality monitoring results are provided in **Table 3**.

Surface water quality field measurements from Saddlers Creek are compared to trigger levels in **Table 4**.

Surface water quality laboratory results from Saddlers Creek are compared to trigger levels in **Table 5**.

Groundwater quality results for Maxwell Infrastructure bores are provided in **Table 6**.

Groundwater quality results for Maxwell Underground bores are provided in **Table 7**.

Groundwater level results are provided in **Table 8**.

Noise monitoring results are provided from **Table 9** to **Table 18**.

Locations of monitoring sites are shown in **Appendix 1** to **Appendix 4**.

The Consultant hydrogeologist report providing the requirements of Condition 5 of EPBC 2018/8287, inclusive of hydrographs for all monitoring bores, and an explanation of the data relative to the groundwater performance measures in SSD 9526, is provided in **Appendix 5**.

Table 1: Deposited dust monitoring results for Quarter 2 2022.

Gauge	Insoluble Solids Result ($g/m^2/month$)			Annual Mean Limit ($g/m^2/month$)	Rolling Annual Average to end of June 2022 ($g/m^2/month$)
	April	May	June		
2175	1.3	1.2	1.3	4	***1.7***
2230	3.8	0.9	1.3	4	***2.6***
2235	1.8	1.2	1.2	4	***2.1***
2247	2.0	0.8	1.2	4	***1.5***

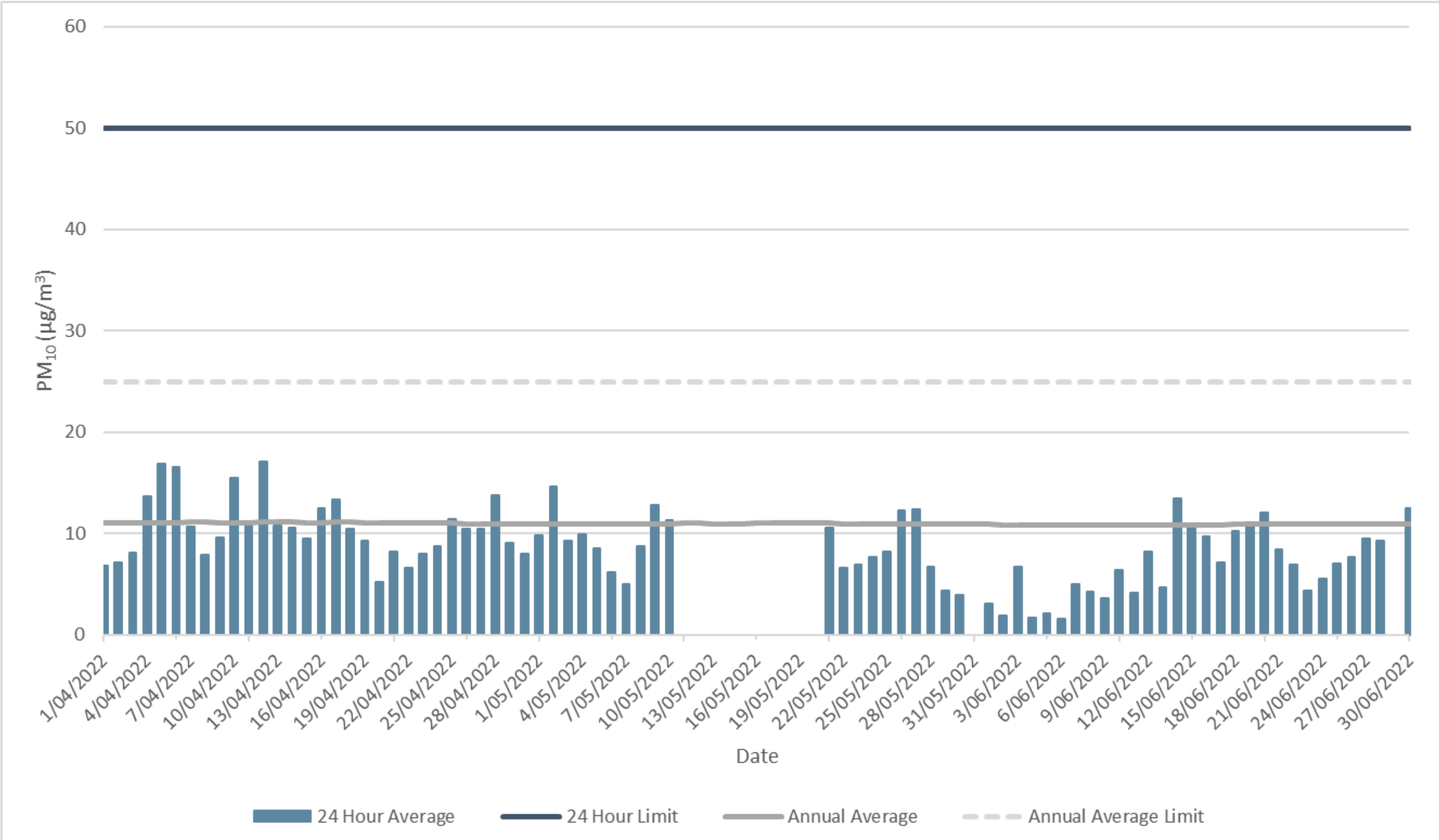

Figure 1: TEOM-1 PM_{10} monitoring results for Quarter 2 2022.

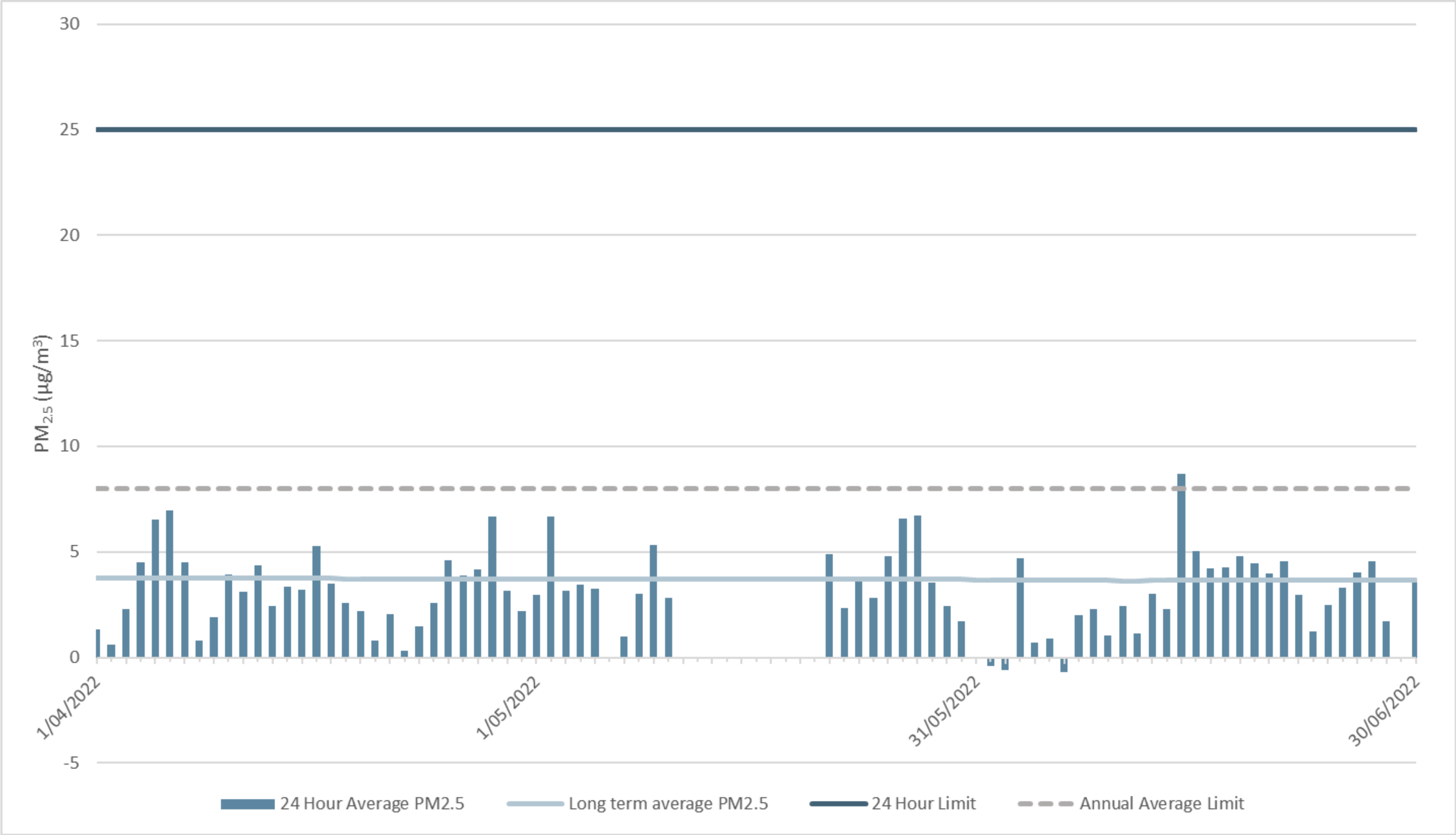

Figure 2: TEOM-1 $PM_{2.5}$ monitoring results for Quarter 2 2022.

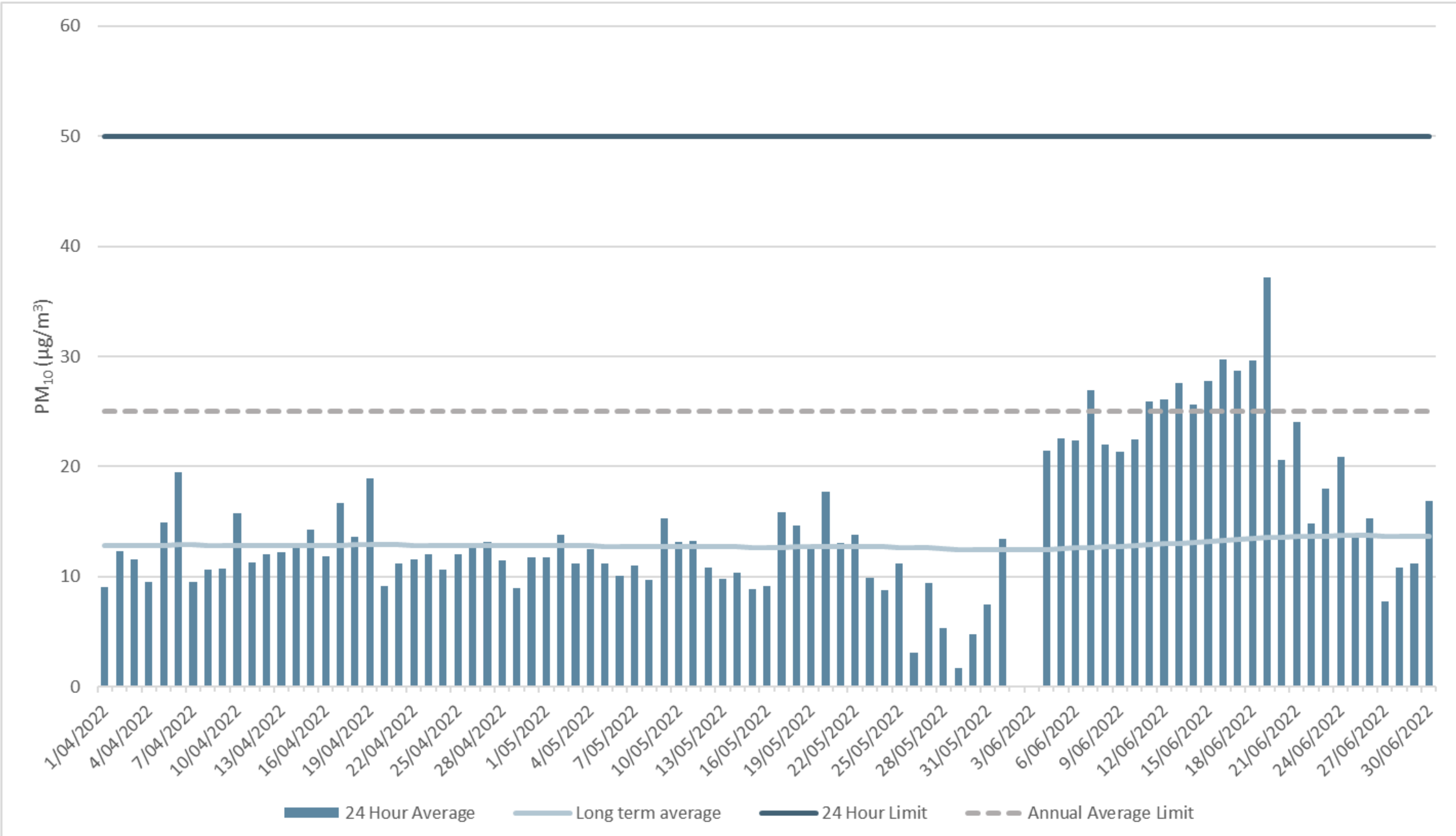

Figure 3: TEOM-2 PM_{10} monitoring results for Quarter 2 2022.

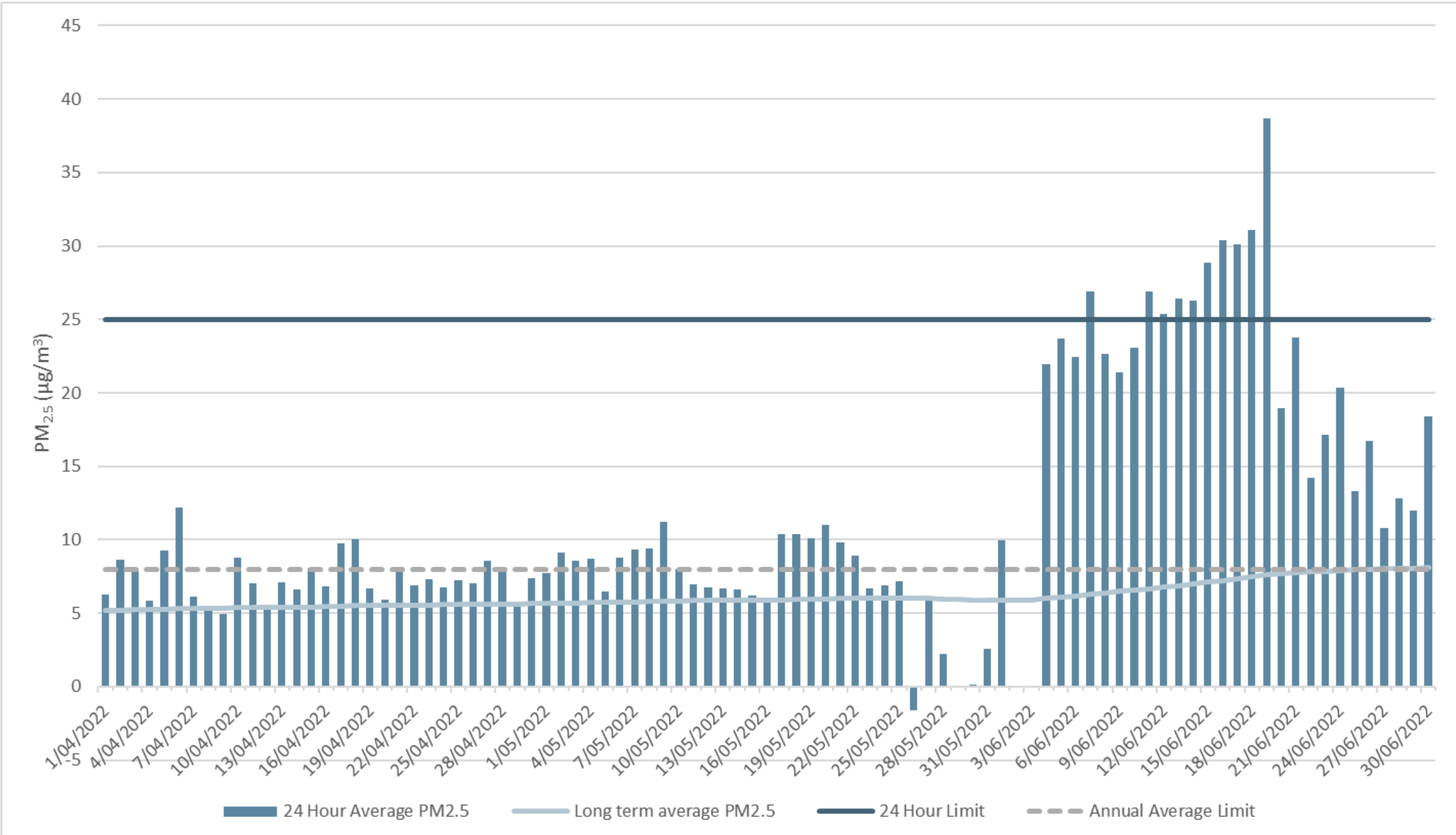

Figure 4: TEOM-2 $PM_{2.5}$ monitoring results for Quarter 2 2022.

Notes:

- Monitoring of PM_{10} and $PM_{2.5}$ commenced at TEOM-2 on 12 December 2021.
- All 24-hour averages during Quarter 2 2022 were below the 24-hour criteria for both PM_{10} and $PM_{2.5}$ at both TEOM-1 and TEOM-2. The results of the investigations into any exceedances of the criteria (if required) are provided in the Annual Review.
- The rolling annual averages remained very low during the reporting period, which reflects lower recorded concentrations following the significant rainfall for the year to date with the resultant higher vegetation cover locally and across regional NSW. Levels are much lower than those experienced in 2019 and early 2020, which were predominantly due to regional dust storms and bush fires.
- Gaps in data are due to maintenance and scheduled calibration by monitoring contractor, plus occasionally power cuts and equipment failure. Note that values close to zero may appear as gaps in data in the graphs.
- As a result of actual gaps in data resulting from events such as maintenance and scheduled calibration, the TEOM-generated rolling 24-hour average value is reported by the TEOM as zero (ie invalid). In accordance with Malabar's data validation process, where such events result in >75% valid 1-hour data during the 24-hour period midnight to midnight, this 1-hour data is used to manually calculate the 24-hour average. This process has been applied from Q1 2022. Prior to this the raw data from the TEOM has been presented.
- TEOM-1 (CHP TEOM) exhibited zero and then negative concentrations from 11/05/22 09:10 to 19/05/22 14:55 following the scheduled quarterly calibration on 11 May 2022. The issue was fixed by the monitoring contractor on 19 May 2022.
- TEOM-2 (Plashett TEOM) exhibited periods during June where the PM2.5 concentration was higher than the PM10 concentration, following scheduled maintenance on 2 June 2022. This was deemed due to an electrical fault with the circuit board, plus some flow leaks causing negative concentrations. As a result the instrument was replaced with a hire unit in August with the original unit sent for repair in the US; further detail will be provided in the Q3 report.

Table 2. All mine water storage monitoring locations: laboratory water quality monitoring results for Quarter 2 2022 (year to date average shown). See notes for further details.

Site	Month	Bicarbonate ($CaCO_3$) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO_4) (mg/L)	TSS (mg/L)	TDS (mg/L)
Access Rd Dam (2081)	Jun	103	277	624	5400	382	8.2	52	499	2700	5.0	4760
	Average	91	308	615	5443	401	7.9	53	515	2538	9.0	5088
DC2 Dam (2109)	Jun	272	156	1230	8260	358	7.0	11	1400	2940	14	6390
	Average	**109**	**74**	**524**	**3455**	**140**	**7.0**	***7.5***	**552**	**1079.5**	**15.3**	**2614**
Rail Loop Dam (2114)	Jun	227	211	524	4280	258	8.0	16	459	1880	7.0	3440
	Average	**161**	**128**	**246**	**2308**	**125**	**7.8**	**9.3**	**234**	**862**	**7.8**	**1797**
Industrial Dam (1969)	Jun	106	155	345	3070	193	8.1	25	273	1380	5.0	2420
	Average	**100**	**185**	**343**	**3168**	**204**	**8.2**	**26**	**296**	**1287**	**5.3**	**2703**
OPC Dam	Jun	136	73	106	1180	63	8.7	7.0	94	381	34	876
	Average	**111**	**64**	**68**	**936**	**48**	**8.6**	**5.0**	**70**	**282**	**15**	**690**
V Notch	Jun	346	514	1230	9350	431	7.9	12	1460	4100	5.0	8200
	Average	**292**	**404**	**1250**	**8818**	**383**	**7.8**	**13**	**1406**	**3015**	**5.8**	**7568**
ES Void	Jun	232	561	778	7070	585	8.0	76	624	3860	6.0	7070
	Average	**237**	**541**	**778**	**7410**	**565**	**7.9**	**75**	**616**	**3695**	**5.3**	**6555**

Notes:

The year-to-date value consists of an average of the quarterly sample for the current quarter plus the three previous quarters, as per the Water Management Plan. The exceptions are for the V Notch dam, where samples are taken monthly as is required by the EPL and for the ES Void where monthly samples were also taken in October and November 2021 to inform the design of the water treatment plant for the underground project and hence are included here for completeness.

Table 2 excludes mine water storages yet to be constructed (MEA dam, Mine Water Dam, Treated Water Dam, MEA Sedimentation Dam).

Table 3. All downstream surface water monitoring locations: laboratory surface water quality scheduled monitoring results for Quarter 2 2022 compared to year-to-date averages (Q3 2021–Q2 2022). See notes for further details.

Site	Month	Antimony	Arsenic	Bicarbonate ($CaCO_3$)	Calcium	Chloride	EC	Magnesium	Molybdenum	Potassium	Selenium	Sodium	Sulphate (SO_4)	TSS	TDS	Turbidity
Saddlers U/S	Apr	0.0010	0.0010	233	100	336	1910	76	0.0010	9.0	0.010	203	389	5.0	1470	6.4
	Average	**0.0010**	**0.0020**	**356**	**156**	**390**	**2315**	**119**	**0.0010**	**14**	**0.010**	**191**	**438**	**7.3**	**1710**	**4.3**
W3	Apr	Too low to sample														
	Average	**0.0010**	**0.0010**	**283**	**46**	**636**	**2418**	**109**	**0.0010**	**5.8**	**0.010**	**358**	**177**	**25**	**1697**	**45**
SW1/ Saddlers	Apr	0.0010	0.0010	582	106	1670	6220	158	0.0010	7.0	0.010	976	203	12	3590	19
	Average	**0.0010**	**0.0010**	**524**	**124**	**2211**	**6968**	**190**	**0.0011**	**7.0**	**0.010**	**1164**	**281**	**26**	**4602**	**53**
Saddlers D/S (W4-Bowfield)	Apr	0.0010	0.0010	344	42	591	2360	68	0.0010	8.0	0.010	368	138	5.0	1440	15
	Average	**0.0010**	**0.0010**	**415**	**52**	**1115**	**3999**	**116**	**0.0010**	**9.1**	**0.010**	**637**	**164**	**19**	**2408**	**26**
MEA D/S	Apr	0.0010	0.0010	41	6.0	11	107	3.0	0.0010	8.0	0.010	10	10	66	172	71
	Average	**0.0010**	**0.0010**	**57**	**8.5**	**12**	**146**	**4.3**	**0.0010**	**8.3**	**0.010**	**10**	**3.3**	**35**	**140**	**43**
Saltwater D/S	Apr	0.0010	0.0010	83	18	19	219	6.0	0.0010	22	0.010	10	10	22	213	39
	Average	**0.0010**	**0.0013**	**75**	**12**	**14**	**177**	**4.7**	**0.0010**	**13**	**0.010**	**12**	**7.0**	**205**	**180**	**98**
SW3	Apr	Dry														
	Average	**0.0010**	**0.0010**	**55**	**12**	**7**	**129**	**3.8**	**0.0010**	**11**	**0.010**	**4.4**	**7.0**	**72**	**171**	**115**
Transport and Services Corridor sediment dams	See notes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Notes:

In addition to quarterly scheduled sampling, the MUG Project Water Management Plan requires sampling and analysis following 25mm or more of rain over a 24-hour period (defined as midnight to midnight and as recorded at the Drayton South meteorological recording station (AWS-2)). The results from any such post-rainfall events have been included in the year-to-date averages.

The quarterly field measurements of pH, EC, redox potential and temperature are recorded to enable subsequent evaluation in case of need and are not included in the quarterly reporting.

The location of the Transport and Services Corridor sediment dams (eg SW2) are to be confirmed as they are yet to be constructed hence monitoring has not yet commenced.

All results are in mg/L except Conductivity (µS/cm), pH (in pH units) and turbidity (nephelometric turbidity units).

The following will be reported in the AEMR:

- Comparison of water quality results from Saddlers Creek against Water Quality Trigger Values
- Results from the automatic weather stations (AWS-1 and AWS-2)
- Results of the stream health monitoring.

Table 4. Surface water scheduled field measurements at sites along Saddlers Creek for Q4 2021 to Q2 2022 and comparison against trigger levels. If an exceedance of the trigger level occurs for three consecutive readings, this is highlighted in red.

Site		Field result								
		pH			EC			Turbidity		
	Units	pH			µS/cm			NTU		
	Trigger	6.5–8.5			7,600			64		
		Q4 2021	Q1 2022	Q2 2022	Q4 2021	Q1 2022	Q2 2022	Q4 2021	Q1 2022	Q2 2022
W3		Too low to sample	Dry	Too low to sample	Too low to sample	Dry	Too low to sample	Too low to sample	Dry	Too low to sample
Saddlers D/S (W4 – Bowfield)		7.9	8.1	8.3	3,630	7,910	2025	35	2.4	15.3
MEA D/S		8.4	6.5	7.9	279	156	118	26	6.7	62.2
Saddlers U/S		7.7	7.8	8.0	2,817	2,451	1706	5.7	2.4	6.1
Saltwater D/S		Dry	6.5	7.9	Dry	160	231	Dry	220	39.4
SW1/ Saddlers		7.8	7.6	8.0	17,840	1,350	5,160	3.4	7.9	19.4
SW2	Not yet operational	-	-		-	-		-	-	
SW3		Dry	Dry	Too low to sample	Dry	Dry	Too low to sample	Dry	Dry	Too low to sample

Notes

- Any exceedances of trigger values will only be investigated if they occur after construction commences.

- Turbidity results presented are laboratory results; from Q2 2022, a field meter has been used to determine turbidity; this will enable direct comparison against the field trigger values for turbidity.
- Trigger for turbidity calculated by WRM Water based on the 80th percentile of the entire laboratory NTU dataset to end of 2021.

Table 5. Surface water laboratory results at sites along Saddlers Creek (scheduled and post-rainfall sampling) from Q4 2021 to Q2 2022 and comparison against trigger levels. If an exceedance of the trigger level occurs for three consecutive readings, this is highlighted in red.

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9[c]	13[c]	24 [b] [c]	[a]	[a]	[a]	[a]	34[c]	[a]	11[c]	[a]	[a]	50	4900
W3	27/10/21	Scheduled	Too low to sample													
	12/11/21	Rainfall	0.0010	0.0010	0.0010	66	10	103	17	0.0010	7.0	0.010	62	41	17	406
	22/11/21	Rainfall	0.0010	0.0010	0.0010	187	22	284	44	0.0010	6.0	0.010	160	93	30	925
	10/12/21	Rainfall	Too low to sample													
	8/1/22	Rainfall	Too low to sample													
	27/1/22	Scheduled	Dry													
	6/3/22	Rainfall	Too low to sample													
	8/3/22	Rainfall	0.0010	0.0010	0.0010	40	5.0	26	5.0	0.0010	6.0	0.010	18	1.0	20	157
	28/3/22	Rainfall	Too low to sample													
	5/4/22	Scheduled	Too low to sample													
Saddlers D/S (W4 – Bowfield)	27/10/21	Scheduled	0.0010	0.0010	0.0010	311	34	849	80	0.0010	9.0	0.010	476	109	58.0	1800
	12/11/21	Rainfall	No access, too wet													

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9(c)	13(c)	24 (b) (c)	(a)	(a)	(a)	(a)	34(c)	(a)	11(c)	(a)	(a)	50	4900
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	80	17	111	17	0.0010	7.0	0.010	71	55	14.0	425
	8/1/22	Rainfall	0.0010	0.0010	0.0010	627	67	1580	150	0.0010	9.0	0.010	944	208	10	3560
	27/1/22	Scheduled	0.0010	0.0010	0.0010	753	85	2040	210	0.0010	9.0	0.010	1100	263	5.0	4350
	6/3/22	Rainfall	0.0010	0.0010	0.0010	511	77	1820	186	0.0010	12	0.010	1000	222	29	3620
	8/3/22	Rainfall	No access, too wet													
	28/3/22	Rainfall	0.0010	0.0010	0.0010	122	17	244	28	0.0010	9.0	0.010	134	51	16	579
	5/4/22	Scheduled	0.0010	0.0010	0.0010	344	42	591	68	0.0010	8.0	0.010	368	138	5.0	1440
MEA D/S	27/10/21	Scheduled	0.0010	0.0010	0.0010	51	11	18	5.0	0.0010	9.0	0.010	11	1.0	8.0	149
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	No access, too wet													
	8/1/22	Rainfall	No access, too wet													
	27/1/22	Scheduled	0.0010	0.0010	0.0010	82	8.0	9.0	5.0	0.0010	9.0	0.010	10	1.0	7.0	125
	6/3/22	Rainfall	No access, too wet													
	8/3/22	Rainfall	No access, too wet													
	28/3/22	Rainfall	No access, too wet													

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9[(c)]	13[(c)]	24 [(b)] [(c)]	[(a)]	[(a)]	[(a)]	[(a)]	34[(c)]	[(a)]	11[(c)]	[(a)]	[(a)]	50	4900
	5/4/22	Scheduled	0.0010	0.0010	0.0010	41	6.0	11	3.0	0.0010	8.0	0.010	10	10	66	172
Saddlers U/S	27/10/21	Scheduled	0.0010	0.0020	0.0020	388	147	373	116	0.0010	18.0	0.010	175	418	14.0	1580
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	No access, too wet													
	8/1/22	Rainfall	No access, too wet													
	27/1/22	Scheduled	0.0010	0.0040	0.0040	408	119	395	100	0.0010	11	0.010	171	223	5.0	1420
	6/3/22	Rainfall	No access, too wet													
	8/3/22	Rainfall	No access, too wet													
	28/3/22	Rainfall	No access, too wet													
	5/4/22	Scheduled	0.0010	0.0010	0.0010	233	100	336	76.0	0.0010	9.0	0.010	203	389	5.0	1470
Saltwater D/S	27/10/21	Scheduled	Dry													
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	No access, too wet													
	8/1/22	Rainfall	No access, too wet													
	28/1/22	Scheduled	0.0010	0.0020	0.0020	106	12	3.0	4.0	0.0010	14	0.010	10	1.0	564	119

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9[c]	13[c]	24 [b] [c]	[a]	[a]	[a]	[a]	34[c]	[a]	11[c]	[a]	[a]	50	4900
	6/3/22	Rainfall	No access, too wet													
	8/3/22	Rainfall	0.0010	0.0010	0.0010	35	6.0	19	4.0	0.0010	3.0	0.010	17	10	30	207
	28/3/22	Rainfall	No access, too wet													
	5/4/22	Scheduled	0.0010	0.0010	0.0010	83	18.0	19	6.0	0.0010	22.0	0.010	10	10	22.0	213
SW1/ Saddlers	27/10/21	Scheduled	0.0010	0.0010	0.0010	927	268	5280	432	0.0010	6.0	0.010	2590	622	5.0	9910
	12/11/21	Rainfall	No access, too wet													
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	80	14	105	11	0.0010	7.0	0.010	63	17	14.0	372
	8/1/22	Rainfall	0.0010	0.0010	0.0010	597	136	2570	201	0.0010	9.0	0.010	1300	345	10	5520
	27/1/22	Scheduled	0.0010	0.0010	0.0010	896	188	3690	327	0.0020	6.0	0.010	1870	423	6.0	7800
	6/3/22	Rainfall	0.0010	0.0010	0.0010	68	14	171	14	0.0010	8.0	0.010	103	22	119	452
	8/3/22	Rainfall	No access, too wet													
	28/3/22	Rainfall	0.0010	0.0010	0.0010	90	14	125	13	0.0010	8.0	0.010	77	16	26	402
	5/4/22	Scheduled	0.0010	0.0010	0.0010	582	106	1670	158	0.0010	7.0	0.010	976	203	12	3590
SW2	-	-	Location to be established – see notes													
SW3	27/10/21	Scheduled	Dry													
	12/11/21	Rainfall	No access, too wet													

Site	Sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9 (c)	13 (c)	24 (b) (c)	(a)	(a)	(a)	(a)	34 (c)	(a)	11 (c)	(a)	(a)	50	4900
	22/11/21	Rainfall	No access, too wet													
	10/12/21	Rainfall	0.0010	0.0010	0.0010	83	21	8.0	6.0	0.0010	11.0	0.010	6.0	10	7.0	216
	8/1/22	Rainfall	0.0010	0.0010	0.0010	54	8.0	6.0	2.0	0.0010	10	0.010	4.0	10	20	124
	27/1/22	Scheduled	Dry													
	6/3/22	Rainfall	0.0010	0.0010	0.0010	32	7.0	5.0	2.0	0.0010	10	0.010	3.0	4.0	96	153
	8/3/22	Rainfall	0.0010	0.0010	0.0010	29	6.0	6.0	2.0	0.0010	9.0	0.010	3.0	1.0	221	161
	28/3/22	Rainfall	0.0010	0.0010	0.0010	79	20	10	7.0	0.0010	13	0.010	6.0	10	18	202
	5/4/22	Scheduled	Too low to sample													

Notes.
(a) No trigger; for interpretation purposes only. (b) Result is a combination of As (V) and As (III) (c) Trigger set as a preliminary guideline value.
In accordance with the Surface Water Management Plan, results from Saddlers Creek (median over three consecutive samples) will be compared to the relevant trigger levels. Trigger values are values that trigger further investigation or management action.

Table 6: Maxwell Infrastructure Groundwater quality biennial monitoring results for Quarter 2 2022 (year to date average shown). See notes for further details. NS = Not sampled.

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value
R4241	0.010	0.0010	650	0.11	149	745	0.0010	0.0010	4490	6253	0.64	0.0010	214	0.25	0.0010	0.005	6.9	Min: 6.0, Max: 8.5
Average	0.010	0.0010	584	0.21	172	857	0.0010	0.0010	4910	-	0.82	0.0010	244	0.29	0.0010	0.012	7.0	-
F1162	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	0.010	0.0010	522	0.22	101	738	0.0020	0.0010	3720	-	8.59	0.0010	146	0.56	0.0010	0.0040	7.0	-
F1164	0.010	0.0020	511	0.07	89	646	0.0020	0.0010	3340	-	24	0.0010	111	0.707	0.0030	0.0090	6.9	-
Average	0.010	0.0020	511	0.07	89	646	0.0020	0.0010	3340	-	24	0.0010	111	0.71	0.0030	0.0090	6.9	-
GW01D	0.010	0.0010	508	0.31	404	1220	0.0010	0.0020	5320	5680	0.050	0.0010	164	0.262	0.0060	0.62	7.0	Min: 6.0, Max: 8.5
Average	0.010	0.0010	479	0.31	378	1250	0.0010	0.0020	5365	-	0.07	0.0010	157	0.257	0.0070	0.34	7.0	-
GW01S	0.010	0.0010	519	0.14	220	1860	0.0010	0.050	7080	9260	0.050	0.0010	243	0.011	0.0020	0.031	7.0	Min: 6.0, Max: 8.5
Average	0.010	0.0010	504	0.14	228	2260	0.0010	0.026	7840	-	0.05	0.0010	228	0.076	0.0020	0.024	7.0	-
GW02D	0.010	0.0010	1880	0.22	73	1230	0.0010	0.0070	12000	10500	0.05	0.0010	17	0.915	0.0080	0.024	7.2	Min: 6.0, Max: 8.5
Average	0.010	0.0010	1750	0.27	50	1240	0.0010	0.005	11750	-	0.05	0.0010	15	0.51	0.0080	0.022	7.3	*
GW02S	0.010	0.0010	749	0.1	271	880	0.0010	0.001	6540	9480	0.29	0.0010	299	1.53	0.0020	0.021	7.1	Min: 6.0, Max: 8.5
Average	0.010	0.0010	723	0.12	294	924	0.0010	0.001	6785	-	1.92	0.0010	302	1.47	0.0020	0.018	6.9	-

Table 6 continued

Site	Selenium	Silver	Sodium	Sulfate as SO4 – Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
R4241	0.010	0.0010	396	1090	44	3250	NS
Average	***0.010***	***0.0010***	***450***	***1090***	***34***	***3555***	***0.010***
F1162	NS	NS	NS	NS	NS	NS	NS
Average	***0.010***	***0.0010***	***506***	***360***	***110***	***2260***	***0.010***
F1164	0.010	0.0010	403	340	167	1970	NS
Average	***0.010***	***0.0010***	***403***	***340***	***167***	***1970***	NS
GW01D	0.010	0.0010	540	609	19	3800	NS
Average	***0.010***	***0.0010***	***525***	***610***	***51***	***3810***	***0.080***
GW01S	0.29	0.0010	1080	620	1810	5120	NS
Average	***0.36***	***0.0010***	***1170***	***552***	***2115***	***5255***	***0.080***
GW02D	0.010	0.0010	3060	3390	2450	10000	NS
Average	***0.010***	***0.0010***	***2950***	***3115***	***2905***	***8625***	***0.010***
GW02S	0.010	0.0010	892	2230	34	5160	NS
Average	***0.010***	***0.0010***	***890***	***2285***	***36***	***5250***	***0.020***

Table 7: DS1 monitoring bore: Laboratory groundwater quality monthly monitoring results for Quarter 2 2022 (year to date average shown). See notes for further details. NS = Not sampled.

Date of sample	pH value	Electrical conductivity	Total Dissolved Solids @180°C	Salinity (g/kg)
27/04/2022	6.3	7800	6950	4.31
25/05/2022	6.3	7520	6810	4.15
23/06/2022	6.4	8040	6330	4.45
Average (year to date)	***6.5***	***7502***	6697	***4.20***

Table 8: Maxwell Underground Groundwater quality biennial monitoring results for Quarter 2 2022 (year to date average shown). See notes for further details (under the new Maxwell Underground Project, sampling changed from quarterly to biennial, the next scheduled sampling due Q3 2022). NS = Not sampled.

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value
DD1005	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS
Average	***0.025***	***0.0010***	***914***	***0.21***	***114***	***1600***	***0.007***	***0.018***	***6250***	-	***1.320***	***0.0020***	***191***	***0.01***	***0.0050***	***0.013***	***7.3***	
DD1014	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS
Average	***0.010***	***0.0010***	***725***	***0.37***	***70***	***3020***	***0.0010***	***0.002***	***9705***	-	***0.43***	***0.0010***	***42***	***0.13***	***0.0010***	***0.006***	***7.3***	
DD1015	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS
Average	***0.010***	***0.0010***	***1030***	***0.19***	***104***	***1360***	***0.0010***	***0.0010***	***5940***	-	***0.050***	***0.0010***	***169***	***0.00***	***0.0010***	***0.0010***	***7.2***	
DD1016	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	NS
Average	***0.010***	***0.0010***	***1050***	***0.29***	***165***	***1490***	***0.0010***	***0.0010***	***5750***	-	***1.900***	***0.0010***	***291***	***0.16***	***0.0010***	***0.0010***	***7.0***	
DD1025	NS	NS	NS	NS	NS	NS	NS	NS	NS	14,200	NS	NS	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5
Average	***0.010***	***0.0010***	***1220***	***0.19***	***232***	***4005***	***0.0010***	***1.27***	***11600***	-	***0.050***	***0.0010***	***445***	***0.21***	***0.0010***	***0.012***	***7.2***	
DD1032	NS	NS	NS	NS	NS	NS	NS	NS	NS	7,170	NS	NS	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5
Average	***0.010***	***0.0010***	***1200***	***0.28***	***12***	***1490***	***0.0010***	***0.0010***	***6540***	-	***0.130***	***0.0010***	***4.0***	***0.010***	***0.0010***	***0.001***	***7.8***	
DD1043	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	
Average	***0.010***	***0.0010***	***2405***	***0.43***	***44***	***1315***	***0.0010***	***0.0010***	***7725***	-	***0.050***	***0.0010***	***25***	***0.02***	***0.001***	***0.001***	***7.1***	
DD1052	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value
Average	***0.14***	***0.0020***	***713***	***0.28***	***4.5***	***1875***	***0.001***	***0.003***	***7195***	-	***0.050***	***0.001***	***2.5***	***0.02***	***0.005***	***0.006***	***9.0***	
DD1057	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.003***	***3800***	***0.29***	***11***	***1385***	***0.001***	***0.001***	***10050***	-	***1.020***	***0.001***	***6***	***0.03***	***0.003***	***0.002***	***7.7***	-
MB03	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
MB1A	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.001***	***597***	***0.09***	***94***	***521***	***0.001***	***0.004***	***2490***	-	***0.050***	***0.001***	***67***	***0.00***	***0.003***	***0.005***	***7.7***	-
MB1R	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.001***	***1230***	***0.18***	***58***	***1255***	***0.001***	***0.001***	***5925***	-	***0.210***	***0.001***	***52***	***0.01***	***0.001***	***0.001***	***7.3***	-
MB1W	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.001***	***1280***	***0.21***	***59***	***1190***	***0.001***	***0.001***	***5585***	-	***0.050***	***0.001***	***52***	***0.00***	***0.001***	***0.002***	***7.6***	-
MB2A	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.01***	***0.0010***	***917***	***0.22***	***109***	***2115***	***0.0010***	***0.0020***	***8145***	-	***0.050***	***0.001***	***243***	***0.36***	***0.0030***	***0.0030***	***7.5***	-
MB2R	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.01***	***0.0010***	***1070***	***0.20***	***32***	***1285***	***0.0010***	***0.0030***	***5965***	-	***0.050***	***0.0010***	***46***	***0.010***	***0.0010***	***0.0080***	***8.4***	-
MB3A	NS	NS	NS	NS	NS	NS	NS	NS	NS	9,009	NS	NS	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5
Average	***0.01***	***0.0010***	***775***	***0.31***	***45***	***2320***	***0.0010***	***0.0030***	***7955***	-	***0.050***	***0.0010***	***218***	***0.0010***	***0.0030***	***0.0030***	***7.7***	-
MB3R	NS	NS	NS	NS	NS	NS	NS	NS	NS	6,327	NS	NS	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value
Average	***0.01***	***0.0010***	***807***	***0.21***	***159***	***1435***	***0.0010***	***0.0010***	***5640***	-	***0.160***	***0.0010***	***304***	***0.27***	***0.0010***	***0.0020***	***7.4***	-
MB4A	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.01***	***0.0010***	***447***	***0.10***	***40***	***327***	***0.0010***	***0.0010***	***1786***	-	***0.050***	***0.0010***	***38***	***0.020***	***0.0010***	***0.0010***	***7.7***	-
MB4C	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.01***	***0.0010***	***392***	***0.10***	***35***	***334***	***0.0010***	***0.0010***	***1661***	-	***0.050***	***0.0010***	***34***	***0.020***	***0.0010***	***0.0010***	***7.6***	-
MW1	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.0010***	***560***	***0.24***	***114***	***1700***	***0.0020***	***0.108***	***6010***	-	***0.050***	***0.0010***	***361***	***0.0010***	***0.0010***	***0.056***	***7.5***	-
MW2	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	***0.010***	***0.0010***	***699***	***0.16***	***36***	***1022***	***0.0070***	***0.0010***	***4490***	-	***0.050***	***0.0010***	***75***	***0.0010***	***0.0040***	***0.0010***	***7.8***	-
MW3	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-
Average	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS	-

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Table 8 continued

Site	Potassium	Selenium	Silver	Sodium	Sulfate as SO4 - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1005	NS	NS	NS	NS	NS	NS	NS	NS
Average	***16***	***0.010***	***0.0010***	***1038***	***220***	***23***	***3845***	***0.020***
DD1014	NS	NS	NS	NS	NS	NS	NS	NS
Average	***11***	***0.010***	***0.0010***	***2210***	***214***	***13***	***6120***	***0.010***
DD1015	NS	NS	NS	NS	NS	NS	NS	NS
Average	***18***	***0.010***	***0.0010***	***902***	***165***	***38***	***3460***	***0.010***
DD1016	NS	NS	NS	NS	NS	NS	NS	NS
Average	***15***	***0.010***	***0.0010***	***821***	***100***	***16***	***3845***	***0.010***
DD1025	NS	NS	NS	NS	NS	NS	NS	NS
Average	***16***	***0.010***	***0.0010***	***2305***	***456***	***5.0***	***8790***	***0.090***
DD1025	NS	NS	NS	NS	NS	NS	NS	NS
Average	***5.0***	***0.010***	***0.0010***	***1505***	***15***	***12***	***3985***	***0.010***
DD1032	NS	NS	NS	NS	NS	NS	NS	NS
Average	***20***	***0.010***	***0.0010***	***1855***	***142***	***10***	***5110***	***0.010***
DD1043	NS	NS	NS	NS	NS	NS	NS	NS
Average	***20***	***0.020***	***0.0010***	***1505***	***27***	***55***	***4280***	***0.010***

Table 8 continued

Site	Potassium	Selenium	Silver	Sodium	Sulfate as SO4 - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1052	NS	NS	NS	NS	NS	NS	NS	NS
Average	***16***	***0.010***	***0.0010***	***2525***	***1.0***	***28***	***6820***	***0.010***
DD1057	NS	NS	NS	NS	NS	NS	NS	NS
Average	NS	NS	NS	NS	NS	NS	NS	NS
MB03	NS	NS	NS	NS	NS	NS	NS	NS
Average	**3.5**	***0.010***	***0.0010***	***387***	***83***	***405***	***1620***	***0.010***
MB1A	NS	NS	NS	NS	NS	NS	NS	NS
Average	***14***	***0.010***	***0.0010***	***1210***	***88***	***15***	***3680***	***0.010***
MB1R	NS	NS	NS	NS	NS	NS	NS	NS
Average	***14***	***0.010***	***0.0010***	***1255***	***67***	***12***	***3625***	***0.010***
MB1W	NS	NS	NS	NS	NS	NS	NS	NS
Average	**5.5**	***0.010***	***0.0010***	***1405***	**568**	***5.0***	***5060***	***0.010***
MB2A	NS	NS	NS	NS	NS	NS	NS	NS
Average	***10***	***0.010***	***0.0010***	***1190***	***2.0***	***10***	***3385***	***0.010***
MB2R	NS	NS	NS	NS	NS	NS	NS	NS
Average	***2.0***	***0.01***	***0.001***	***1525***	***615***	***13***	***5350***	***0.010***

Table 8 continued

Site	Potassium	Selenium	Silver	Sodium	Sulfate as SO4 - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
MB3R	NS	NS	NS	NS	NS	NS	NS	NS
Average	**7.5**	***0.010***	***0.0010***	***745***	***445***	***24***	***4065***	***0.010***
MB4A	NS	NS	NS	NS	NS	NS	NS	NS
Average	***4.0***	***0.010***	***0.0010***	***312***	***27***	***55***	***1083***	***0.010***
MB4C	NS	NS	NS	NS	NS	NS	NS	NS
Average	**3.5**	***0.010***	***0.0010***	***290***	***22***	***102***	***1088***	***0.010***
MW1	NS	NS	NS	NS	NS	NS	NS	NS
Average	***5.0***	***0.010***	***0.0010***	***846***	***817***	***580***	***4930***	***0.010***
MW2	NS	NS	NS	NS	NS	NS	NS	NS
Average	**5.5**	***0.010***	***0.0010***	***824***	***111***	***2215***	***2725***	***0.010***
MW3	NS	NS	NS	NS	NS	NS	NS	NS
Average	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

The Maxwell UG (MUG) Project Water Management Plan (WMP) was implemented for Q3 2021 and supercedes the requirements of the Maxwell Infrastructure WMP. The MUG Project WMP requires:

- the monthly recording of reduced standing water levels in all bores (standpipes either manually or using loggers and VWPs)
- quarterly recording (field measurement) of all standpipes for pH, EC, redox potential and temperature; and
- biennial sampling and analysis of all standpipes for TDS, TSS, major cations (Ca, Mg, Na), major anions (chloride, sulfate, carbonate, bicarbonate), total alkalinity, and total and dissolved metals (Al, As, B, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Se, Ag & Zn).

Of these, the following are new or amended variables required by the new MUG WMP:

- monthly rather than quarterly recording of reduced standing water levels where there are no loggers (however the long-term plan is to install loggers in all bores); for those with loggers and for the VWPs the data is downloaded quarterly;
- quarterly recording (field measurement) of redox potential and temperature (previously not required);
- biennial sampling and analysis for carbonate and total alkalinity (previously not required); these hav been added to the table for Q4 2021 given the first sampling under the new plan occurred in Dec 2021;
- removal of the requirement to record barium (Ba), beryllium (Be), cadmium (Cd), cobalt (Co), potassium (K), vanadium (V), nitrite as N, nitrate as N, mercury (Hg), ammonia as N, total Kjeldahl nitrogen as N, total phosphorus (P) and reactive phosphorus as P.
- removal of bores DD1030, DD1034-A and B, DD1041 A and B.

Sampling for the MI bores under the previous Maxwell Infrastructure WMP transitioned to the new MUG Project WMP. Sampling of the MI bores occurred in June 2022 and hence is next scheduled for December 2022 (Q4 2022). Sampling of the MUG bores occurred in Q1 2022 and hence is next scheduled for July 2022 (Q3 2022). No results are presented in the Q2 2022 report for the MU bores.

The year-to-date averages includes samples taken on a quarterly basis until the implementation of the new MUG Project WMP, which requires biennial sampling. The exception is for DS1 for which monthly samples are taken as per the EPL for pH, EC, TDS and salinity, and hence the average presented is the average of all samples taken during each of the past 12 months for those variables.

All results are in mg/L except Conductivity (µS/cm), pH (in pH units) and salinity (g/kg). Dissolved metal concentration (mg/L) are presented in **, , .** Plots of total and dissolved metal concentrations are shown in **Appendix 5**.

Trigger levels

As presented in SLR (2022) Q2 - 2022 quarterly report, observed groundwater levels, EC and pH at monitoring bores part of the TARP remain within “Normal Condition” during the reporting period. To note that further monitoring data is required at GW02D to confirm EC groundwater trends as it remains above the trigger level. However it is likely that the increase in EC at this location is not related to site activities hence does not result in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.

Table 9. All groundwater bores: Reduced standing groundwater levels (mAHD) during Quarter 2 2022 compared to the year-to-date average

Site (with seam names for VWPs)	April	May	June	Year to date average	Type of bore	Type of measurement as of Sep 2021
DS1	223.94	223.94	223.94	223.70	Standpipe	Manual
R4241	176.97	176.44	176.13	176.29	Standpipe	Manual
F1162	139.44	139.54	139.79	137.20	Standpipe	Manual
F1164	137.66	137.94	138.20	134.66	Standpipe	Manual
GW01D	203.26	203.60	203.12	200.25	Standpipe	Logger
GW01S	199.45	199.94	199.96	198.00	Standpipe	Logger
GW02D	136.60	136.41	136.51	135.20	Standpipe	Logger
GW02S	193.67	193.01	192.36	190.41	Standpipe	Logger
GW04	145.04	145.27	145.49	144.53	Standpipe	Manual
BLK6R12 – VW1 (WB)	160.0	159.93	160.01	159.93	VWP	Logger
BLK6R12 – VW2 (RB)	147.88	147.80	147.85	147.85	VWP	Logger
BLK6R12 – VW3 (WN)	122.01	121.96	122.04	122.09	VWP	Logger
BLK6R12 – VW4 (BK)	121.72	121.75	121.90	121.55	VWP	Logger
DD1005	141.68	143.98	143.94	143.16	Standpipe	Manual
DD1014	133.26	133.64	133.61	133.72	Standpipe	Manual
DD1015	(7)	(7)	(7)	-	Standpipe	Manual
DD1016	141.02	141.40	141.49	141.36	Standpipe	Manual
DD1025	155.08	155.40	155.50	155.27	Standpipe	Manual
DD1027	133.55	134.11	134.14	133.95	Standpipe	Manual
DD1032	127.67	128.45	128.45	128.34	Standpipe	Manual
DD1043	128.38	132.94	128.93	128.84	Standpipe	Manual
DD1052	114.67	(8)	115.47	115.10	Standpipe	Manual

DD1057	123.69	124.38	124.35	124.38	Standpipe	Manual
MB03	114.82	(9)	(9)	114.80	Standpipe	Logger
MB1-Alluvial	73.07	73.58	73.40	73.37	Standpipe	Logger
MB1-Redbank	74.94	75.63	75.54	75.33	Standpipe	Manual
MB1-Whybrow	74.28	74.97	74.85	74.75	Standpipe	Manual
MB2-Alluvial	114.03	113.86	113.69	113.79	Standpipe	Logger
MB2-Regolith	115.60	115.63	115.56	115.48	Standpipe	Logger
MB3-Alluvial	129.10	129.90	129.88	129.47	Standpipe	Logger
MB3-Regolith	128.43	129.45	129.46	129.08	Standpipe	Logger (2)
MB4-Alluvial	71.47	71.69	71.31	71.69	Standpipe	Logger
MB4-Coal	71.23	71.57	71.13	71.25	Standpipe	Manual
MW1	129.43	129.69	129.59	129.35	Standpipe	Logger
MW2	113.26	113.27	113.26	112.89	Standpipe	Logger
MW3	(10)	(10)	(10)	(10)	Standpipe	Manual
RBD1 – VW1 (WB)	147.93	147.88	147.98	147.75	VWP	Logger
RBD1 – VW2 (RB)	143.19	143.12	143.19	143.16	VWP	Logger
RBD1 – VW3 (WN)	128.73	128.61	128.58	128.22	VWP	Logger
RBD1 – VW4 (BK)	88.17	88.19	88.23	88.01	VWP	Logger
RD1189 – VWP1 (WH)	184.32	184.77	184.40	185.05	VWP	Logger
RD1189 – VWP2 (AZZBF)	(11)	(11)	(11)	(11)	VWP	Logger
RD1189 – VWP3 (WW12)	(11)	(11)	(11)	(11)	VWP	Logger
RD1189 – VWP4 (Mt Arthur seam)	141.05	140.94	141.05	141.07	VWP	Logger
RD1189 – VWP5 (PF2)	(11)	(11)	(11)	(11)	VWP	Logger
RD1189 – VWP6 (BY)	136.40	135.47	135.58	135.78	VWP	Logger

RD1189 – VWP7 (WY)	(11)	(11)	(11)	(11)	VWP	Logger
RD1192- VWP1 (WB)	(12)	(12)	(12)	(12)	VWP	Logger
RD1192- VWP2 (RB)	133.01	133.18	133.27	133.23	VWP	Logger
RD1192-VWP3 (BK)	150.07	150.61	150.83	149.16	VWP	Logger
MB1VWP (VWP1) (INT)	(12)	(12)	(12)	(12)	VWP	Logger
MB1VWP (VWP2) (INT)	(13)	86.88	86.80	86.95	no data	Logger
MB1VWP (VWP3) (INT)	(13)	95.19	95.25	95.26	VWP	Logger
MB1VWP (VWP4) (WB)	(13)	96.55	96.58	96.60	VWP	Logger
MB1VWP (VWP5) (WN)	(13)	100.19	100.11	99.91	VWP	Logger
WND16 (VWP1) (WB)	112.59	111.38	112.45	112.14	VWP	Logger
WND16 (VWP2) (WN)	107.70	107.75	108.08	107.84	VWP	Logger
WND16 (VWP4) (BK)	(12)	(12)	(12)	(12)	VWP	Logger
WND26 (VWP1) (WB)	134.70	134.72	134.81	134.46	VWP	Logger
WND26 (VWP2) (RB)	130.65	130.68	130.82	130.44	VWP	Logger
WND26 (VWP3) (WA)	137.91	138.03	138.37	137.34	VWP	Logger

1. In addition to a water level logger, a barologger was installed at MB3-Regolith on 23 August 2021 (a barologger enables the correction of water level for barometric pressure for all bores for this project). Prior to August, it was installed at DD1032.
2. In August 2021, loggers in DD1043, DD1057, DD1014, DD1025 and DD1032 were removed and placed into other bores that the Environmental Statement committed to containing loggers.

3. GWLs for the Maxwell Infrastructure loggers are the values on the same day as the manual measurements taken in the bores without loggers. See notes under Table 7 for an explanation of any NS.
4. GWLs for the Maxwell Underground loggers are the values taken on the 15th of each month (as the manual measurements are taken over a number of days due to the number of loggers). If there are multiple values on the same day, the average of the daily values is presented.
5. New Solinst Levelogger 5's were installed in MB03, MB1 – Alluvial, MB4 - Alluvial, MB3 – Alluvial, MB2 – Regolith, GW01D, GW01S, GW02D and GW02S in August 2021. In addition, older loggers from DD1057, DD1014, DD1015, DD1025 and DD1032 were relocated to MB2 – Alluvial, MW2, MW1, MB3 – Regolith. Malabar became aware of an issue with the firmware installed on these new loggers in January 2022; the issue caused the loggers to stop recording in mid-November. Following identification of the issue and in consultation with Solinst, the firmware was upgraded and the loggers were redeployed in February 2022. Manual measurements recommenced monthly at all bores in January 2022 and will continue until confidence in the loggers can be obtained. Data in this table is therefore manual measurements unless not taken; if manual measurements were not taken an average of the monthly logger recordings are included, where available. Hence for those bores, there is a gap in data between mid-November 2021 and when the monthly manual measurements recommenced in January 2022.
6. Manual measurements were not taken in August and September 2021, as the Groundwater Management Plan at that time required only quarterly measurements (July and October). If data is shown for those months they are logger recordings, where loggers were installed. Annual averages are calculated from manual measurements only, to avoid calculating an average from two different measurement techniques.
7. DD1015 is reported blocked during the reporting period.
8. DD1052 – the manual measurement from May 2022 appear erroneous and has been removed.
9. MB03 was reported dry during the reporting period.
10. There was no access to MW3 over the reporting period.
11. Groundwater levels at RD1189 VWP2, VWP3, VWP5, VWP7 appear unstable hence are not reported.
12. The following VWP are disabled: RD1192-VWP1, MB1-VWP1, WND16-VWP4.
13. No record available at MB1 VW2, VWP3, VWP4, VWP5 in April 2022

* GWLs for the Maxwell Underground VWPs are the values taken on the 15th of each month. If there are multiple values on the same day, the average of the daily values is presented. If no data is recorded on the 15th of the month, then the closest recorded value to the 15th of the month is presented (see*).

Acronyms: DD = diamond drill hole. mAHD = meters above Australian Height Datum (the elevation of the water level is calculated by subtracting the Depth to Water from the reference elevation). n/a = not available. NS = not sampled. RH = rotary drill hole. VWP = Vibrating wire piezometer and logger. Seam acronyms: BK = Blakefield seam; BY = Bayswater seam; MA = Mt Arthur seam; PF = Piercefield seam; INT = Interburden; WB = Wambo seam; RB = Redbank Creek seam; WA = tbc; WH = Woodlands Hill seam; WN = Whynot seam; WY = Wynn seam. WW = Warkworth seam; ZZ = indicates that the seam is intruded or heat affected.

Noise monitoring results for Quarter 2 2022

Noise monitoring under the Noise and Blasting Management Plan (NBMP) for the Maxwell Underground Coal Mine Project commenced in September 2021 at monitoring sites NM1 to NM4 as required by the plan.

To date, the Maxwell Underground Project has been inaudible at all locations and all dates.

Table 10. Noise monitoring results for 20 April 2022

EPA identification no.	Sampling point	Day ($L_{A\,eq\,(15\,minute)}$)		Evening ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A1\,(1\,minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	65	41	64	41	52	52	77	No	Project inaudible
17	NM2	44	44	40	41	40	40	52	61	No	Project inaudible
18	NM3	40	57	35	54	35	51	52	75	No	Project inaudible
-	NM4	40	71	35	68	35	60	52	89	No	Project inaudible
Additional Information											
Date of Final Report	16 May 2022										
Weather Conditions	Wind speed 1.3–4.7 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 11. Noise monitoring results for 21 April 2022

EPA identification no.	Sampling point	Day ($L_{A eq (15 minute)}$)		Evening ($L_{A eq (15 minute)}$)		Night ($L_{A eq (15 minute)}$)		Night ($L_{A1 (1 minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	67	41	59	41	50	52	79	No	Project inaudible
17	NM2	44	52	40	44	40	38	52	59	No	Project inaudible
18	NM3	40	59	35	57	35	48	52	72	No	Project inaudible
-	NM4	40	69	35	69	35	63	52	88	No	Project inaudible
Additional Information											
Date of Final Report	16 May 2022										
Weather Conditions	Wind speed 1.7–5.4 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 12. Noise monitoring results for 22 April 2022

EPA identification no.	Sampling point	Day ($L_{A\,eq\,(15\,minute)}$)		Evening ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A1\,(1\,minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	67	41	63	41	61	52	85	No	Project inaudible
17	NM2	44	43	40	40	40	40	52	66	No	Project inaudible
18	NM3	40	59	35	56	35	52	52	72	No	Project inaudible
-	NM4	40	73	35	69	35	59	52	82	No	Project inaudible
Additional Information											
Date of Final Report	16 May 2022										
Weather Conditions	Wind speed 1.0–4.6 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, and frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 13. Noise monitoring results for 24 May 2022

EPA identification no.	Sampling point	Day ($L_{A\ eq\ (15\ minute)}$)		Evening ($L_{A\ eq\ (15\ minute)}$)		Night ($L_{A\ eq\ (15\ minute)}$)		Night ($L_{A1\ (1\ minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	68	41	67	41	62	52	87	No	Project inaudible
17	NM2	44	38	40	39	40	38	52	45	No	Project inaudible
18	NM3	40	56	35	55	35	48	52	74	No	Project inaudible
-	NM4	40	71	35	66	35	64	52	91	No	Project inaudible

Additional Information	
Date of Final Report	20 June 2022
Weather Conditions	Wind speed 0.9–5.0 m/s. No rain during monitoring.
Notes	Measured noise sources included traffic, birds, insects, frogs, aeroplanes. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.

Table 14. Noise monitoring results for 25 May 2022

EPA identification no.	Sampling point	Day ($L_{A\,eq\,(15\,minute)}$)		Evening ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A1\,(1\,minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	69	41	53	41	53	52	82	No	Project inaudible
17	NM2	44	39	40	37	40	35	52	56	No	Project inaudible
18	NM3	40	57	35	67	35	53	52	72	No	Project inaudible
-	NM4	40	69	35	52	35	65	52	89	No	Project inaudible
Additional Information											
Date of Final Report	20 June 2022										
Weather Conditions	Wind speed 0.9–2.8 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 15. Noise monitoring results for 26 May 2022

EPA identification no.	Sampling point	Day ($L_{A\,eq\,(15\,minute)}$)		Evening ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A1\,(1\,minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	69	41	67	41	62	52	88	No	Project inaudible
17	NM2	44	49	40	38	40	34	52	41	No	Project inaudible
18	NM3	40	58	35	56	35	46	52	70	No	Project inaudible
-	NM4	40	71	35	67	35	68	52	90	No	Project inaudible

Additional Information	
Date of Final Report	20 June 2022
Weather Conditions	Wind speed 0.6–4.0 m/s. No rain during monitoring.
Notes	Measured noise sources included traffic, birds, insects, and frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.

Table 16. Noise monitoring results for 20 June 2022

EPA identification no.	Sampling point	Day ($L_{A\ eq\ (15\ minute)}$)		Evening ($L_{A\ eq\ (15\ minute)}$)		Night ($L_{A\ eq\ (15\ minute)}$)		Night ($L_{A1\ (1\ minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	68	41	66	41	63	52	86	No	Project inaudible
17	NM2	44	43	40	48	40	38	52	57	No	Project inaudible
18	NM3	40	54	35	55	35	44	52	70	No	Project inaudible
-	NM4	40	71	35	68	35	67	52	91	No	Project inaudible
Additional Information											
Date of Final Report	12 July 2022										
Weather Conditions	Wind speed 0.9–3.1 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, frogs, a dog and trains. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 17. Noise monitoring results for 21 June 2022

EPA identification no.	Sampling point	Day ($L_{A eq (15 minute)}$)		Evening ($L_{A eq (15 minute)}$)		Night ($L_{A eq (15 minute)}$)		Night ($L_{A1 (1 minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	68	41	68	41	62	52	86	No	Project inaudible
17	NM2	44	45	40	41	40	40	52	64	No	Project inaudible
18	NM3	40	54	35	54	35	46	52	66	No	Project inaudible
-	NM4	40	70	35	70	35	68	52	90	No	Project inaudible
Additional Information											
Date of Final Report	12 July 2022										
Weather Conditions	Wind speed 1.2–4.0 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

Table 18. Noise monitoring results for 22 June 2022

EPA identification no.	Sampling point	Day ($L_{A\,eq\,(15\,minute)}$)		Evening ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A\,eq\,(15\,minute)}$)		Night ($L_{A1\,(1\,minute)}$)		Exceedance (yes/no)	Observations
		Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
16	NM1	45	67	41	66	41	59	52	79	No	Project inaudible
17	NM2	44	46	40	45	40	38	52	66	No	Project inaudible
18	NM3	40	56	35	54	35	54	52	79	No	Project inaudible
-	NM4	40	70	35	68	35	67	52	91	No	Project inaudible
Additional Information											
Date of Final Report	12 July 2022										
Weather Conditions	Wind speed 0.6–3.7 m/s. No rain during monitoring.										
Notes	Measured noise sources included traffic, birds, insects, and frogs. The Maxwell Underground Coal Mine Project was inaudible at all locations and times.										

APPENDIX 1 – AIR QUALITY MONITORING LOCATIONS

APPENDIX 2 – NOISE AND BLAST MONITORING LOCATIONS

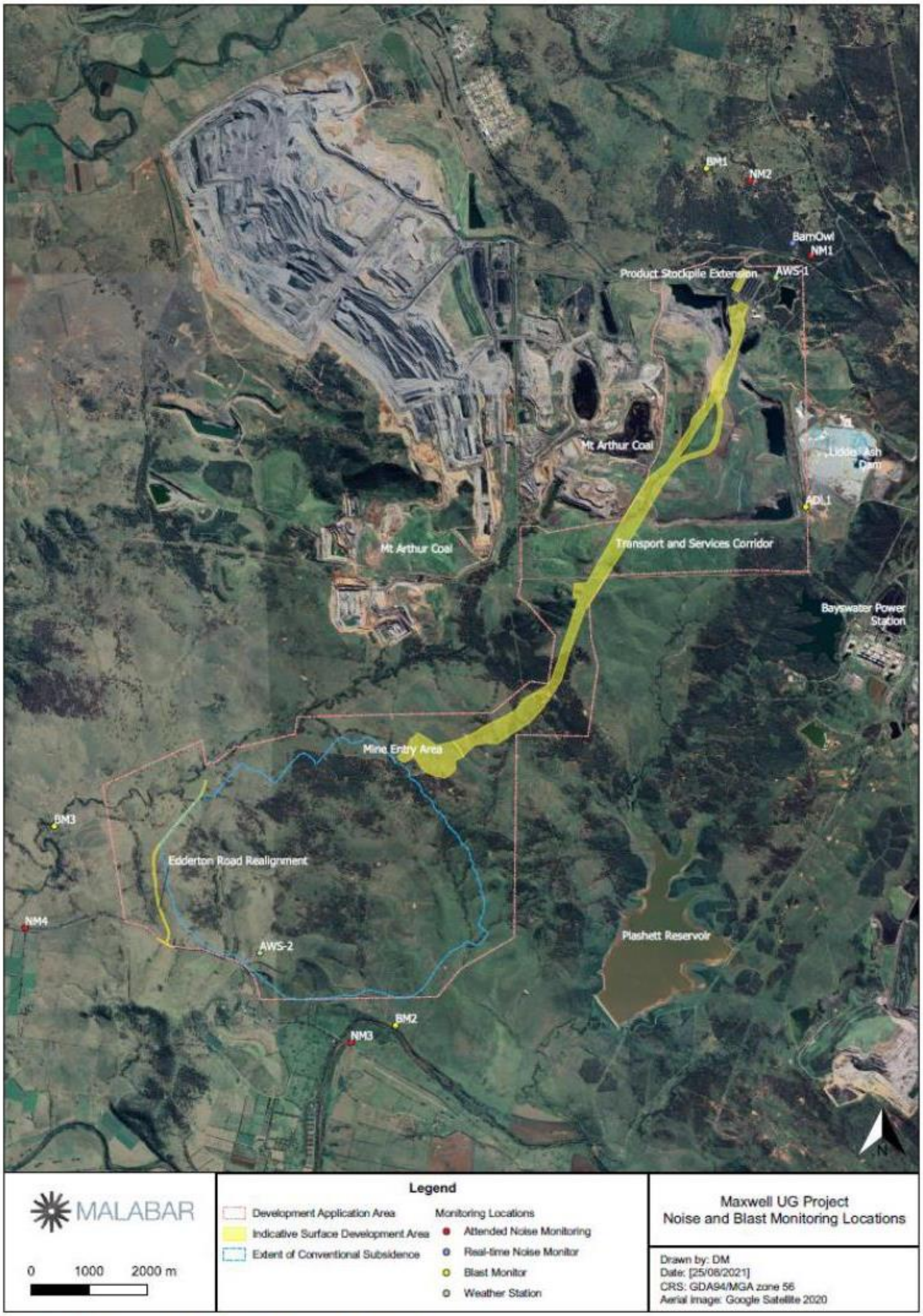
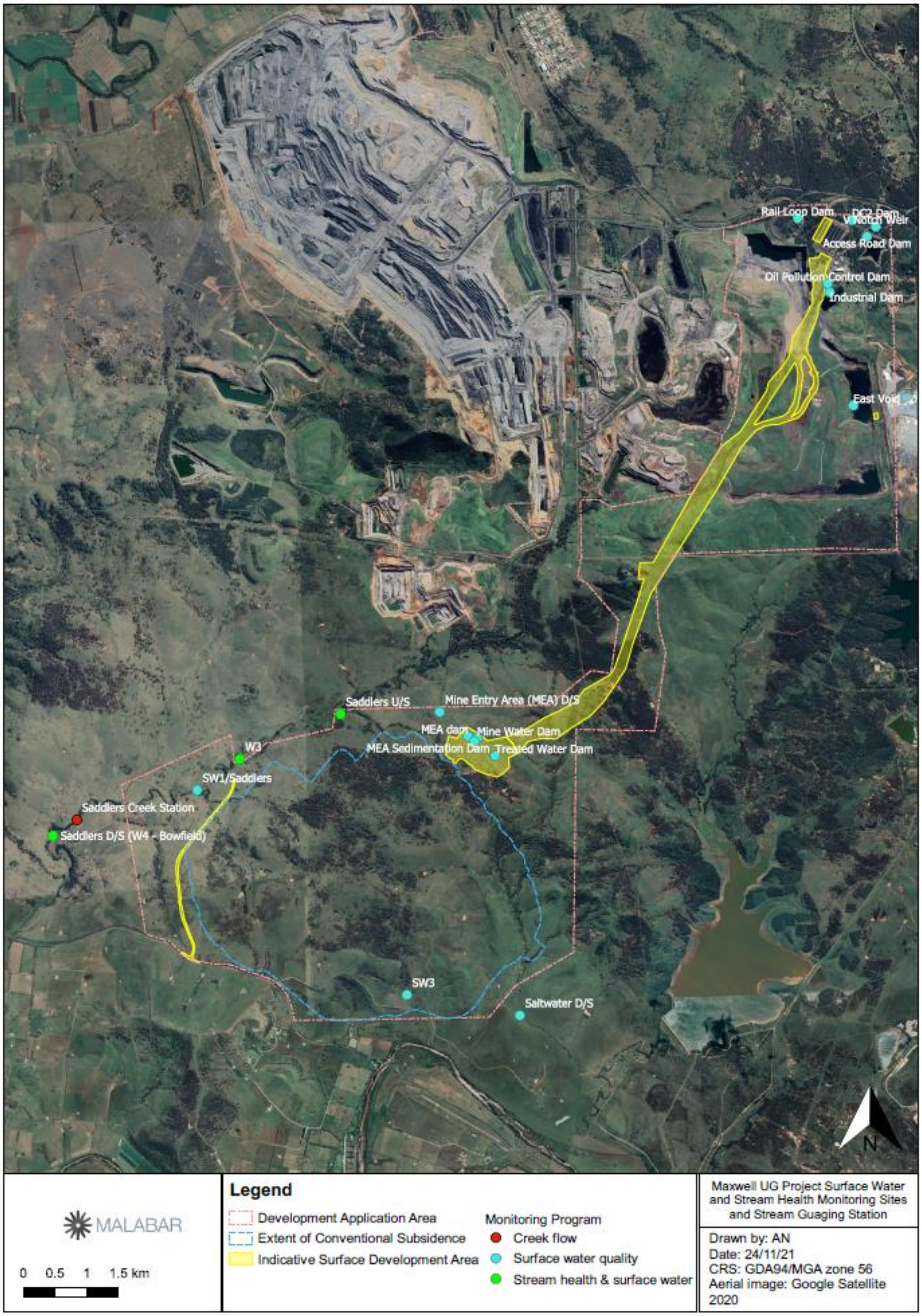
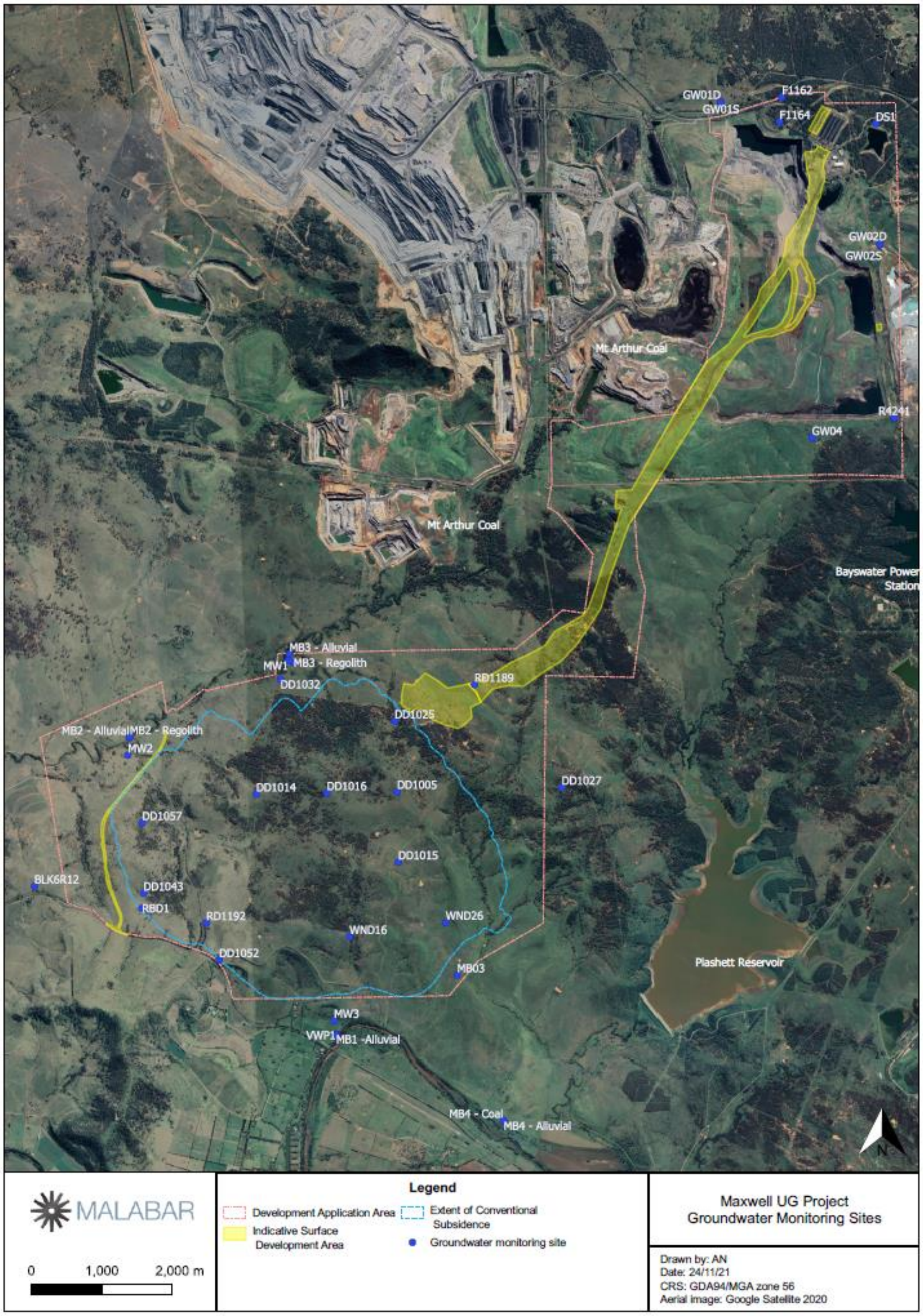


Figure 1. Noise and Blast Monitoring Locations

APPENDIX 3 – SURFACE WATER MONITORING LOCATIONS



APPENDIX 4 – GROUNDWATER MONITORING LOCATIONS



APPENDIX 5 – CONSULTANT HYDROGEOLOGIST REPORT PROVIDING HYDROGRAPHS AND DATA ANALYSIS

Memorandum

To:	Alex Newton	At:	Malabar Resources Pty Ltd
From:	Maxime Philibert	At:	SLR Consulting Australia Pty Ltd
Date:	7 March 2023	Ref:	610.30966.00000-M01-v2.0-20230307.docx
Subject:	Maxwell Project Quarterly Groundwater Monitoring Report Q2 2022 April - June 2022		

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Malabar Resources to perform a quarterly groundwater review of data collected by Cbased Environmental for the Maxwell Underground (MUG) and Maxwell Infrastructure referred here as the Maxwell Project. The quarterly groundwater assessment will support the annual review compliance reporting conducted by Malabar Resources for the site and is envisaged to act as an early warning procedure for any performance trigger exceedances.

This memo provides an overview of the groundwater data collected at the relevant monitoring bores (refer to Figure 1 for the location) for the period April–June 2022 and assesses this data against the Trigger Action Response Plan (TARP) Trigger Criteria presented in the Groundwater Management Plan (GWMP) contained within the Water Management Plan (November 2021) for the Maxwell Underground Project. Discussion of any recorded exceedances or bores anticipated to exceed is also included in Section 2 and Section 3.

There was no mining activity conducted for the Maxwell Underground Project (the Project) during the review period. Construction of the Project commenced in May 2022 and extraction of the secondary workings will likely occur in Q1 2023.

1.1 Groundwater Data

The following outlines any data gaps in groundwater levels or quality identified for the review period:

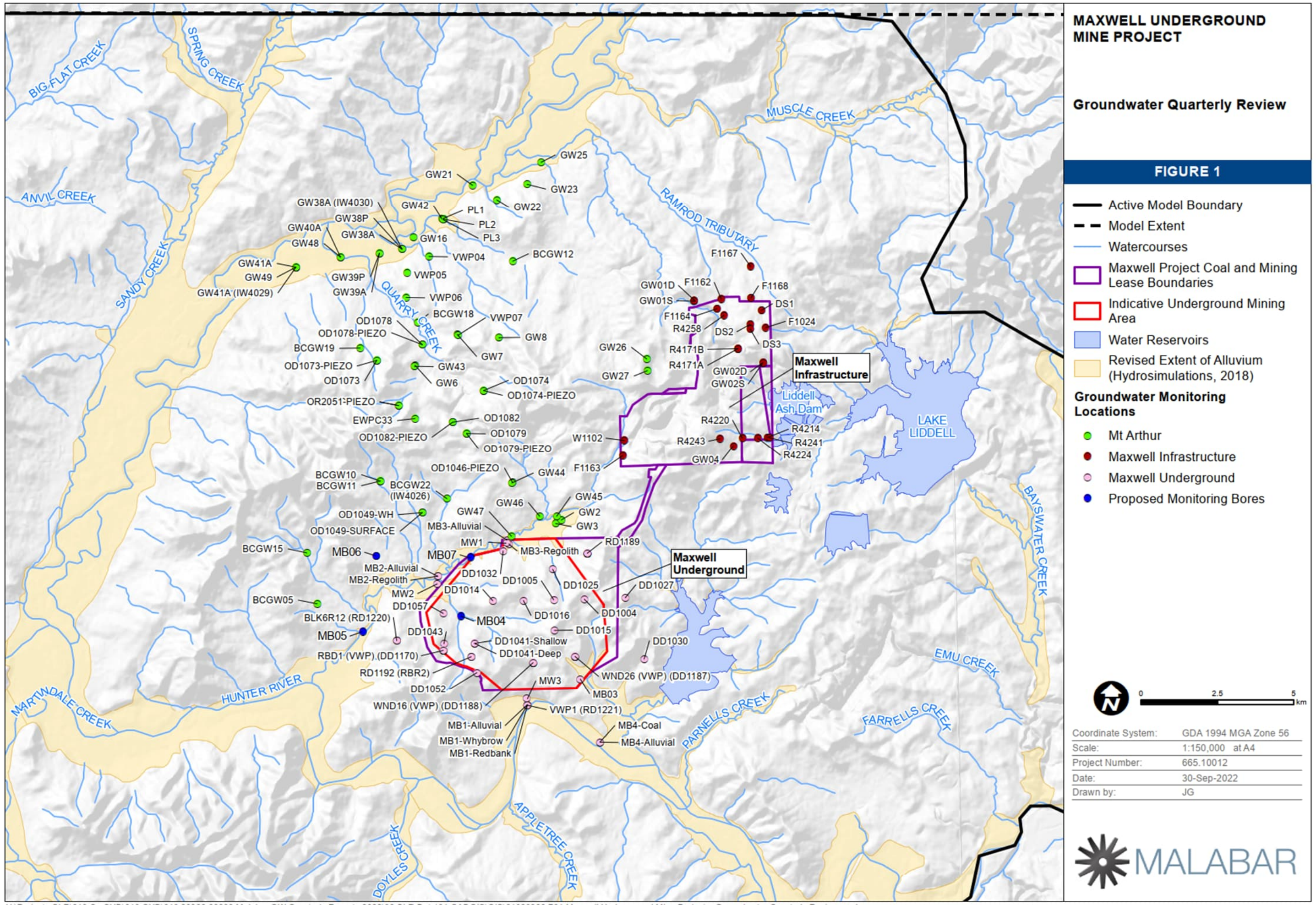
- Groundwater levels and quality results for private bores are reviewed annually, no groundwater data is available and therefore not presented for the review period; and

1.2 Groundwater Monitoring Parameters and Frequency

The groundwater monitoring parameters and the frequency of monitoring as per the GWMP is presented below:

- Standpipes
    - Reduced standing water level (for bores with no data logger) – monthly
    - pH, electrical conductivity, redox potential, temperature – quarterly

    - Total dissolved solids, total suspended solids, major cations/anions, total alkalinity, dissolved and total metals – biennial (twice yearly)
- DS1 (in accordance with EPL 1323 Condition U1.1)
    - Reduced standing water level, pH, electrical conductivity, total dissolved solids, salinity – monthly
- Data loggers and VWPs
    - Reduced standing water level – downloaded quarterly



H:\Projects-SLR\610-SrvSYD\610-SYD\610.30966.00000 Malabar GW Quarterly Reports 2022\06 SLR Data\01 CADGIS\GIS\61030966 F01 Maxwell Underground Mine Project – Groundwater Quarterly Review.mxd

Figure 1 Groundwater Monitoring Network

2 Groundwater Level Trigger Review

This section addresses the compliance of groundwater levels at MUG and MI during the reporting period in relation to a trigger analysis.

All groundwater level monitoring bores and VWPs in the vicinity of the Maxwell Project, and their available completion details, are listed in Table 1 below.

Table 2 outlines groundwater level trigger exceedances during the review period at each of the monitored bore locations as per the approved trigger criteria (Malabar Resources, Nov 2021) presented in Appendix A. Hydrographs for all groundwater monitoring locations including those with approved groundwater level trigger levels are presented in Appendix B (MI bores: Figures B1-B9; MU bores/VWP: Figure B10-B39).

Section 2.1 to Section 2.3 discusses briefly any groundwater level exceedances observed during the reporting period only, as identified in Table 2.

Table 1 Groundwater Monitoring Bore Network – Maxwell Project

Monitoring bore or VWP ID	Easting[1] (GDA94)	Northing[1] (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
Maxwell Infrastructure - MI (standpipe)					
DS1	305592	6420380	Shallow bedrock aquifer	15	EX
F1162	301045	6420755	Greta Coal Measures	274	EX
F1164	304223	6420406	Greta Coal Measures	190.5	EX
R4241	305793	6416224	Jurassic Volcanics	150	EX
GW01S	303386	6420691	Base Regolith	12–15	EX
GW01D	303391	6420683	Greta Coal Measures	29–32	EX
GW02S	305592	6420380	Base Regolith	8–14	EX
GW02D	301045	6420755	Greta Coal Measures	69–72	EX
GW04	304223	6420406	Permian Sequence	101–104	EX
Maxwell Underground (MUG) – standpipes					
MB1 - Redbank	297930	6407453	Redbank Seam	51–57	EX
MB1 - Whybrow	297928	6407448	Whybrow Seam	25–28	EX
MB1A	297933	6407459	Hunter River Alluvium	8–11	EX
MB2R	295004	6411675	Regolith	20–29	EX
MB2A	294998	6411669	Saddlers Creek Alluvium	5–7	EX
MB3R	297328	6412729	Regolith	27–30	EX
MB3A	297269	6412850	Saddlers Creek Alluvium (upslope)	8.5–14.5	EX
MB4 - Coal	300302	6406234	JPS-Coal	42–47	EX
MB4A	300307	6406231	Hunter River Alluvium	10–18	EX

Monitoring bore or VWP ID	Easting[1] (GDA94)	Northing[1] (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
MB03	299649	6408297	Saltwater Creek Alluvium	5–8	EX
MW1	297254	6412760	Saddlers Creek Alluvium (upslope)	6–9	EX
MW2	294977	6411419	Saddlers Creek Alluvium	4–9.5	EX
MW3	297904	6407652	Hunter River Alluvium	2.9–6.9	EX
MB04	295755	6410371	Unnamed Creek Regolith	tbc	P
MB05	292546.7	6409857	Saddlers Creek alluvium	tbc	P
MB06_S	292980.2	6412335	Woodland Hill Overburden	tbc	P
MB06_D	292980.2	6412335	Bowfield Seam	tbc	P
MB07	296070.3	6412297	Saddlers Creek Alluvium	tbc	P
DD1005	298799	6410901	Blakefield Overburden	138.6	EX
DD1014	296799	6410864	Blakefield Overburden	90.5	EX
DD1015	298815	6409900	Blakefield Overburden	162.5	EX
DD1016	297801	6410882	Blakefield Overburden	126.4	EX
DD1025	298764	6411901	Blakefield Overburden	44.6	EX
DD1027	301133	6410960	Edderton Seam	252.8	EX
DD1032	297143	6412495	Piercefield Overburden	276.5	EX
DD1043	295200	6409458	Woodlands Hill Overburden	182–203	EX
DD1052	296274	6408513	Whynot Seam Overburden	105–127	EX
DD1057	295181	6410458	Arrowfield Overburden	164–188	EX
Maxwell Underground (MUG) – Vibrating Wire Piezometers (VWPs)					
RD1189 (SD1_DD001)	299896	6412419	Warkworth Seam	186.2	EX
			Mt Arthur Seam	230	EX
			Piercefield Seam	255.5	EX
RD1192 (RBR2)	296092	6409038	Wambo Seam	61.2	EX
			Redbank Seam	80	EX
			Blakefield Seam	148.5	EX
BLK6R12 (RD1220)	293653	6409558	Redbank Seam	40.5	EX
			Whynot Seam	86.5	EX
			Blakefield Seam	148.5	EX
VWP1 (RD1221) (RDW006A)	297926	6407444	Interburden	21	EX
			Interburden	40	EX
			Interburden	73	EX
			Whybrow Seam	87	EX
			Whynot Seam	109.2	EX
			Blakefield Seam	138	EX

Monitoring bore or VWP ID	Easting[1] (GDA94)	Northing[1] (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
RBD1 (DD1170)	295178	6409246	Whybrow Seam	24.65	EX
			Redbank Seam	33.55	EX
			Whynot Seam	79.5	EX
			Blakefield Seam	103.3	EX
WND16 (DD1188)	298122	6408842	Wambo Seam	33.75	EX
			Whynot Seam	59.25	EX
			Blakefield Seam	90.15	EX
			Blakefield Seam	110.5	EX
WND26 (DD1187)	299487	6409044	Whybrow Seam	77.3	EX
			Redbank Seam	84.6	EX
			Wambo Seam	123.45	EX
			Whynot Seam	144.25	EX

1 Coordinates in metres (GDA 1994 MGA Zone 56).

VWP – vibrating wire piezometer mBGL – metres below ground level EX – Existing A – Alluvium

R – Regolith JPS – Jerry's Plain Subgroup F – Failed P – Proposed monitoring bore D – Decommissioned

"-" - Not drilled yet tbc – to be confirmed

Table 2 Groundwater Level Trigger Exceedances – shallow and deep open standpipe bores

Bore	Year to date Average (m AHD)^	Trigger Level Exceedances			Future Reviews														Drawdown since mining started (m)
		Apr 22	May 22	Jun 22	Jul 22	Aug 23	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	
Maxwell Infrastructure		Water Management Plan (Nov 2021)																	
R4241	223.93	N	N	N															#
GW01D	202.57	N	N	N															#
GW01S	199.03	N	N	N															#
GW02D	136.55	N	N	N															#
GW02S	192.69	N	N	N															#
Maxwell Underground																			
DD1025	155.18	N	N	N															#
DD1032	128.20	N	N	N															#
MB3-Alluvial	129.56	N	N	N															#
MB3-Regolith	129.12	N	N	N															#
Private Bores																			
GW029660	*	*	*	*															#
GW029647	*	*	*	*															#
GW029648	*	*	*	*															#

LX: maximum trigger level exceedances recorded *"-": no observed drawdown due to mining* *#: not applicable* N:Normal Level TARP Level 1 TARP Level 2

"" no groundwater level data available for this period*

^Year to date average: average groundwater levels including Q1 and Q2 2022 data, prior the start of mining it is recommended to establish a baseline level for groundwater level at each groundwater monitoring site within the TARP whether it is taking the groundwater level prior to mining or average of groundwater levels at a specific period.

2.1 Normal Level

Groundwater levels at the Maxwell Infrastructure groundwater monitoring sites R4241, GW01D, GW01S, GW02D, GW02S (Appendix B, Figure B4-B8) and at the Maxwell Underground sites MB3-Alluvial and MB3-Regolith (Appendix B, Figure B25-B26) are observed above the groundwater trigger level over the reporting period hence are within the Normal Level of the TARP criteria (Appendix A - Table A1).

2.2 TARP Level 1

2.2.1 DD1025 and DD1032

Since February 2014, groundwater levels at DD1025 are observed below the groundwater level trigger (157.3 mAHD) which suggests that a breach in the groundwater level trigger takes place at DD1025 (Appendix B, Figure B14). During the reporting period groundwater levels at DD1025 are stable and observed at approximately 155.5 mAHD.

Since October 2018, groundwater levels at DD1032 are observed below the groundwater level trigger (130.6 mAHD) which suggests that a breach in the groundwater level trigger takes place at DD1032 (Appendix B, Figure B16) During the reporting period groundwater levels at DD1032 are stable and observed at approximately 128.4 mAHD.

Since monitoring started in 2008, groundwater levels at DD1025 and DD1032 are not overly responsive to rainfall events but seem to have declined by approximately 2m and 2.4m respectively during the NSW drought (2017-end 2019). No mining activities have been conducted at Maxwell Underground project during the reporting period or since the breach in groundwater levels observed at DD1025. Regional mining (e.g. MAC operations) could have exacerbated the decline in groundwater levels during the drought period or buffered any subsequent groundwater recovery, however this remains difficult to assess during dry periods.

The breach in the groundwater level trigger at DD1025 and DD1032 is likely due to an over conservative trigger level. As per the GWMP (Malabar Resources, Nov 2021) the 95th percentile of groundwater monitoring data to date was used to establish the trigger level for Stage 1 only. Further data has become available during Stage 2 hence in accordance with the GWMP, it is appropriate to review and revise where appropriate the trigger levels.

Groundwater trigger levels at DD1025 and DD1032 have been revised in this review period. The 5th percentile of the groundwater dataset fro the period March 2020 to date (i.e. period following the NSW 2017-19 drought) has been used to calculate the revised trigger levels and presented in Appendix B, Figure B14 and Figure B16).

Following the revision of the groundwater trigger levels, groundwater levels at DD1025 and DD1032 are observed above the groundwater trigger level in Q2 2022 and within Normal Level of the TARP criteria (Table 2).

2.3 TARP Level 2

There were no TARP Level 2 groundwater level trigger exceedances over the reporting period.

2.4 General Observations

Groundwater monitoring bores MB03 and MW3 were reported as dry during the review period and DD1015 is reported as blocked as of June 2022.

3 Groundwater Quality Trigger Review

Approved Trigger Action Response Plan (TARP) levels are defined for five sites for the Maxwell Infrastructure area and four sites for the Maxwell Underground area (Malabar Resources, Nov 2021) and presented in Appendix A.

An assessment of groundwater quality (EC and pH) at each of the monitored bore locations against the TARP trigger levels has been undertaken. EC and pH plots for groundwater monitoring locations with approved groundwater quality trigger levels are presented in Appendix C (Figures C1-C18). During the reporting period, EC and pH recorded at the groundwater monitoring sites and within the TARP are observed within a Normal Level.

A summary of the groundwater quality (electrical conductivity and pH) trigger levels during the reporting period at the monitored bores are presented in Table 3.

No groundwater quality results were available for the private bores for the reporting period. Results for the private bores are reviewed annually.

Table 3 Trigger Exceedances for pH and EC for the period April-June 2022

Bore	Period [month sampled]	Trigger Level Exceedance		
		EC (µS/cm)	pH lower	pH upper
R4241	Q2-2022 [Jun 22 - lab]	N	N	N
GW01S	Q2-2022 [Jun 22 - lab]	N	N	N
GW01D	Q2-2022 [Jun 22 - lab]	N	N	N
GW02S	Q2-2022 [Jun 22 - lab]	N	N	N
GW02D	Q2-2022 [Jun 22 - lab]	N	N	N
DD1025	Q2-2022 [Apr 22 - field]	N	N	N
DD1032	Q2-2022 [Apr 22 - field]	N	N	N
MB3-Alluvial	Q2-2022 [Apr 22 - field]	N	N	N
MB3-Regolith	Q2-2022 [Apr 22 - field]	N	N	N
Private Bores	No data available	#	#	#

N: Normal Level TARP Level 1 TARP Level 2

3.1 General Observations

The following section presents an overview of bores showing an increasing trend in one of the groundwater quality parameters or bores that could be anticipated to exceed in the next review periods.

- GW02D – EC increased from 11,500 µS/cm in December 2021 to 12,000 µS/cm in July 2022, exceeding the trigger level (10,500 µS/cm) for the second consecutive time in June 2022. Malabar Resources (2021b) noted that the logger was suspended in mud in December 2021. The latest groundwater level elevation is observed at approximately 136 mAHD while the base of the screen is at 131 mAHD which suggests that there is 5m of water in the bore in June 2022. Groundwater levels have shown no response to rainfall events between 2020 and 2022 (Appendix B, Figure B8) compared to the shallower bore GW02S which shows responses to wetter conditions since early 2020 (i.e. in the range of 5m) (Appendix B, Figure B7) and is associated with a decrease in EC (Appendix C, Figure C8). This suggests limited aquifer connectivity between shallow and deep groundwater at site GW02D, which limits freshening of groundwater at this site. A buildup of silt/sediment at the bottom of standpipe GW02D and limited rainfall recharge is likely to favor an increasing trend in EC. It is recommended to continue monitoring EC at GW02D to confirm trends in groundwater EC. A camera could be sent down the bore to assess if the bore is damaged. A bore development could also be conducted to clean the bore if silt/sediment has accumulated.

4 Recommendations

Based on the trigger exceedances assessed in Section 2 and Section 3 and the TARP criteria presented in Appendix A, the following actions are recommended:

4.1 Actions – Trigger Assessment

- Continue the monitoring program, reporting groundwater level and quality data in the next groundwater quarterly review report in September 2022.
- For all sites with a Normal Level in place for groundwater levels, continue monitoring groundwater trends against TARP trigger levels.
- For all sites with a Normal Level in place for groundwater quality, continue monitoring pH and EC against TARP trigger levels.

4.2 Actions – Reporting

- In late 2021, SLR conducted a preliminary assessment on the quality of the VWP data and potential groundwater levels likely influenced by faulty sensors. It is recommended to review the installed depth of the VWP sensors, lithology monitored and compare the groundwater heads at site equipped with VWPs and other piezometers to better understand if pressure heads from the VWP sensors are erroneous. It is suggested to not present groundwater heads from faulty loggers in the next review periods.
- Prior to mining commencing at Maxwell Underground it is recommended to identify an appropriate baseline groundwater level at each groundwater monitoring location within the TARP. This will be used as the reference level for future reviews to calculate groundwater drawdown at bores (i.e. if any mining related effect is observed).

4.3 Actions – Monitoring and Sampling

- Remove DD1015 from the Groundwater Management Plan. Work to unblock the bore has been attempted by CBased in February 2022.

Checked: ST
Authorised by: ST

5 References

Malabar Resources, 2021. Water Management Plan. MXP_MP_EC_08 (25th November 2021), Version 1, Review 2.

Malabar Resources, 2021b. Maxwell Underground Project Environmental Monitoring Data Quarter 4 2021. December 2021.

APPENDIX A

Trigger Action Response Plan and Groundwater Level Triggers

Table A1 Trigger Action Response Plan for the Maxwell Project monitoring bores – Groundwater Levels and Quality

Status	Trigger	Action	Response
Maxwell Infrastructure			
Normal	Groundwater level and quality below Maxwell Infrastructure Stage 1 groundwater triggers (*Table A3*).	Continue to minimise the long-term catchment areas of the mine voids and transfer water to and from voids. Continue water balance monitoring, groundwater monitoring, and assessment.	None
Level 1	Three consecutive groundwater level, pH or EC results exceed Maxwell Infrastructure Stage 1 groundwater triggers (*Table A3*).	A suitably qualified hydrogeologist reviews groundwater level or quality data to determine if trigger exceedances are caused by site activities and whether this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	If trigger exceedances are not caused by site activities and have not resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then review monitoring frequency. If trigger exceedances are caused by site activities and resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then undertake Level 2 Actions.
Level 2	Investigation following Level 1 trigger review indicates trigger exceedances are caused by site activities and this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	Undertake actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Report non-compliance. Undertake adaptive management strategies.
Maxwell Underground			
Normal	Groundwater level and quality below Maxwell Underground Stage 1 groundwater level triggers (*Table A3*).	Continue groundwater monitoring, and assessment.	None
Level 1	Three consecutive groundwater level, pH or EC results exceed Maxwell Underground Stage 1 groundwater level triggers (*Table A3*).	A suitably qualified hydrogeologist reviews groundwater level or quality data to determine if trigger exceedances are as a result of activities at the site and whether this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	If trigger exceedances are not caused by site activities and have not resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then review monitoring frequency. If trigger exceedances are caused by site activities and resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then undertake Level 2 Actions.
Level 2	Investigation following Level 1 trigger review indicates trigger exceedances are caused by activities at the Project and this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	Undertake actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Report non-compliance. Undertake adaptive management strategies. In consultation with suitably qualified hydrogeologist and other relevant specialists, undertake repair, mitigate and/or offset any adverse groundwater impacts of the development.

Table A2 Trigger Action Response Plan for Privately-owned bores - Groundwater Levels and Quality

Status	Trigger	Action	Response
Groundwater levels			
Normal	Drawdown at privately-owned bores less than 2 m. No complaints about potential impacts of the site on privately- owned bores.	Continue regular monitoring and review of potentially impacted private bores (*refer to Section 5.2.2 of the GWMP*).	None
Level 1	Drawdown at privately-owned bores more than 2 m and/or complaint about potential impacts of the site on private bores.	A suitably qualified hydrogeologist reviews groundwater data to determine if 2 m drawdown is as a result of activities at the site (and/or MAC). Collect relevant data on privately-owned bores that are the subject of the complaint. Suitably qualified hydrogeologist to determine if privately-owned bore the subject of the complaint has been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible).	If drawdown is not as a result of activities at the Project (and/or MAC) then review monitoring frequency. If privately-owned bore the subject of the complaint has not been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible) then review monitoring frequency. If drawdown, or impacts the subject of the complaint, are due to site activities then undertake Level 2 actions.
Level 2	Investigation following Level 1 trigger review indicates drawdown is as a result of activities at the site.	Notify relevant bore owner and implement compensatory water supply actions. Undertake any other actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Review groundwater monitoring program.
Groundwater quality			
Normal	No change in beneficial use category	Continue regular monitoring and review of potentially impacted private bores (refer to *Section 5.2.2 of the GWMP*).	None
Level 1	Two consecutive monitoring results indicate a change in beneficial use category.	A suitably qualified hydrogeologist reviews groundwater data to determine if change in water quality is caused by activities at the site.	If a privately-owned bore has not been adversely and directly impacted as a result of the activities at the site, then review monitoring frequency. If change in water quality is changed by activities at the site, then undertake Level 2 actions.
Level 2	Investigation following Level 1 trigger review indicates change in water quality is caused by activities at the site.	Implement compensatory water supply actions. Undertake any other actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Review groundwater monitoring program.

Table A3 Summary of groundwater level and quality triggers for alluvium and hard rock aquifers (Maxwell Project) – (GWMP – Malabar Resources, Nov 2021)

Bore	Groundwater level, trigger level (mAHD)	pH trigger level - minimum	pH trigger level - maximum	EC trigger level (µS/cm)
Maxwell Infrastructure				
R4241	173.6	6.0	8.5	6,253
GW01D	198.2	6.0	8.5	5,680
GW01S	197.0	6.0	8.5	9,260
GW02D	135.7	6.0	8.5	10,500
GW02S	187.7	6.0	8.5	9,480
Maxwell Underground				
DD1025	157.3	6.0	8.5	14,200
DD1032	130.6	6.0	8.5	7,170
MB3-A	127.7	6.0	8.5	9,009
MB3-R	127.3	6.0	8.5	6,327

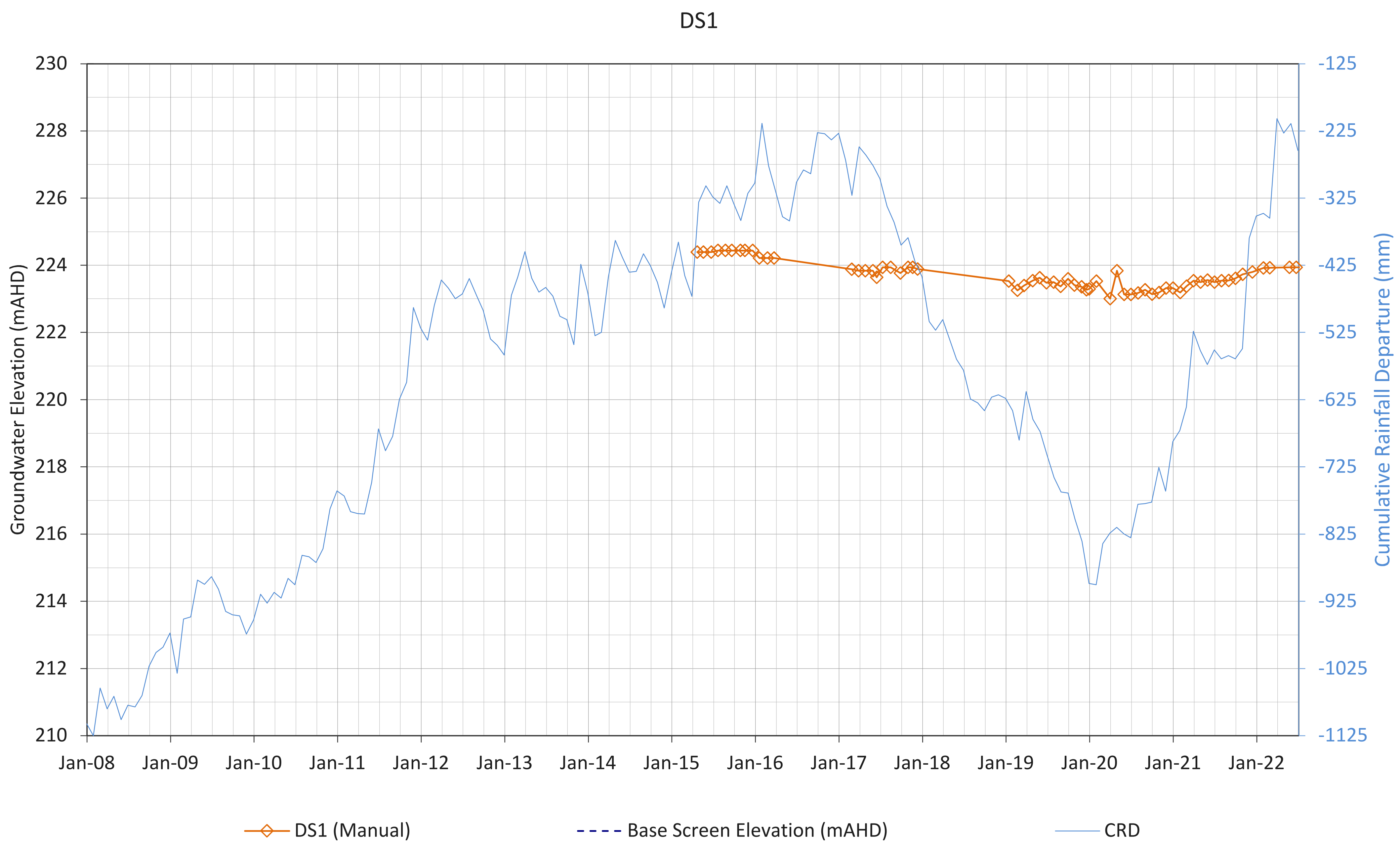
Table A4 Groundwater Quality Categories: Electrical Conductivity - (GWMP – Malabar Resources, Nov 2021)

Beneficial use	Quality Range	Description
Marginal Potable	800 – 2,350 µS/cm (500 - 1,500 mg/L TDS)*	At the upper level this water is at the limit of potable water, but is suitable for watering of livestock, irrigation and other general uses
Irrigation	2,350 – 7,800 µS/cm (1,500 - 5,000 mg/L TDS)*	At the upper level, this water requires shandying for use as irrigation water or to be suitable for selective irrigation and watering of livestock
Saline	7,800 – 22,000 µS/cm (5,000 - 14,000 mg/L TDS)*	Generally unsuitable for most uses. It may be suitable for a diminishing range of salt-tolerant livestock up to about 6,500mg/L [~10,150 µS/cm] and some industrial uses
Highly Saline	>22,000 µS/cm (14,000 mg/L TDS)*	Suitable for coarse industrial processes up to about 20,000 mg/L [~31,000 µS/cm].

* Approximate EC ranges derived from TDS ranges, with conversion factor of 1.5625 applied. Source: National Land and Water Resources Audit (Murray Darling Basin Commission, 2005).

APPENDIX B

Groundwater Levels and Trigger Levels



DS1
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
230
228
226
224
222
220
218
216
214
212
210
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DS1 (Manual)
Base Screen Elevation (mAHD)
CRD

Figure B1

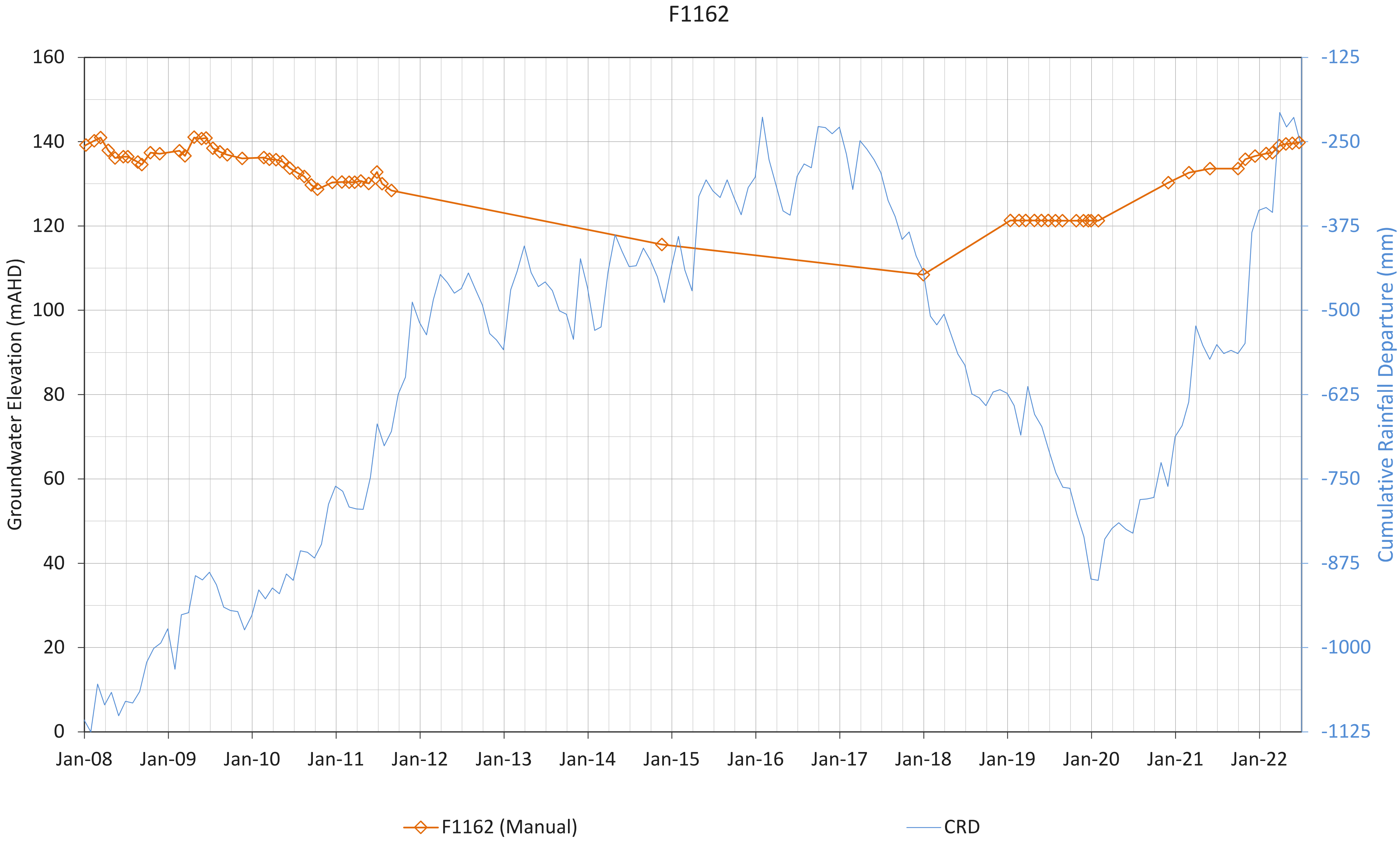
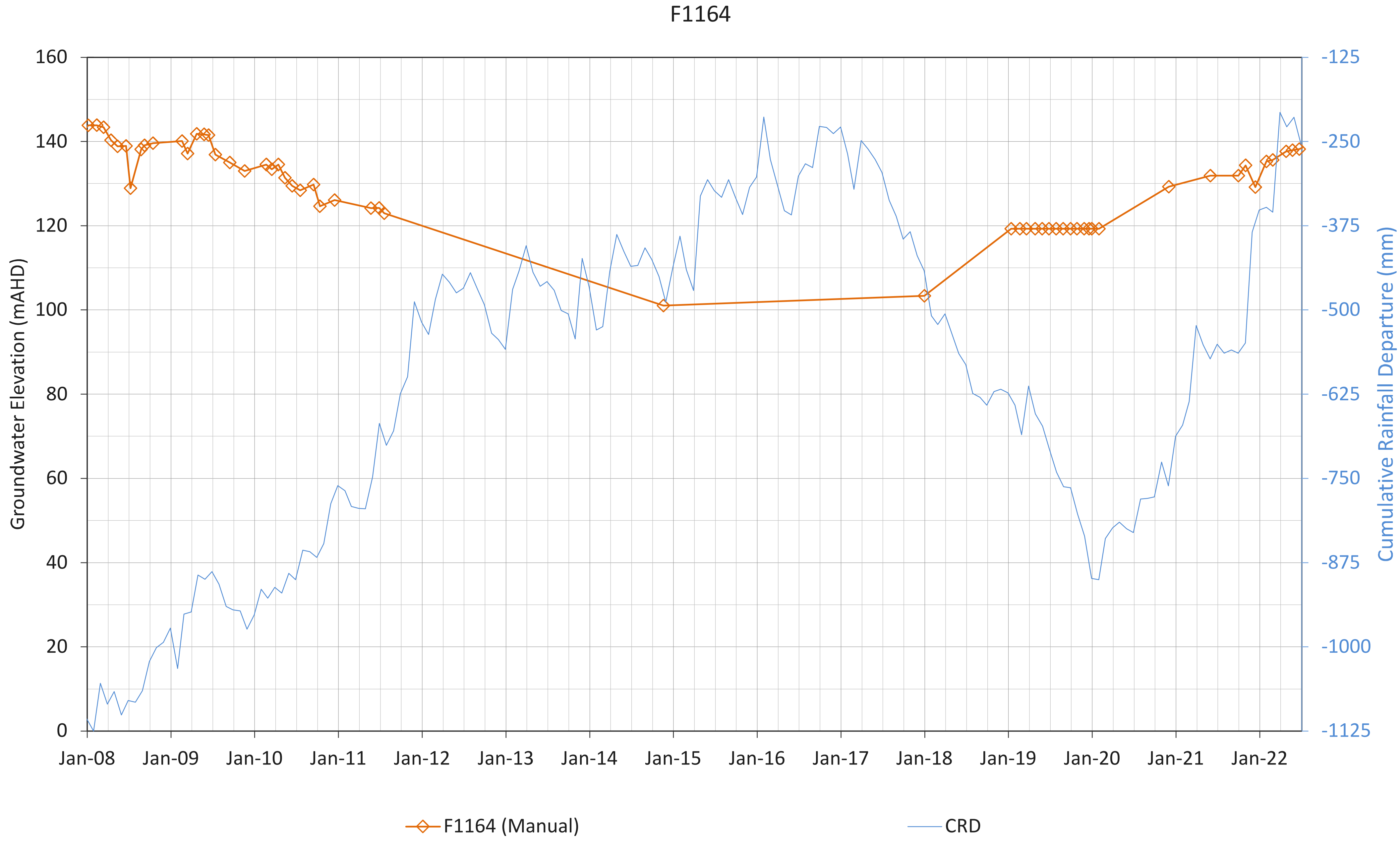

F1162
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
160
140
120
100
80
60
40
20
0
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
F1162 (Manual)
CRD

Figure B2



F1164
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
160
140
120
100
80
60
40
20
0
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
F1164 (Manual)
CRD

Figure B3

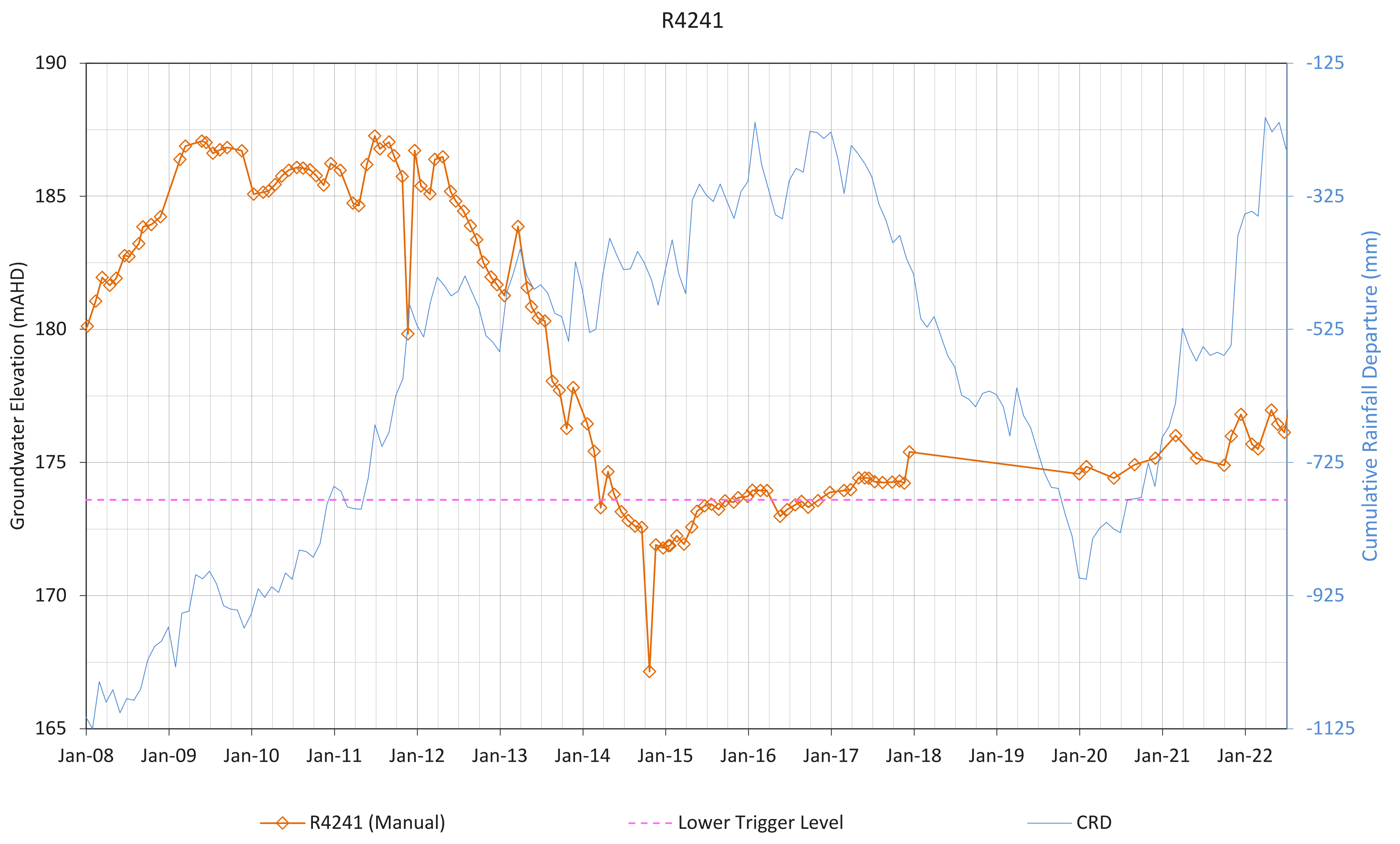

R4241
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
190
185
180
175
170
165
-125
-325
-525
-725
-925
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
R4241 (Manual)
Lower Trigger Level
CRD

Figure B4

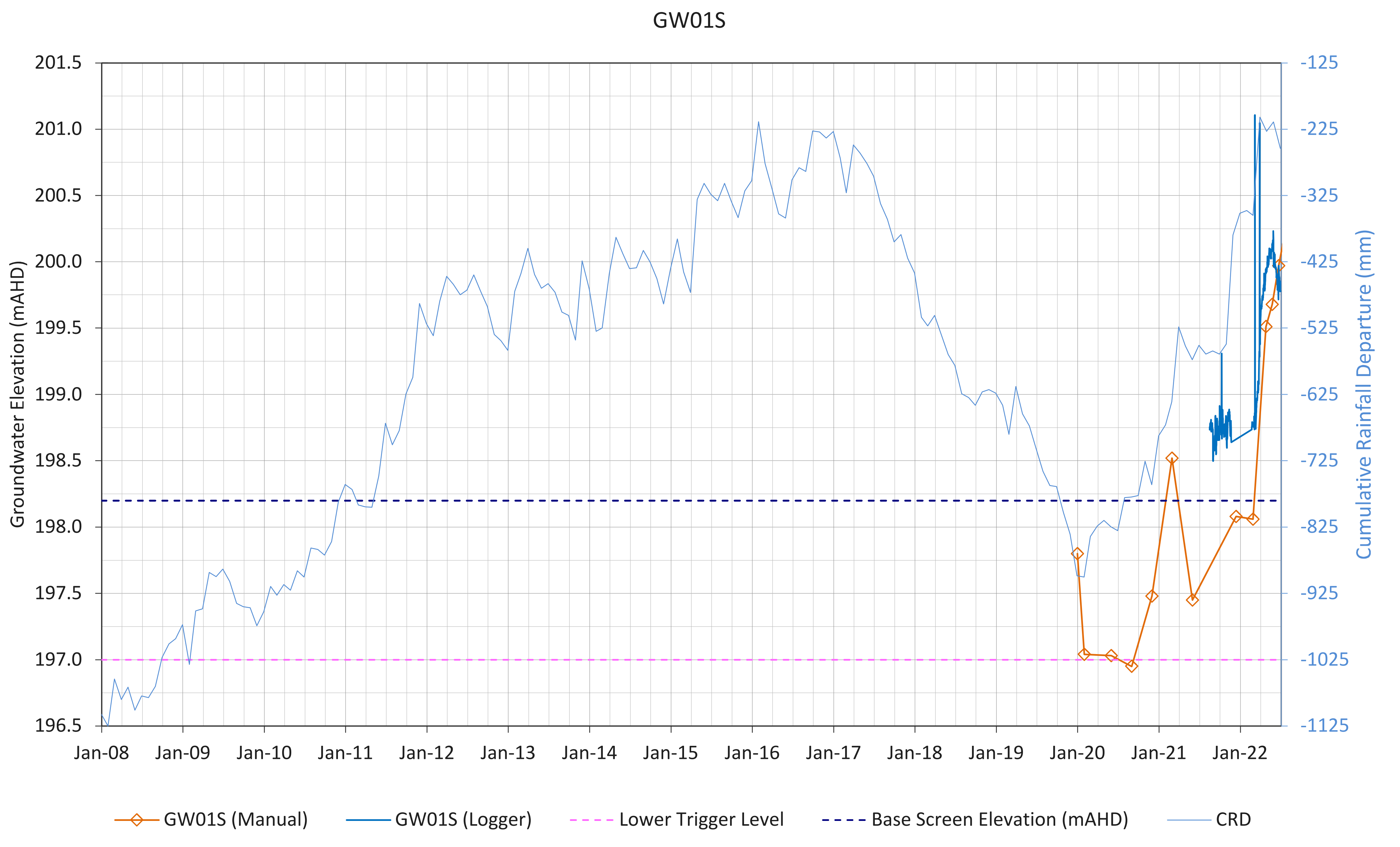
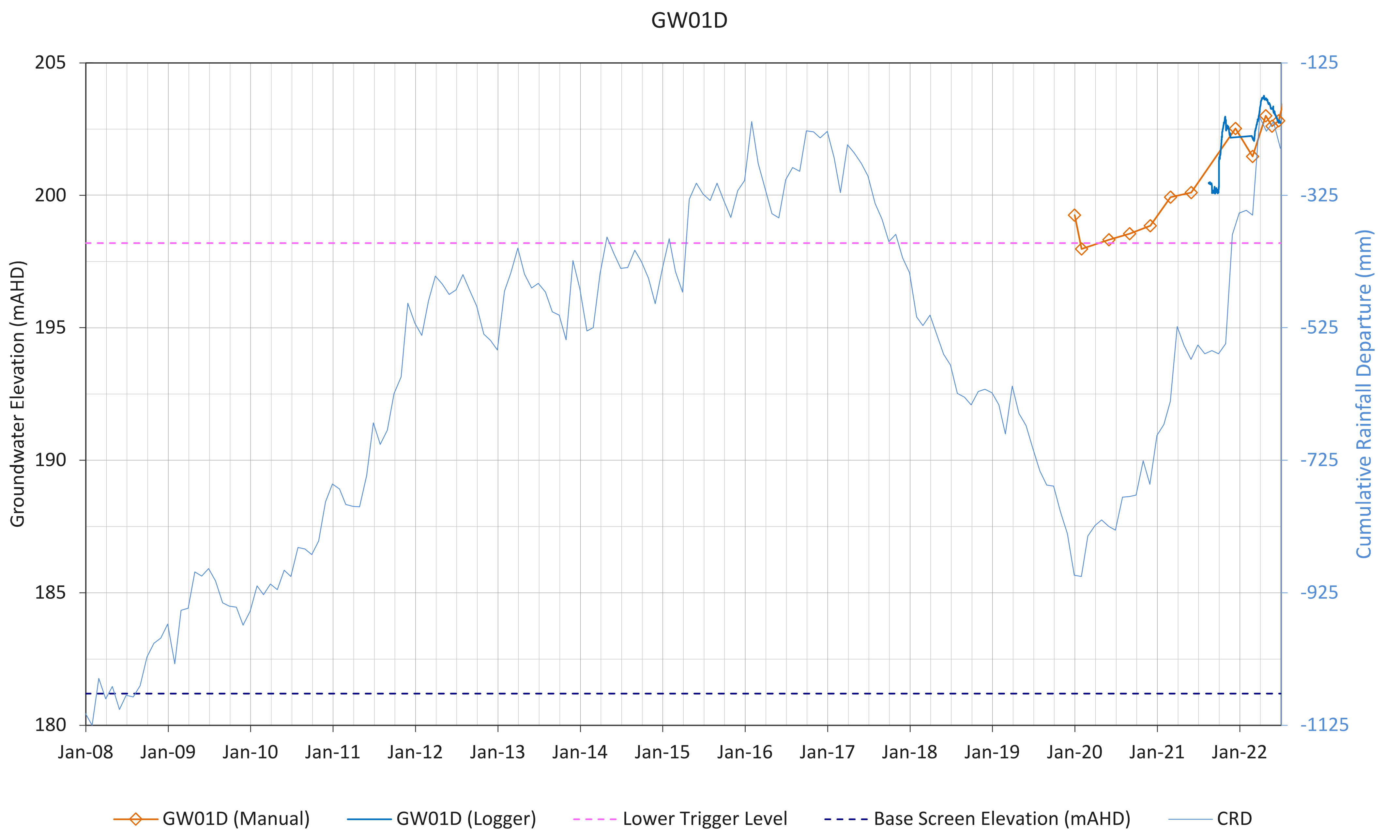

GW01S
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
201.5
201.0
200.5
200.0
199.5
199.0
198.5
198.0
197.5
197.0
196.5
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
GW01S (Manual)
GW01S (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B5



GW01D
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
205
200
195
190
185
180
-125
-325
-525
-725
-925
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
GW01D (Manual)
GW01D (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B6

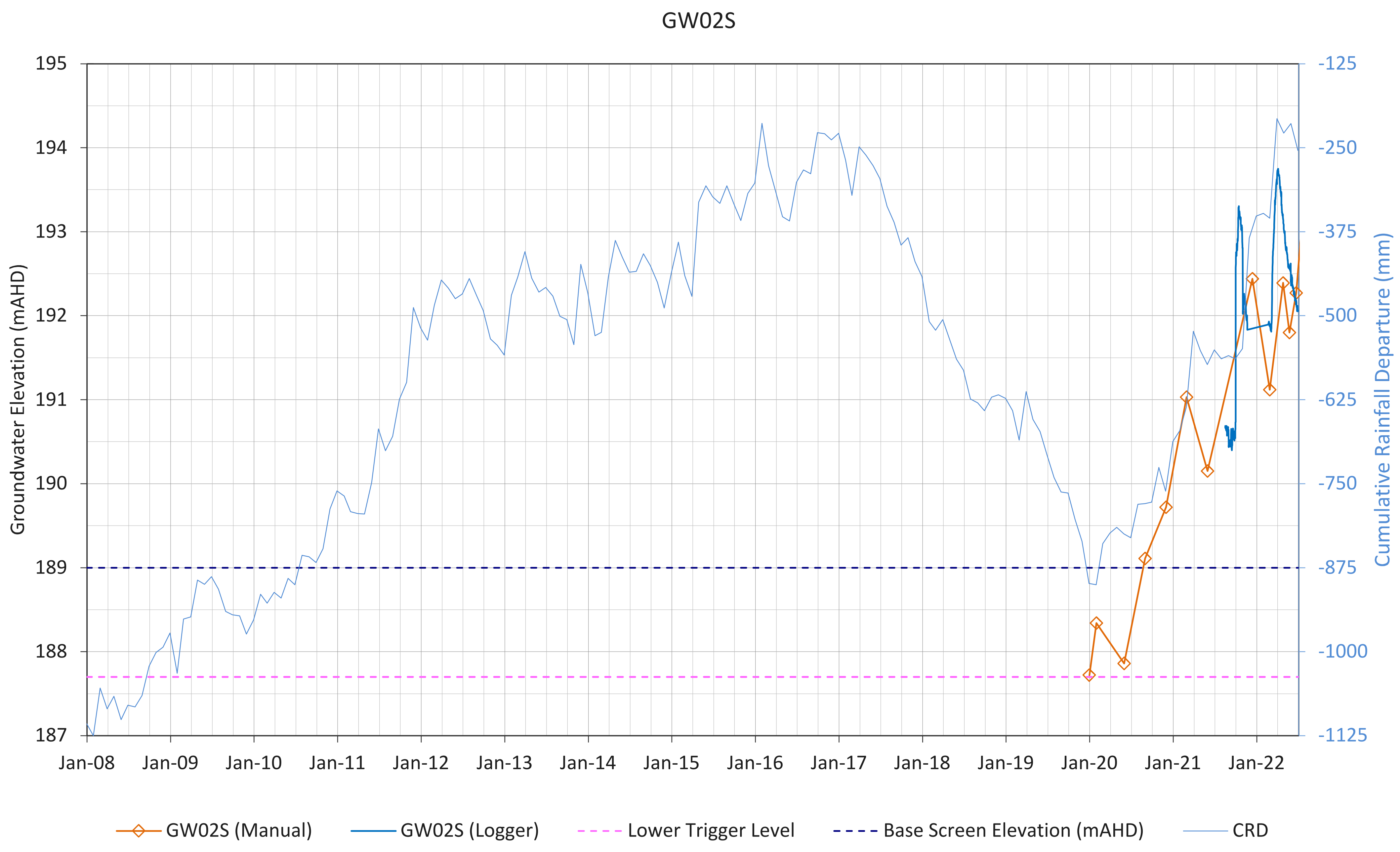

GW02S
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
195
194
193
192
191
190
189
188
187
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
GW02S (Manual)
GW02S (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B7

GW02D
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
138
137
136
135
134
133
132
131
130
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
GW02D (Manual)
GW02D (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B8

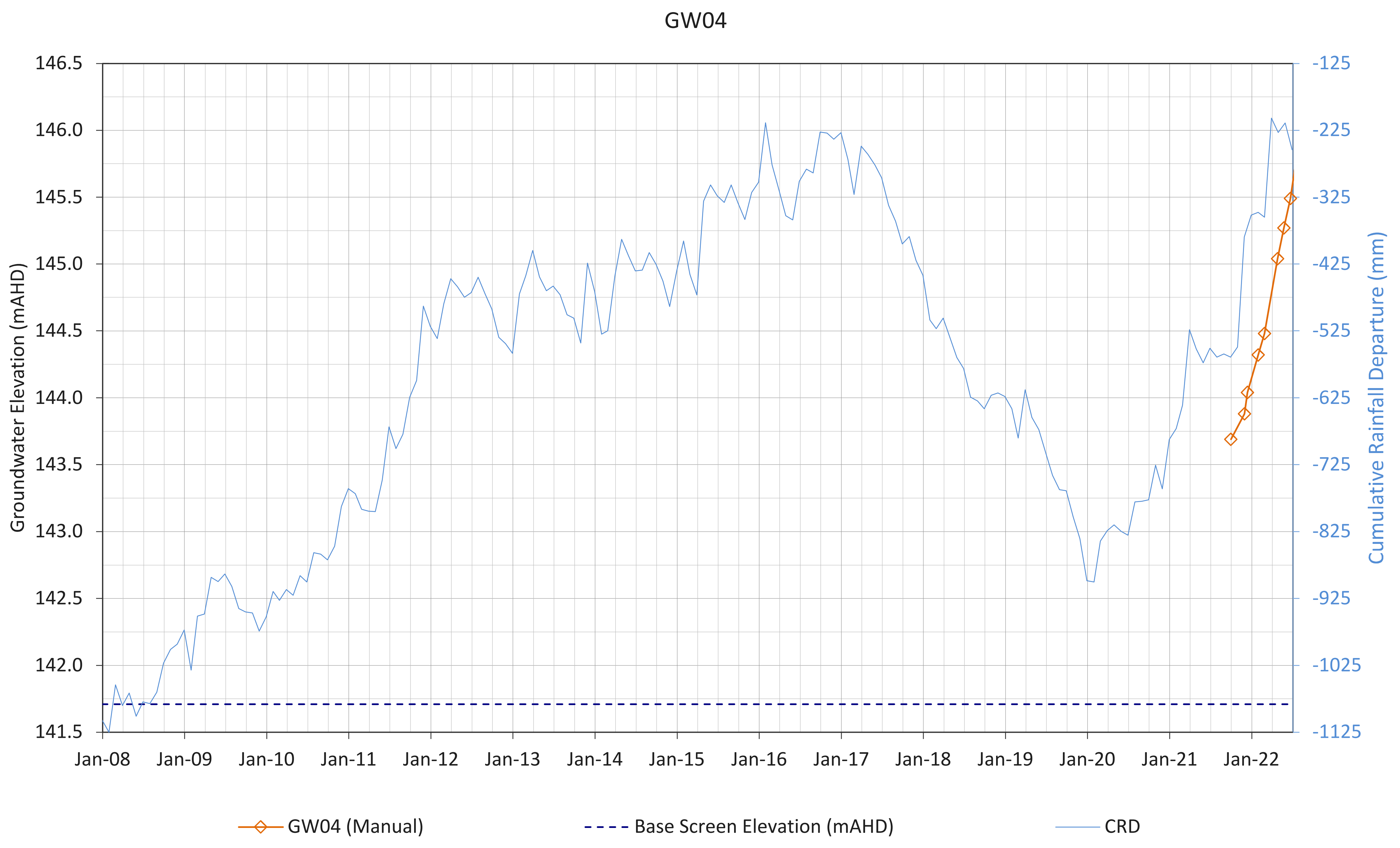

GW04
146.5
146.0
145.5
145.0
144.5
144.0
143.5
143.0
142.5
142.0
141.5
Groundwater Elevation (mAHD)
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Cumulative Rainfall Departure (mm)
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
GW04 (Manual)
Base Screen Elevation (mAHD)
CRD

Figure B9

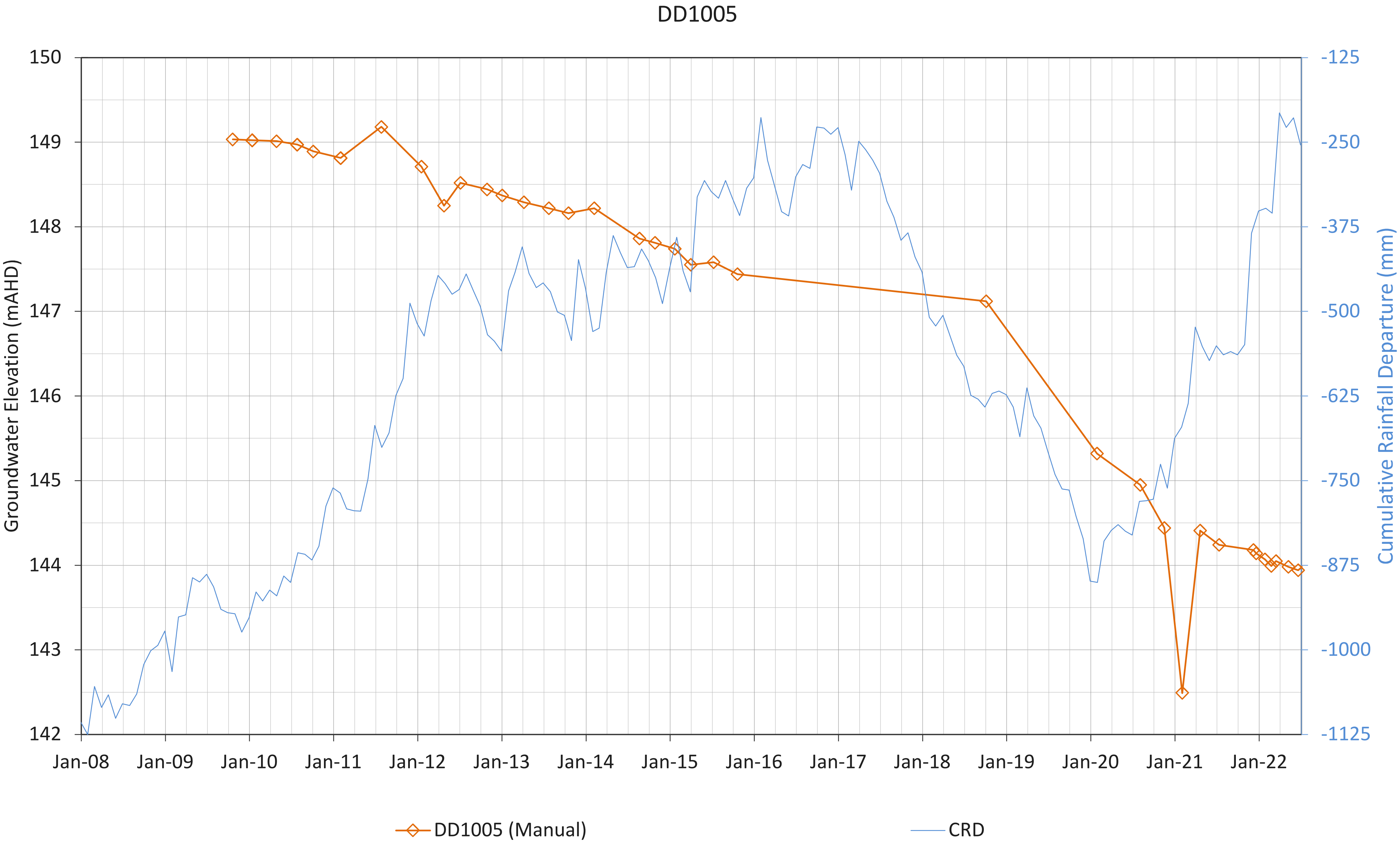
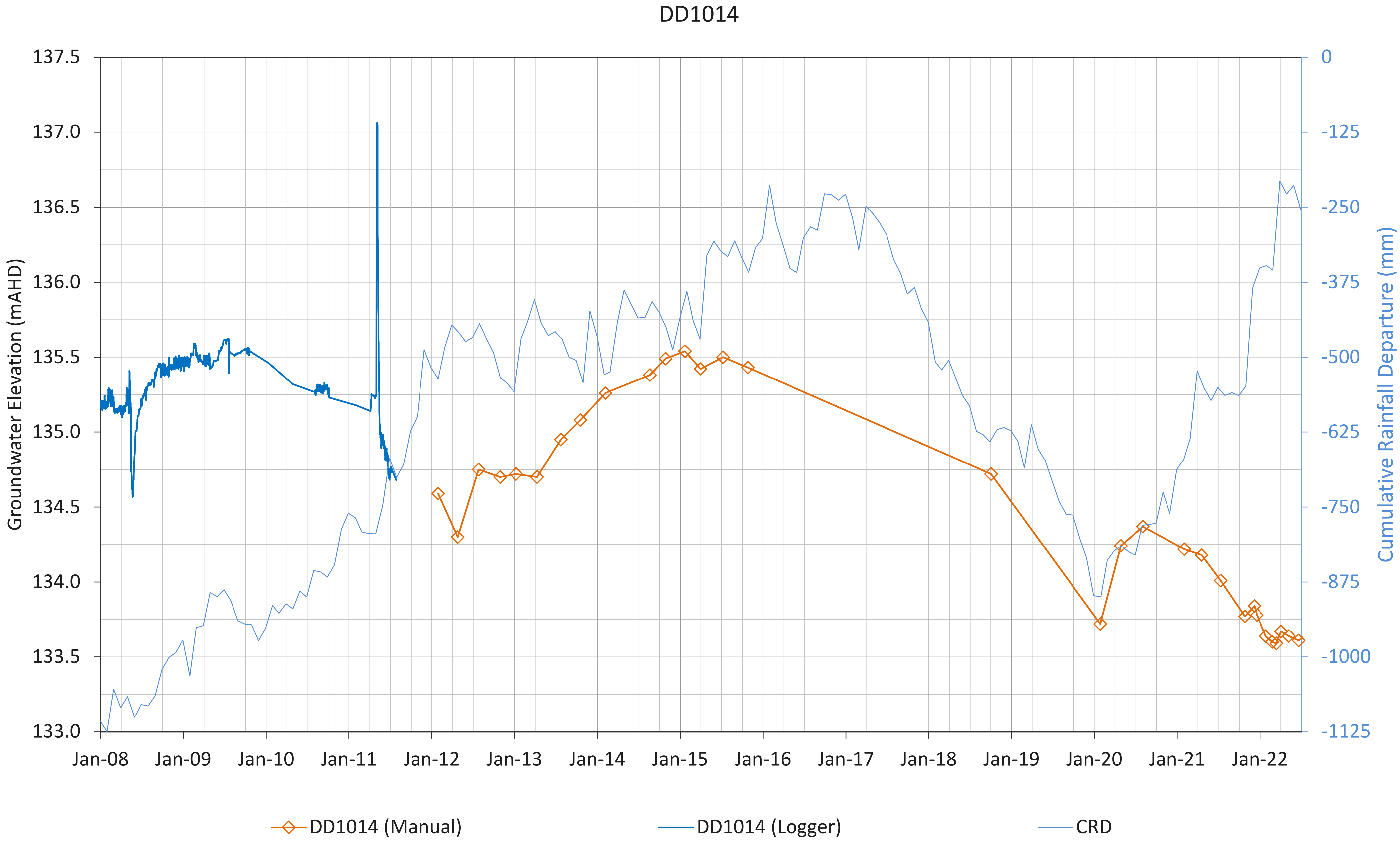

DD1005
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
150
149
148
147
146
145
144
143
142
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1005 (Manual)
CRD

Figure B10



DD1014
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
137.5
137.0
136.5
136.0
135.5
135.0
134.5
134.0
133.5
133.0
0
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1014 (Manual)
DD1014 (Logger)
CRD

Figure B11

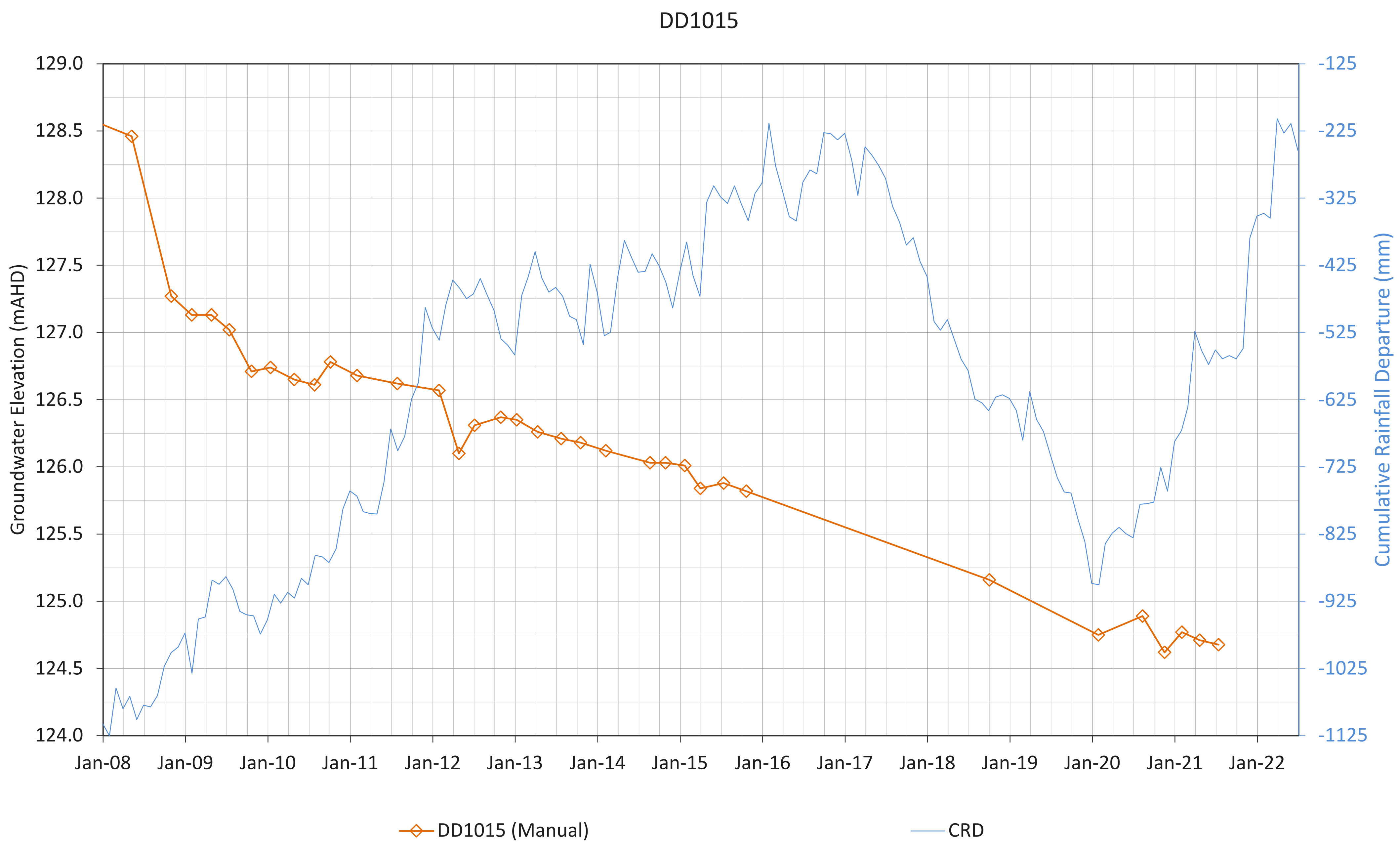
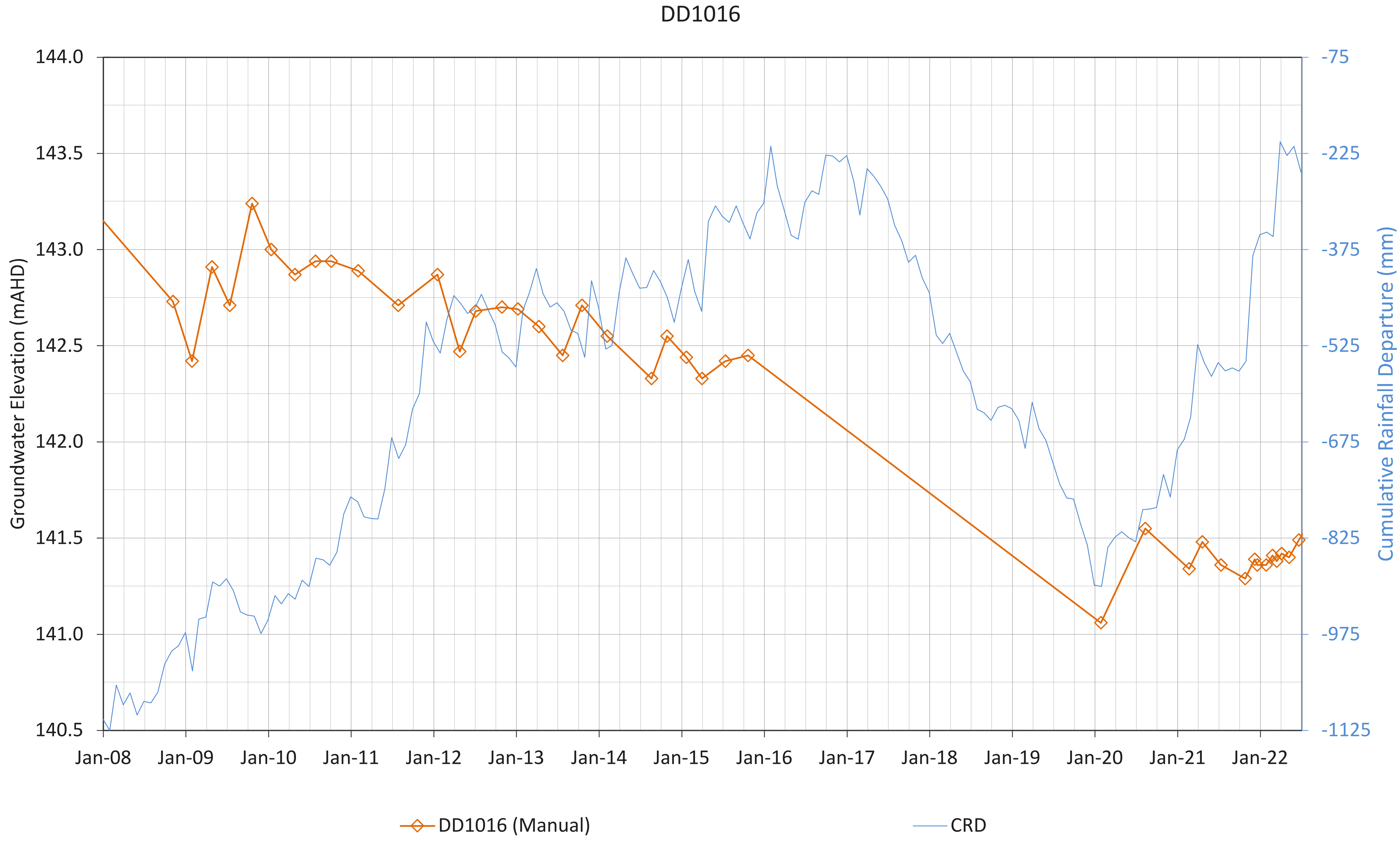
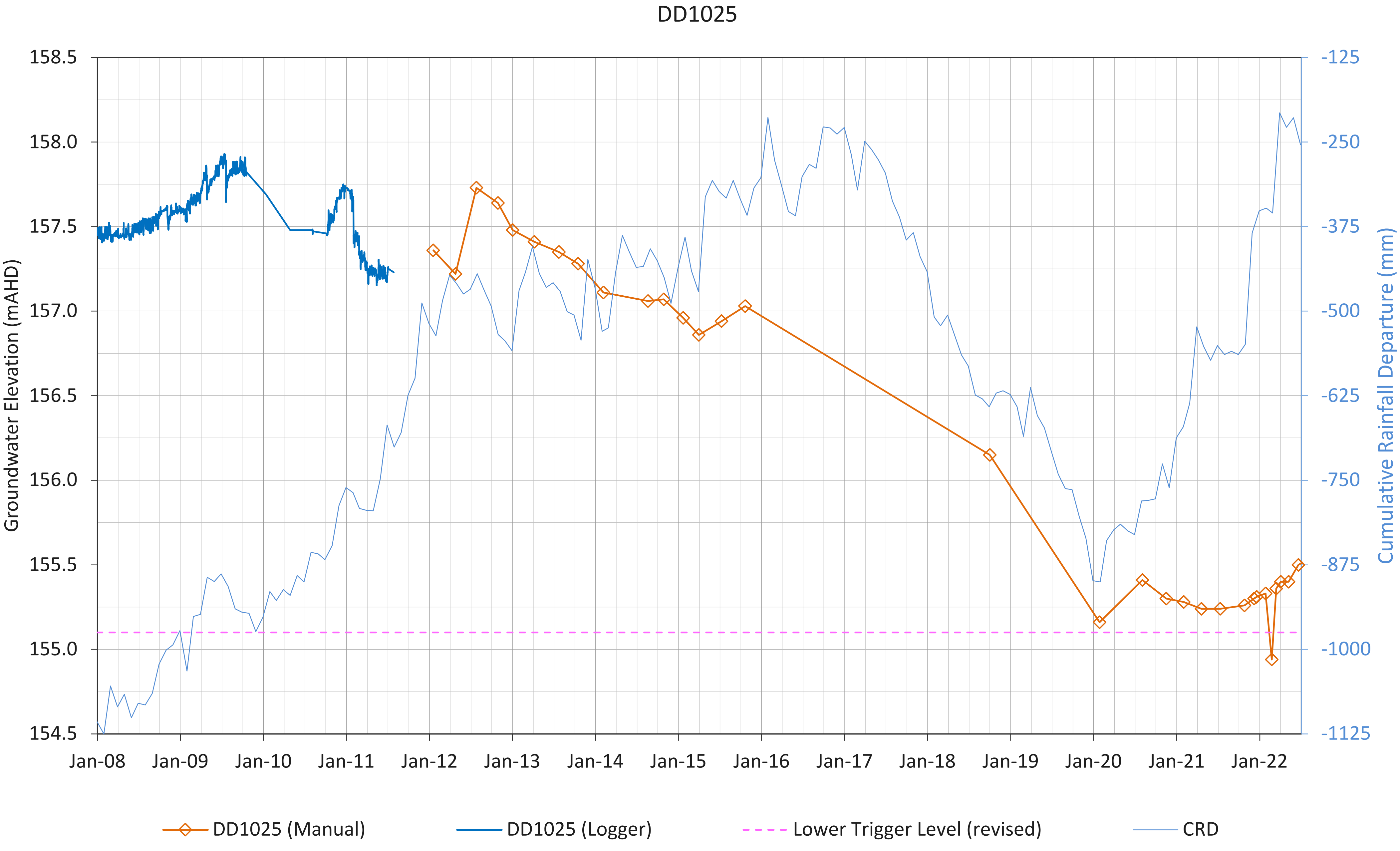

DD1015
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
129.0
128.5
128.0
127.5
127.0
126.5
126.0
125.5
125.0
124.5
124.0
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1015 (Manual)
CRD

Figure B12



DD1016
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
144.0
143.5
143.0
142.5
142.0
141.5
141.0
140.5
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1016 (Manual)
CRD

Figure B13



DD1025
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
158.5
158.0
157.5
157.0
156.5
156.0
155.5
155.0
154.5
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1025 (Manual)
DD1025 (Logger)
Lower Trigger Level (revised)
CRD

Figure B14

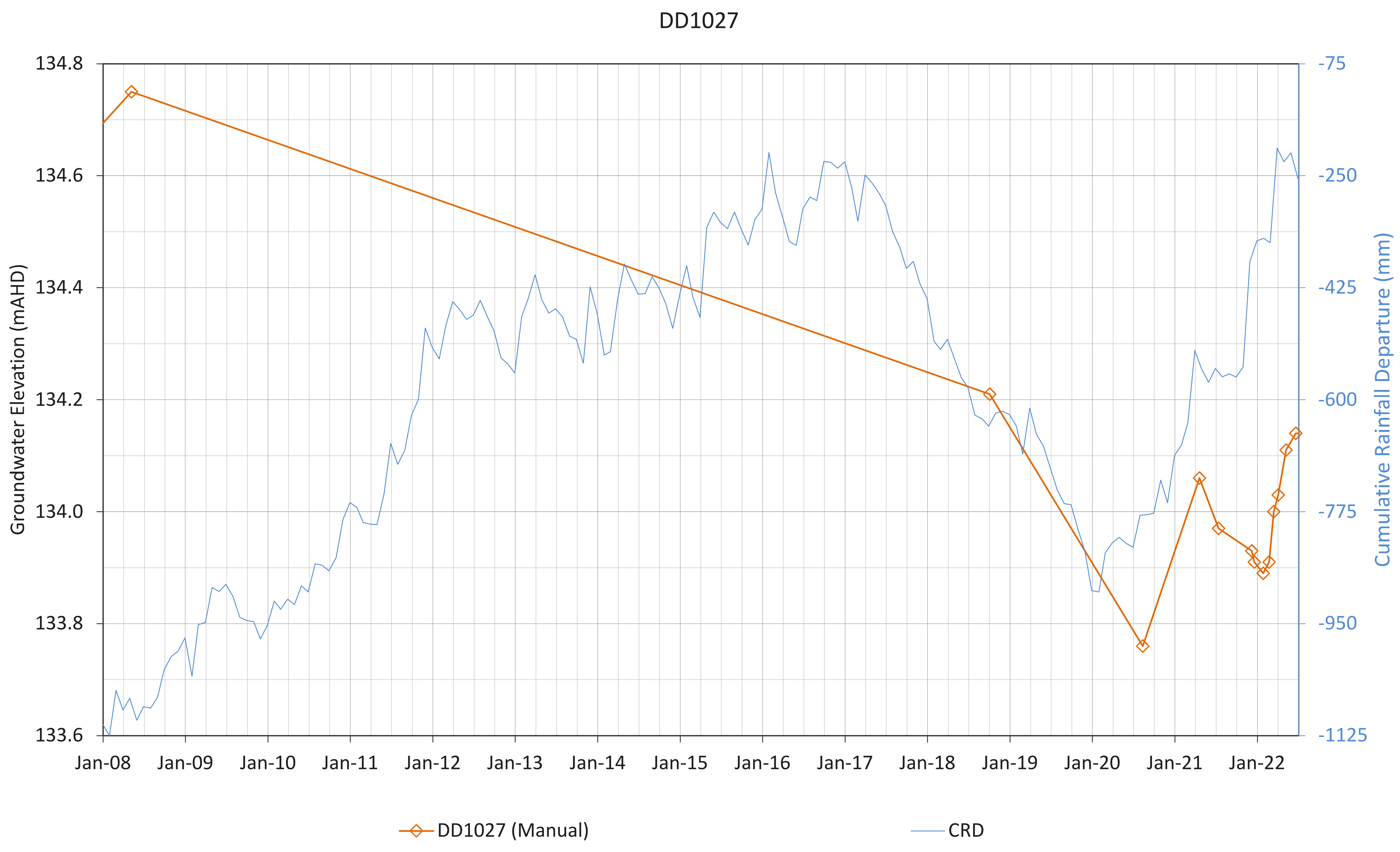

DD1027
Groundwater Elevation (mAHD)
134.8
134.6
134.4
134.2
134.0
133.8
133.6
Cumulative Rainfall Departure (mm)
-75
-250
-425
-600
-775
-950
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1027 (Manual)
CRD

Figure B15

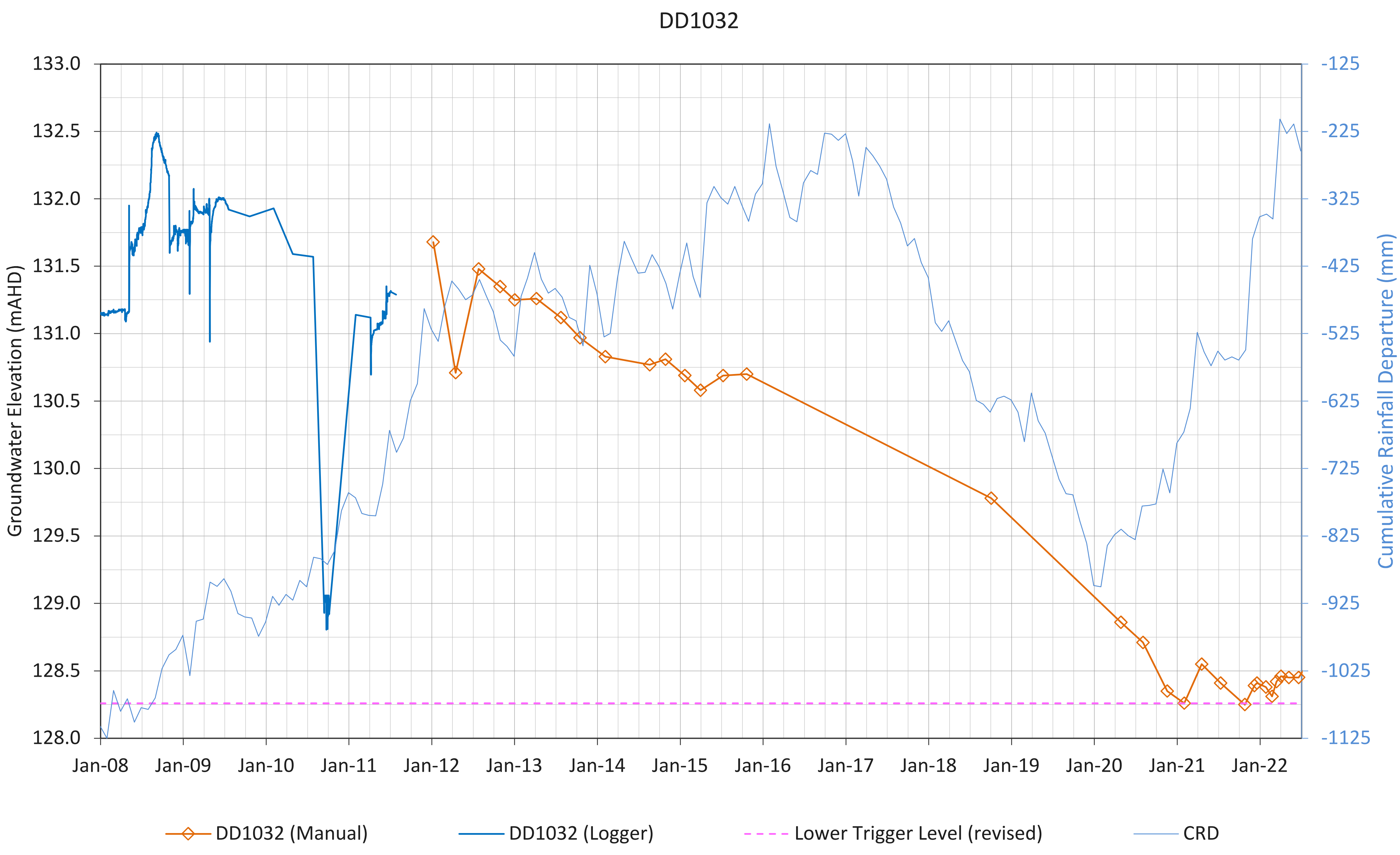

DD1032
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
133.0
132.5
132.0
131.5
131.0
130.5
130.0
129.5
129.0
128.5
128.0
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1032 (Manual)
DD1032 (Logger)
Lower Trigger Level (revised)
CRD

Figure B16

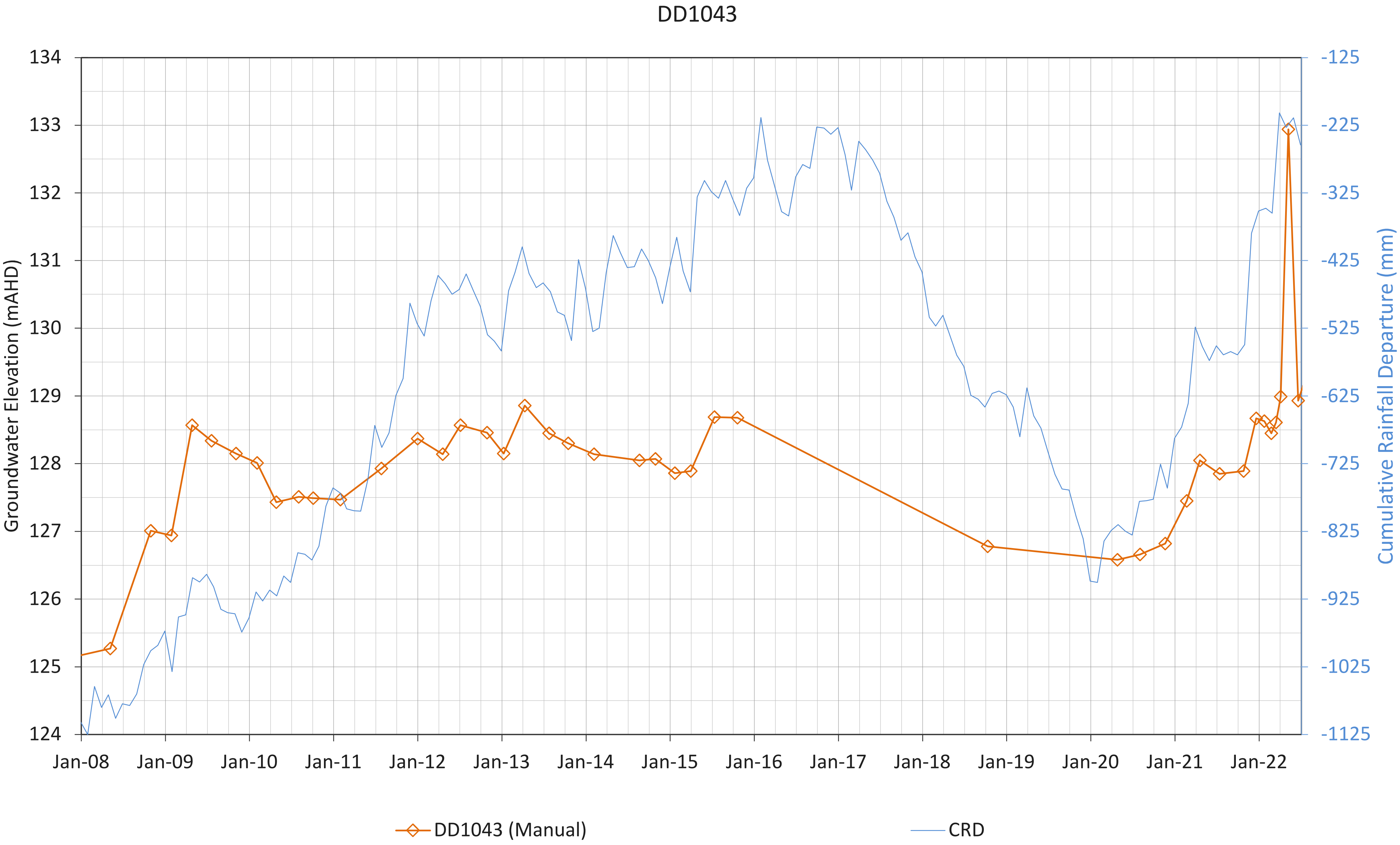

DD1043
134
133
132
131
130
129
128
127
126
125
124
Groundwater Elevation (mAHD)
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Cumulative Rainfall Departure (mm)
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1043 (Manual)
CRD

Figure B17

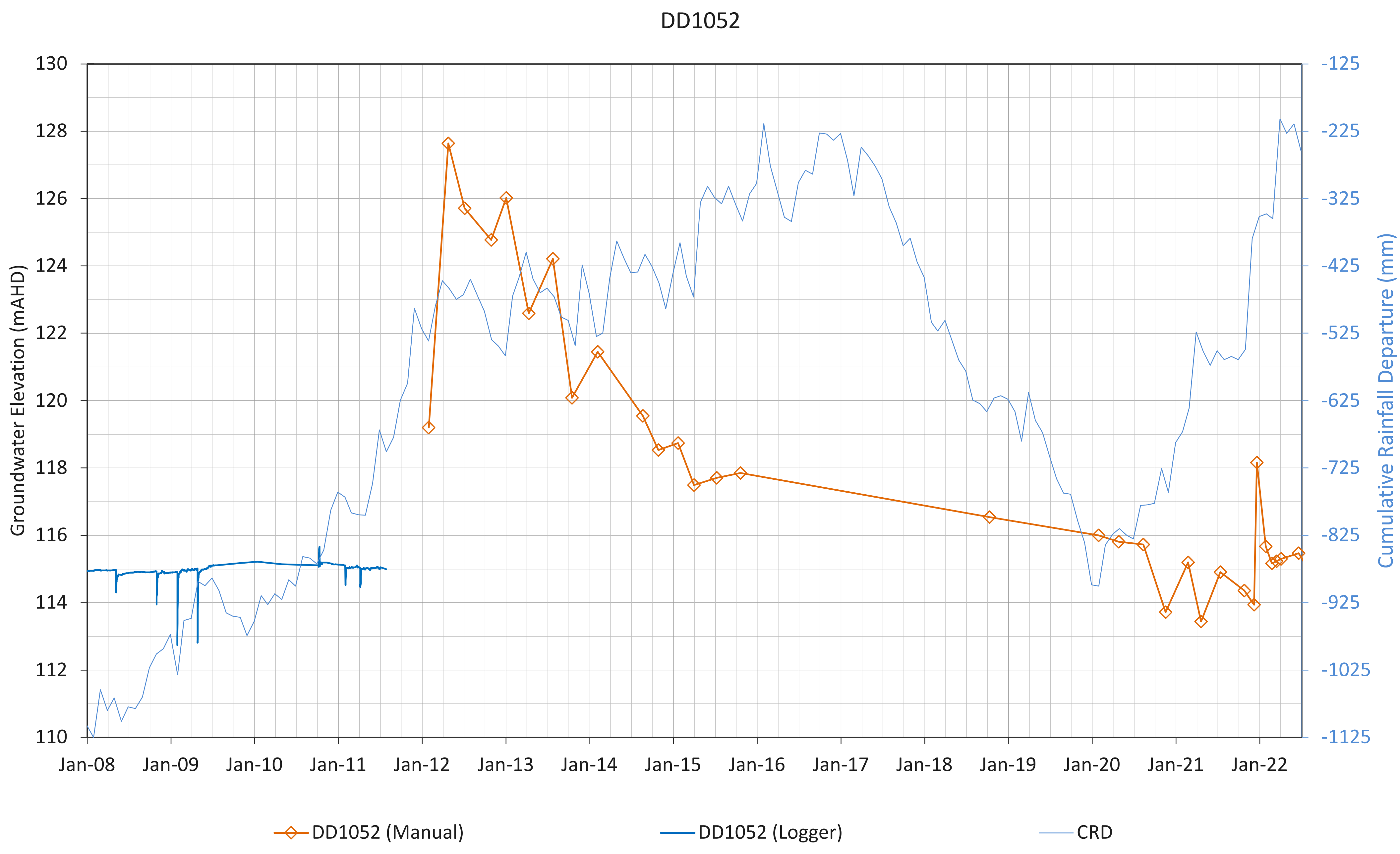
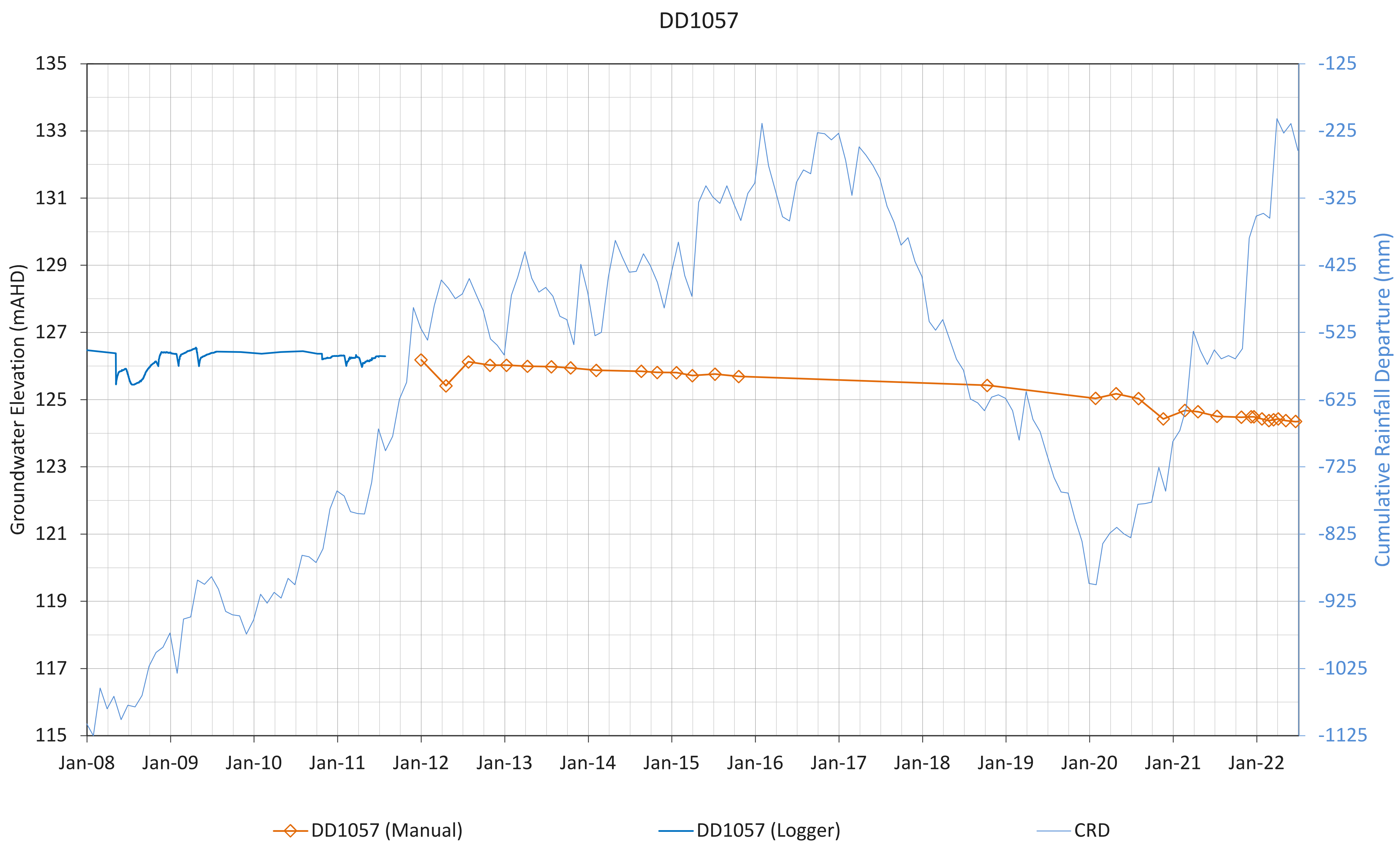
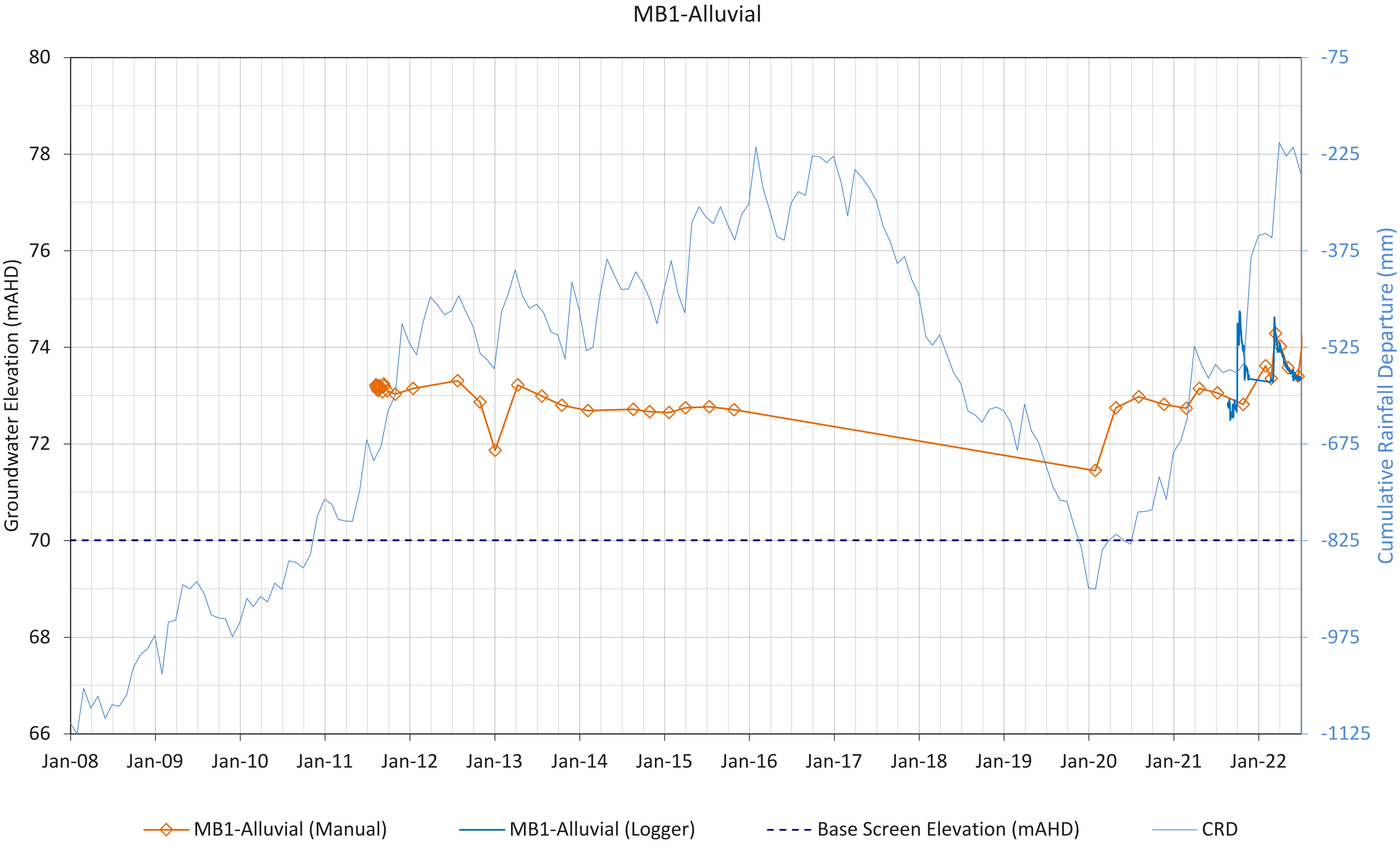

DD1052
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
130
128
126
124
122
120
118
116
114
112
110
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1052 (Manual)
DD1052 (Logger)
CRD

Figure B18



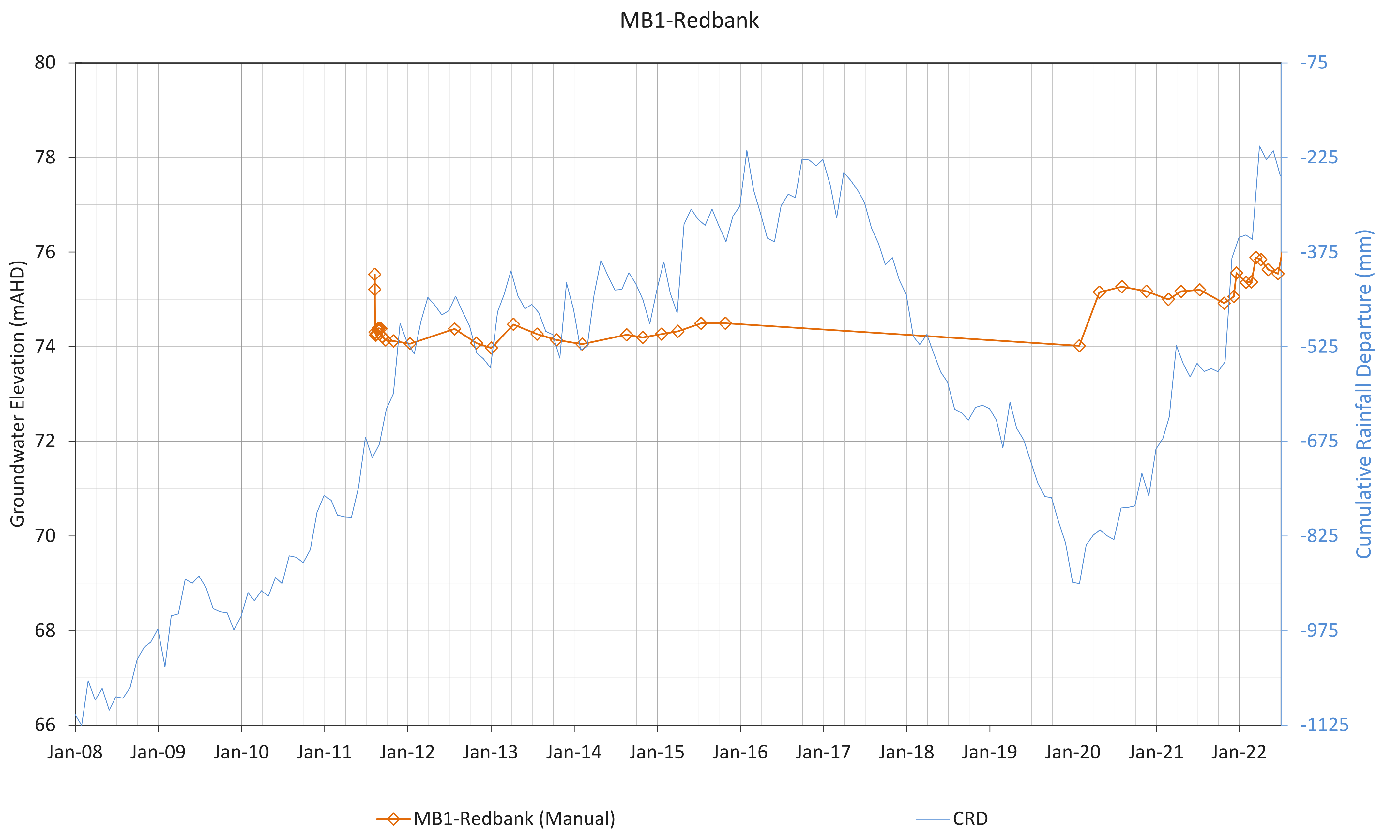
DD1057
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
135
133
131
129
127
125
123
121
119
117
115
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
DD1057 (Manual)
DD1057 (Logger)
CRD

Figure B19



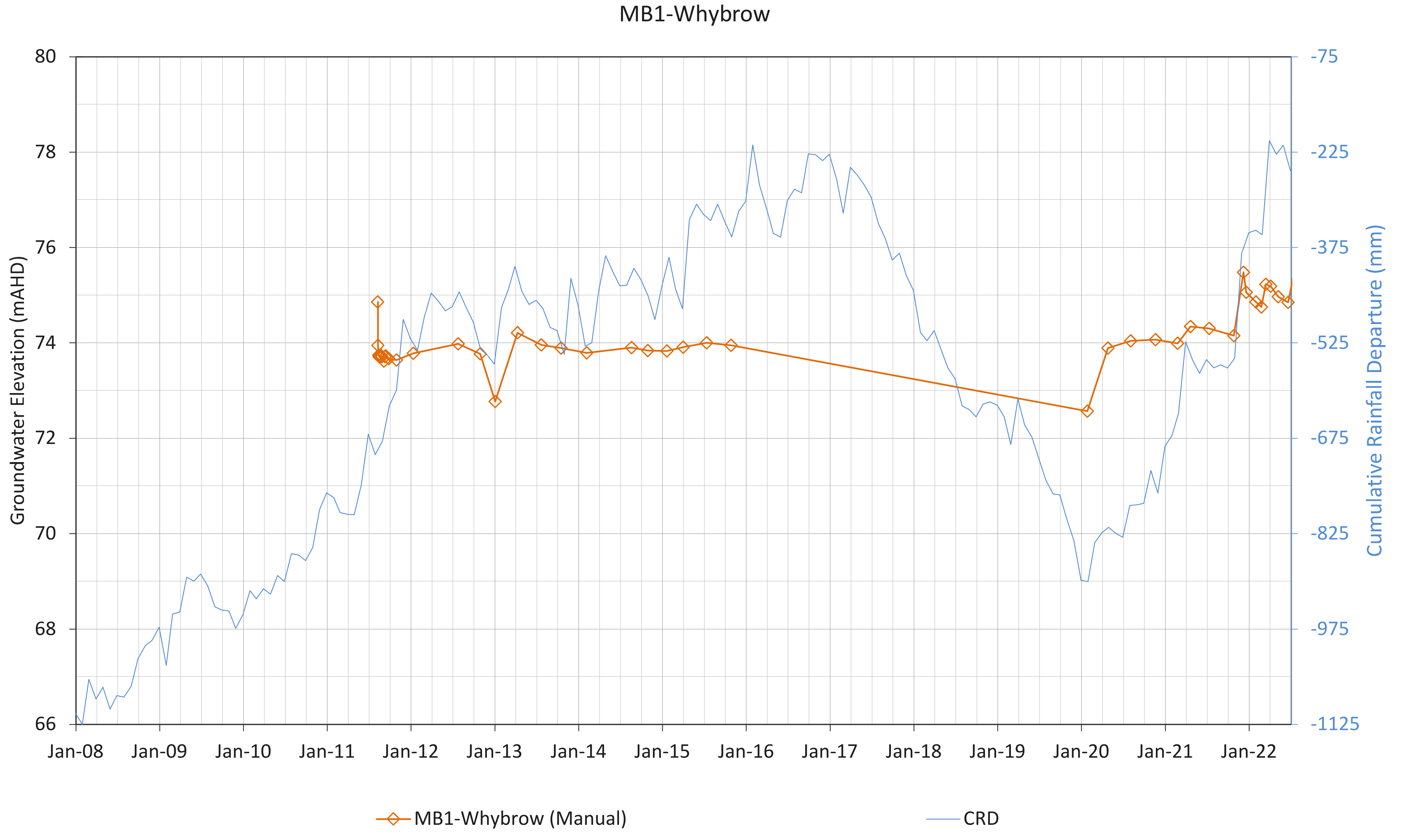
MB1-Alluvial
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
80
78
76
74
72
70
68
66
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB1-Alluvial (Manual)
MB1-Alluvial (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B20



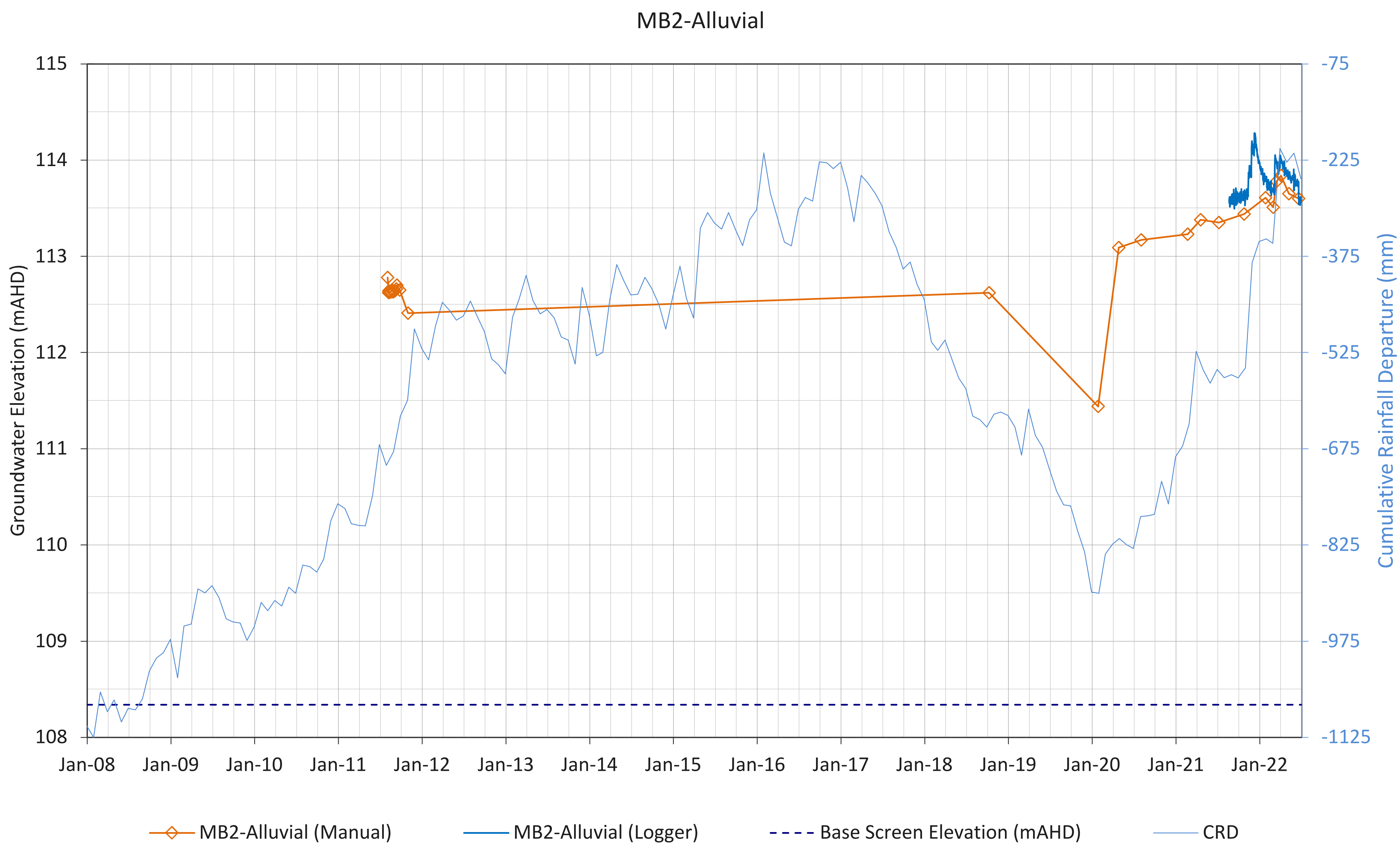
MB1-Redbank
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
80
78
76
74
72
70
68
66
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB1-Redbank (Manual)
CRD

Figure B21



MB1-Whybrow
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
80
78
76
74
72
70
68
66
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB1-Whybrow (Manual)
CRD

Figure B22



MB2-Alluvial
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
115
114
113
112
111
110
109
108
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB2-Alluvial (Manual)
MB2-Alluvial (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B23

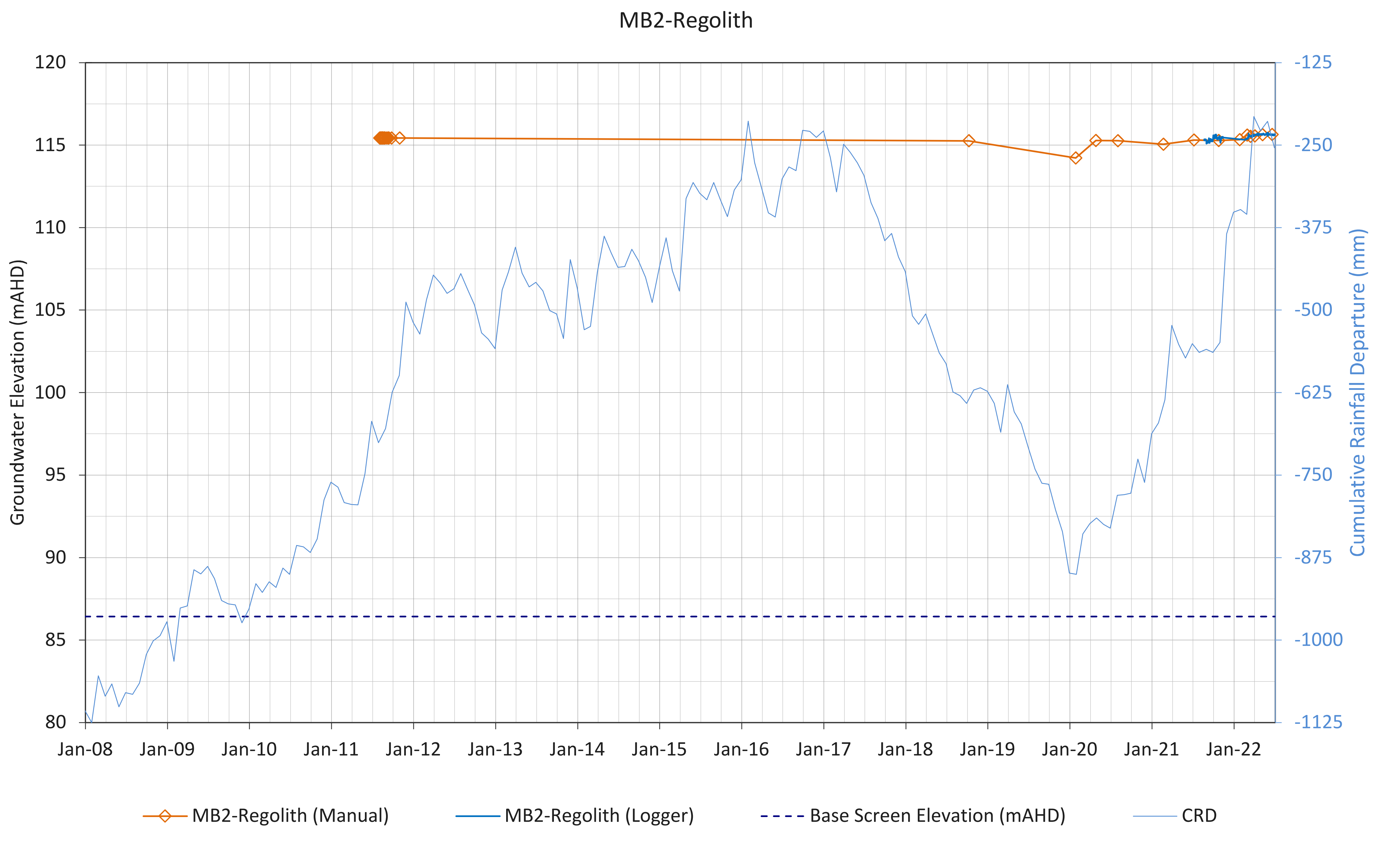

MB2-Regolith
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
120
115
110
105
100
95
90
85
80
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB2-Regolith (Manual)
MB2-Regolith (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B24

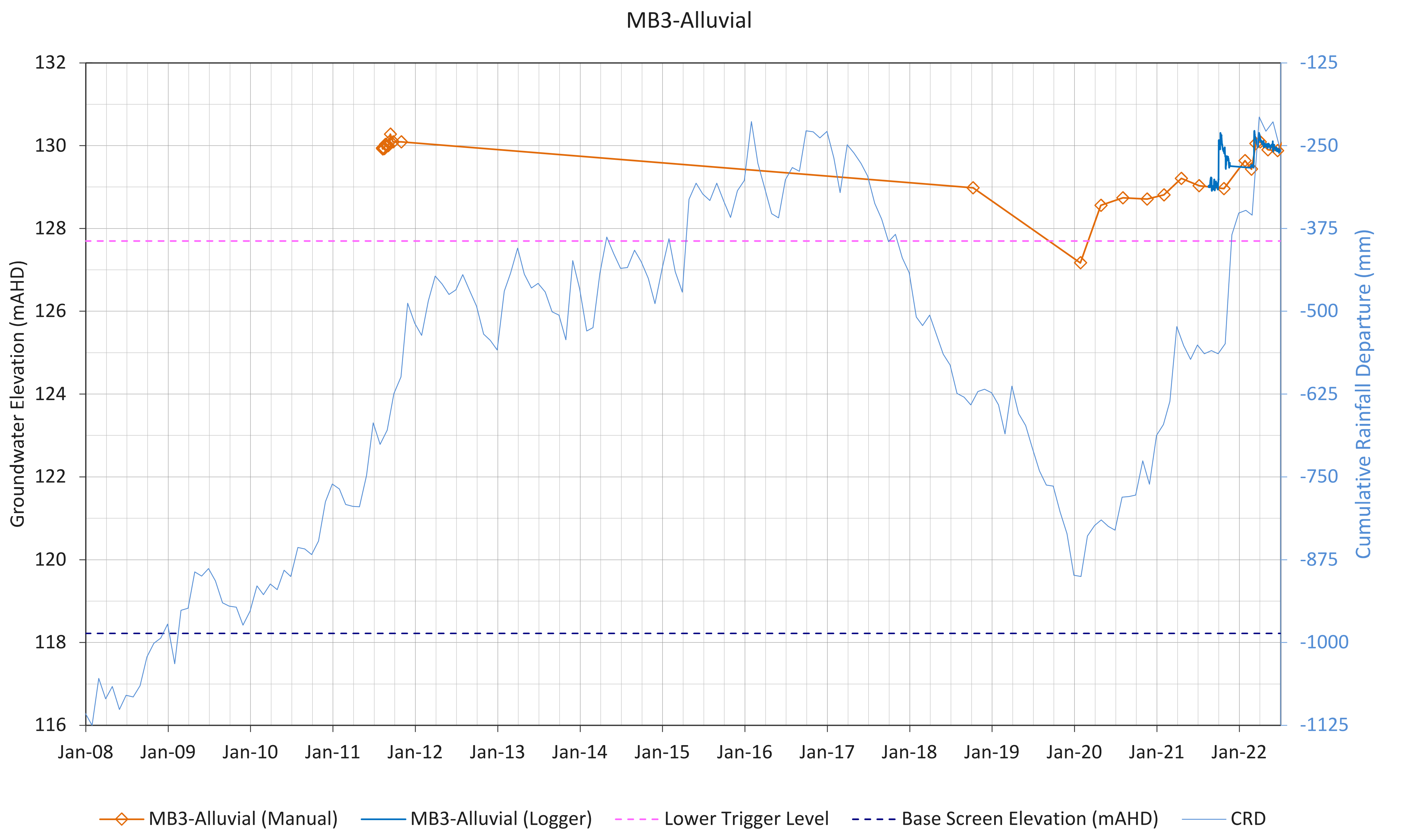

MB3-Alluvial
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
132
130
128
126
124
122
120
118
116
-125
-250
-375
-500
-625
-750
-875
-1000
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB3-Alluvial (Manual)
MB3-Alluvial (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B25

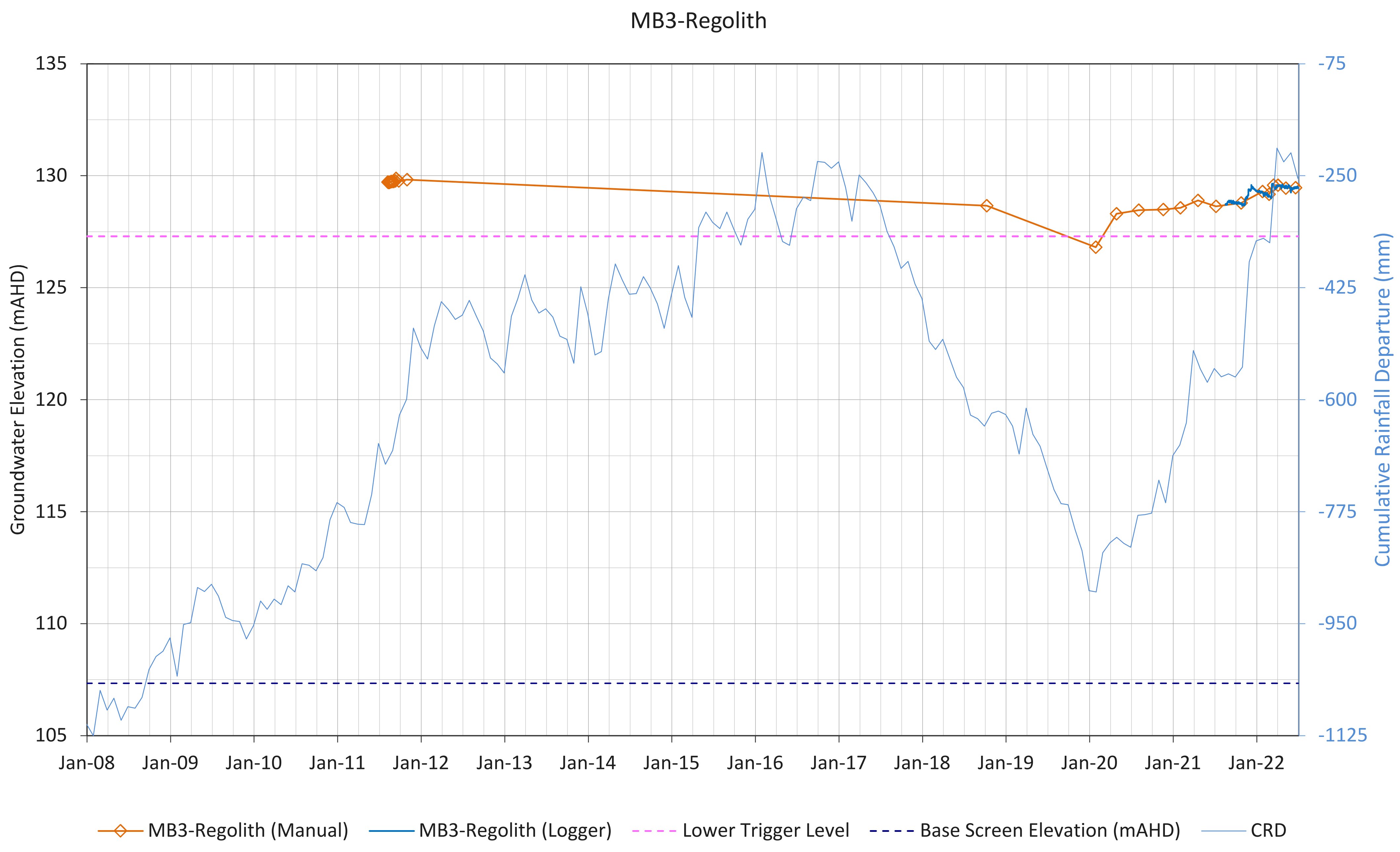
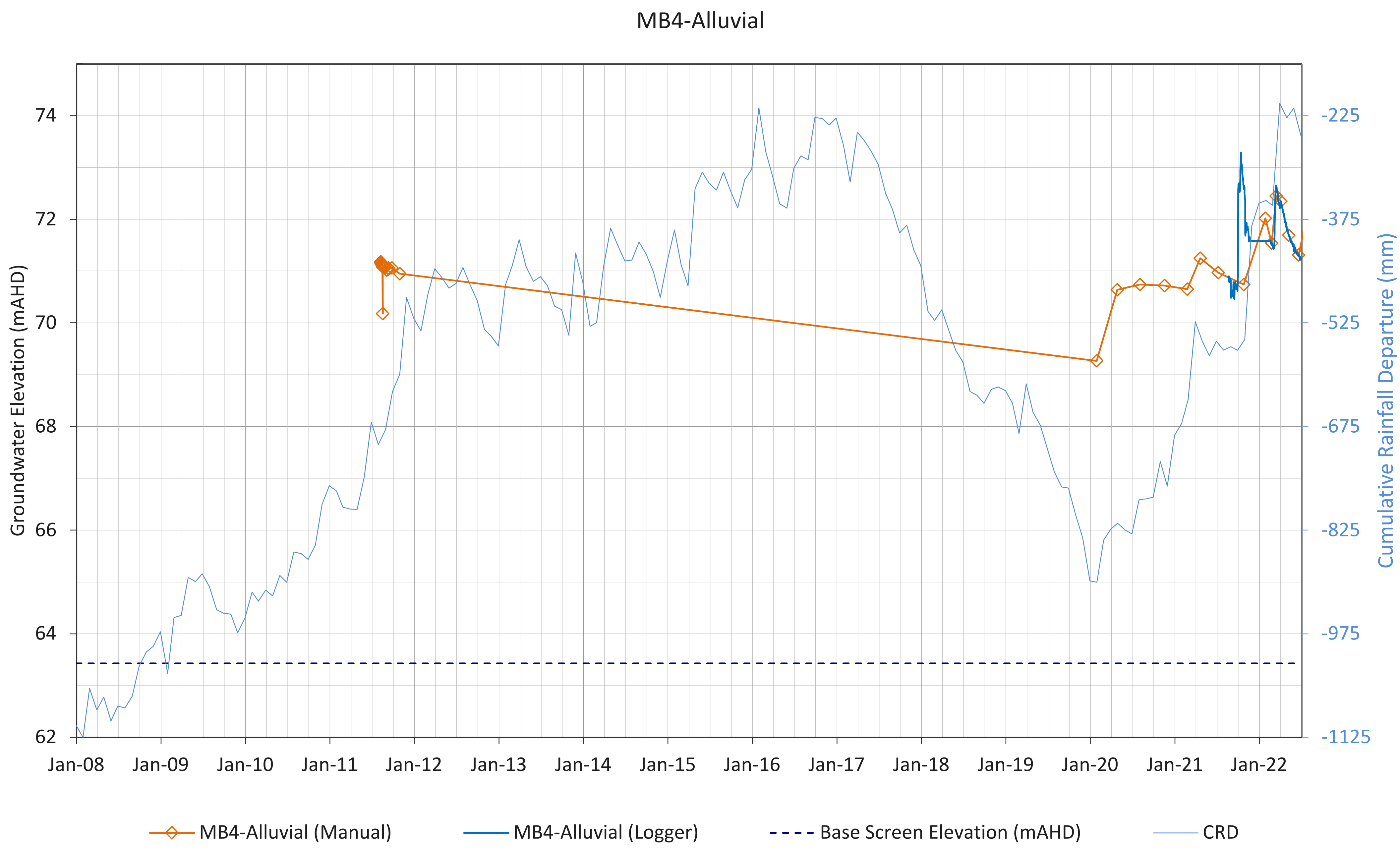
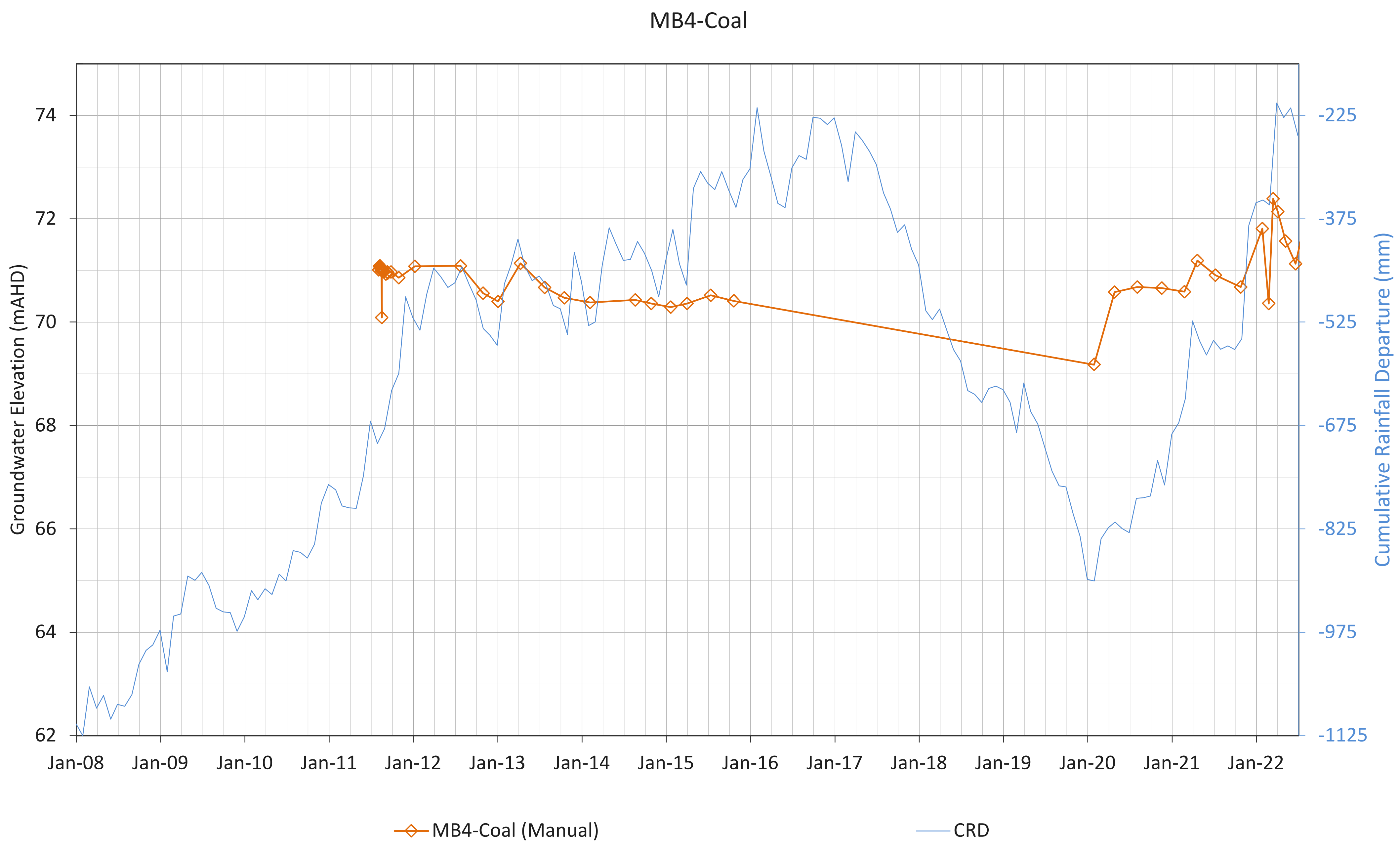

MB3-Regolith
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
135
130
125
120
115
110
105
-75
-250
-425
-600
-775
-950
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB3-Regolith (Manual)
MB3-Regolith (Logger)
Lower Trigger Level
Base Screen Elevation (mAHD)
CRD

Figure B26



MB4-Alluvial
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
74
72
70
68
66
64
62
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB4-Alluvial (Manual)
MB4-Alluvial (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B27



MB4-Coal
Groundwater Elevation (mAHD)
74
72
70
68
66
64
62
Cumulative Rainfall Departure (mm)
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB4-Coal (Manual)
CRD

Figure B28

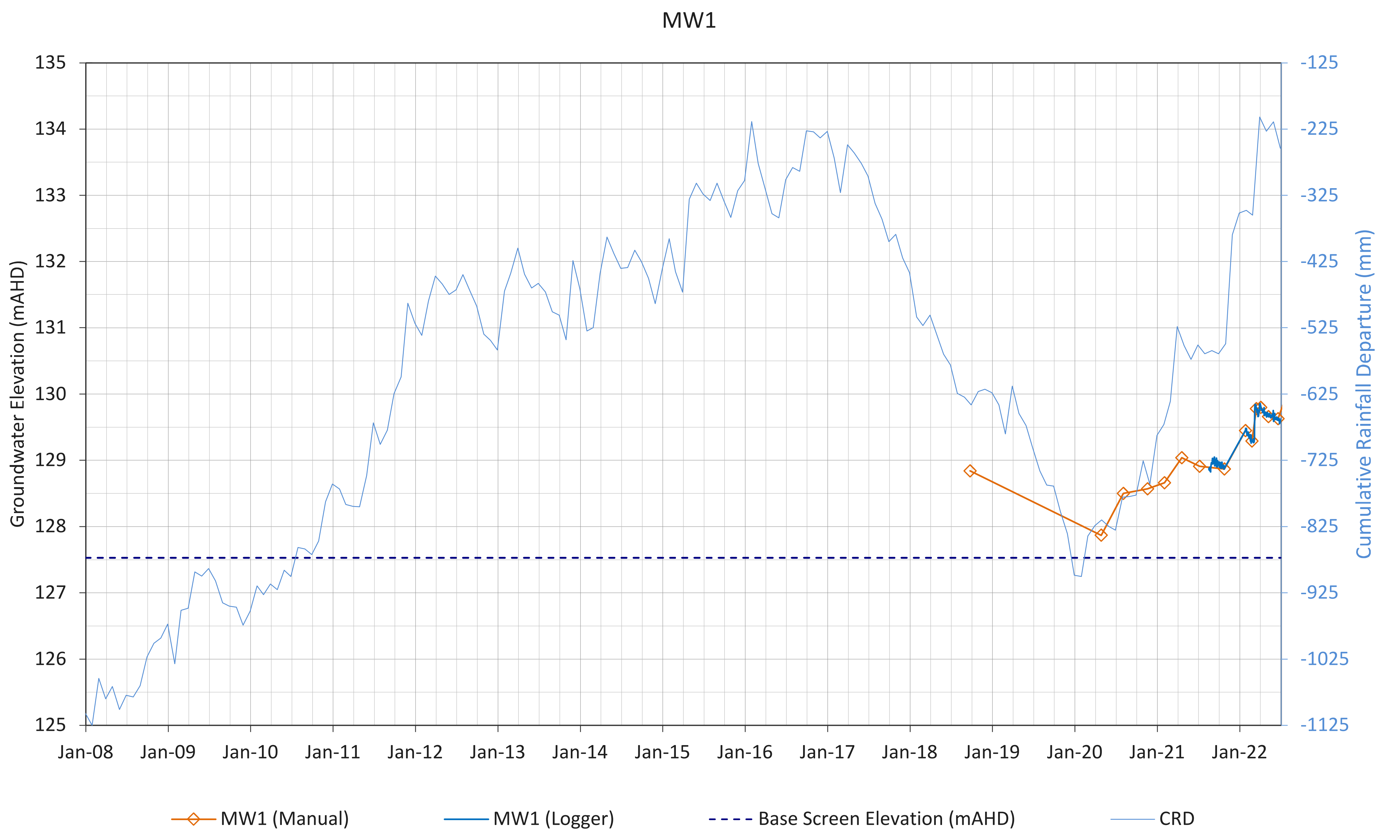
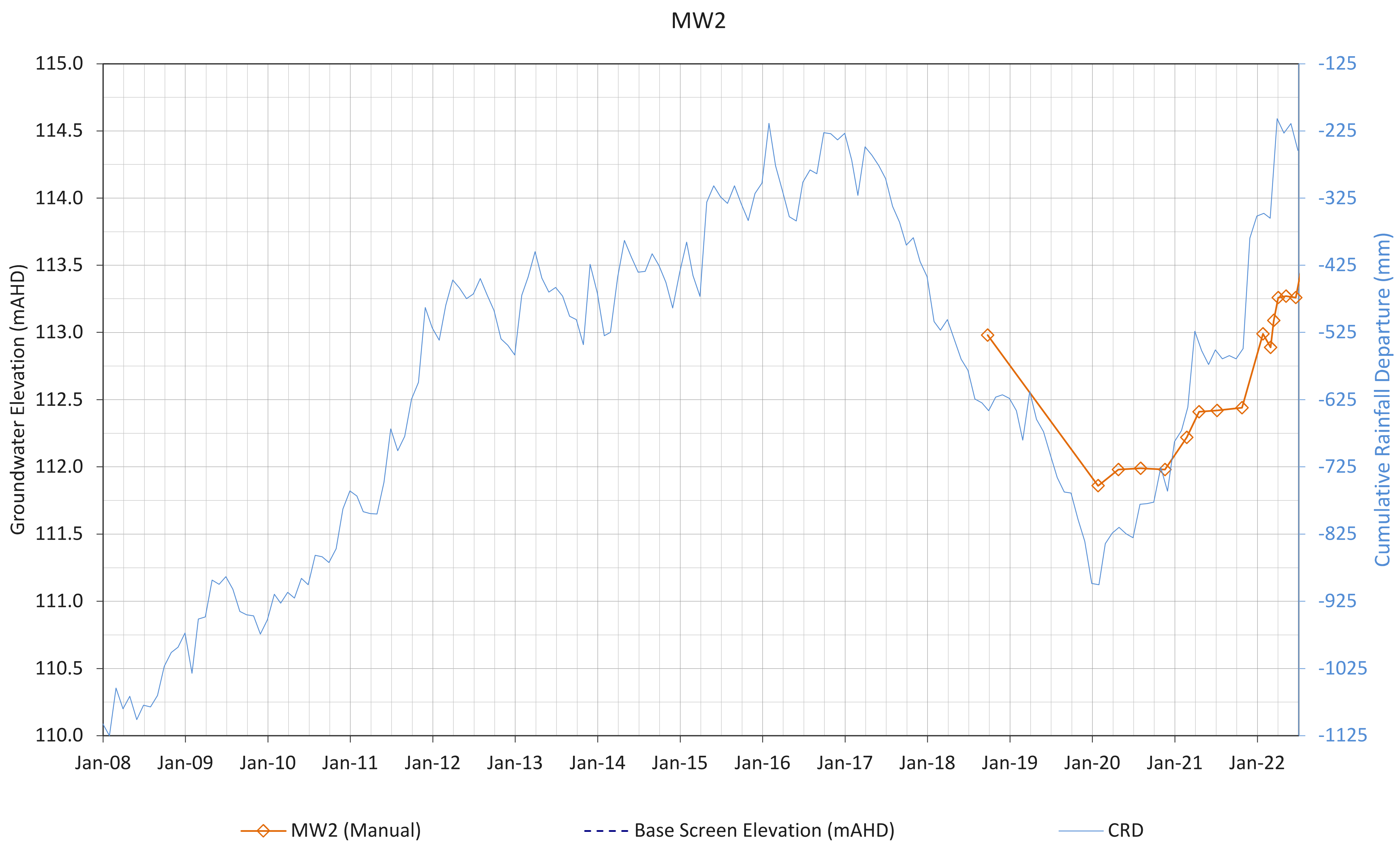

MW1
135
134
133
132
131
130
129
128
127
126
125
Groundwater Elevation (mAHD)
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Cumulative Rainfall Departure (mm)
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MW1 (Manual)
MW1 (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B29



MW2
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
115.0
114.5
114.0
113.5
113.0
112.5
112.0
111.5
111.0
110.5
110.0
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MW2 (Manual)
Base Screen Elevation (mAHD)
CRD

Figure B30

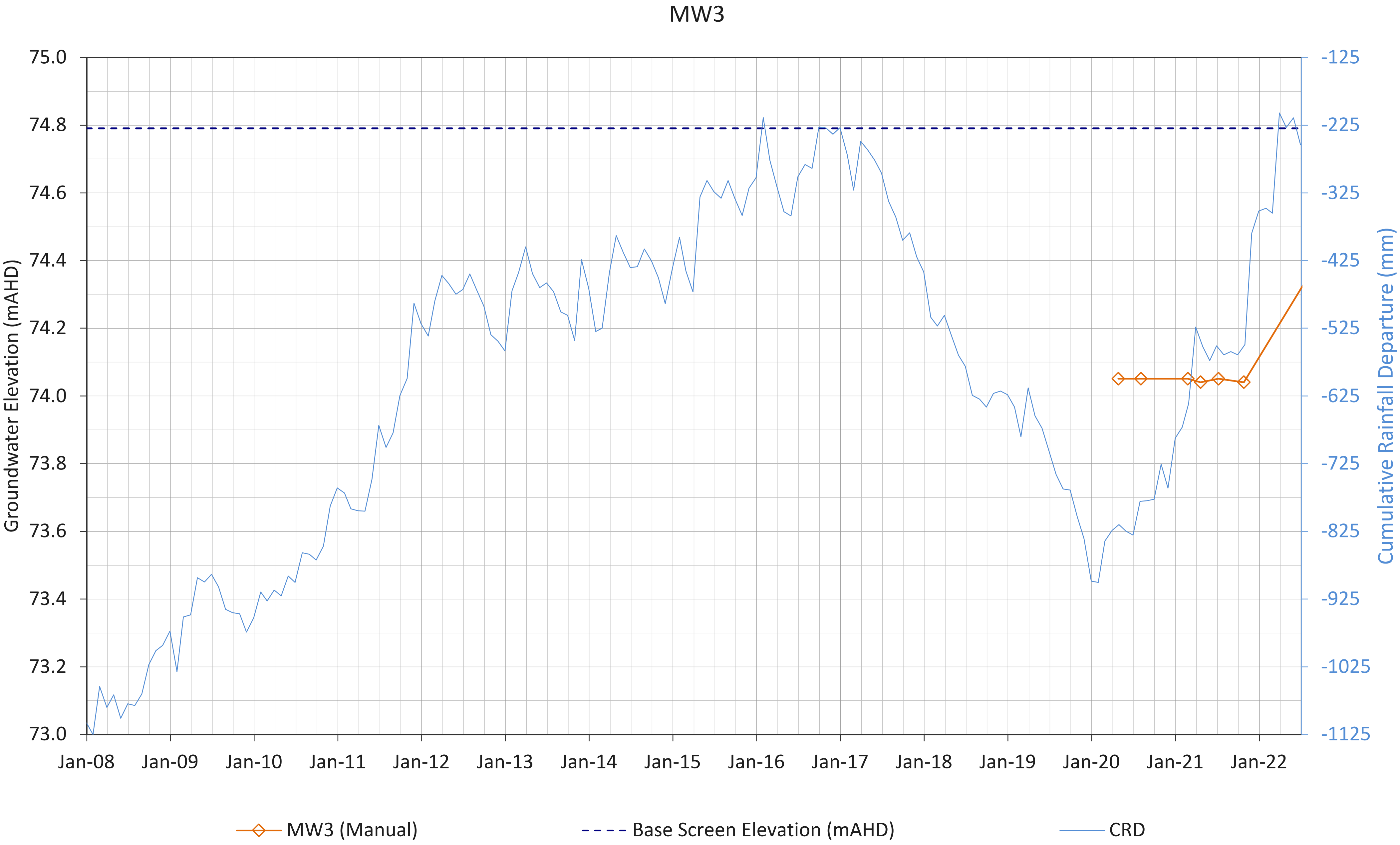
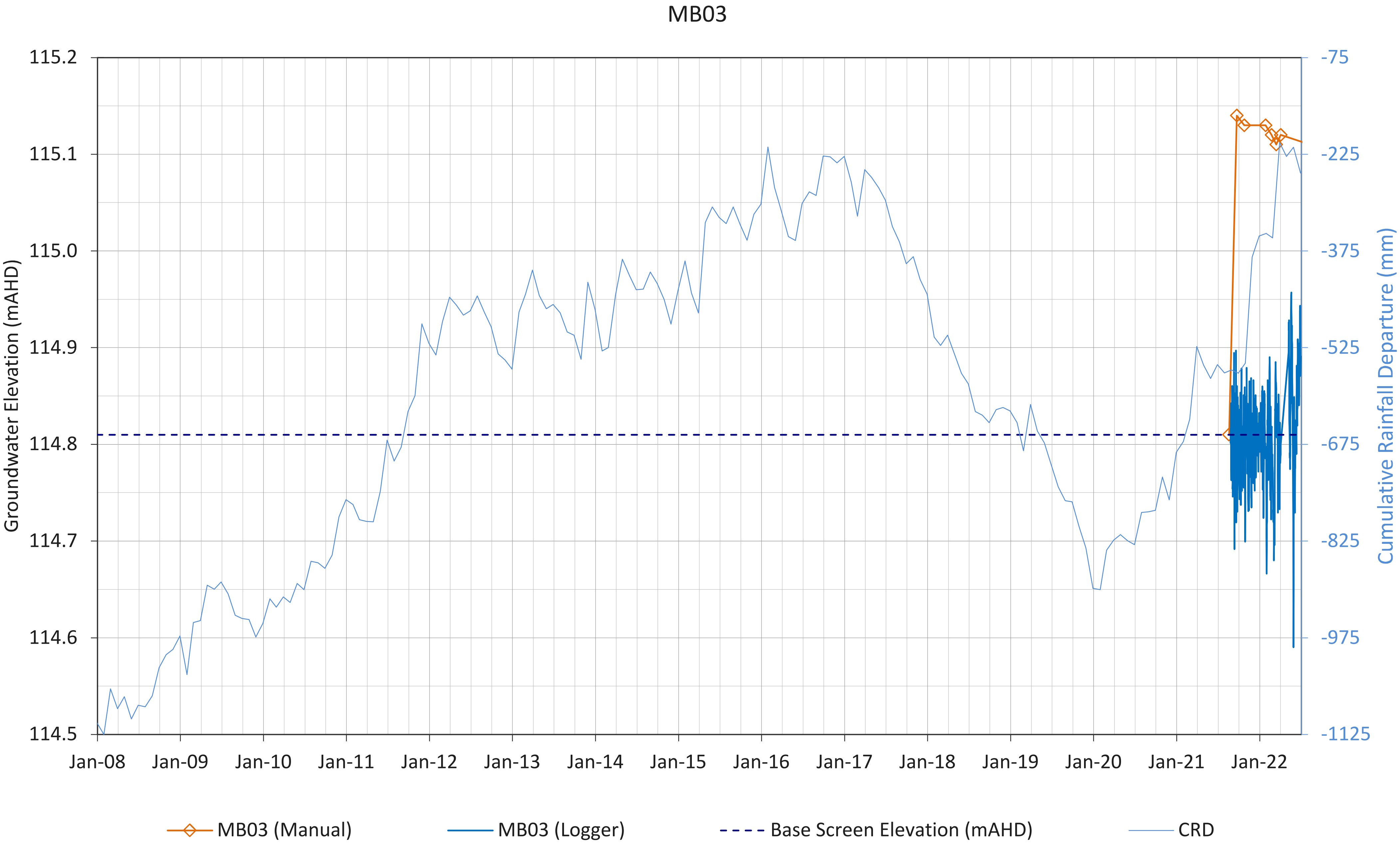

MW3
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
75.0
74.8
74.6
74.4
74.2
74.0
73.8
73.6
73.4
73.2
73.0
-125
-225
-325
-425
-525
-625
-725
-825
-925
-1025
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MW3 (Manual)
Base Screen Elevation (mAHD)
CRD

Figure B31



MB03
Groundwater Elevation (mAHD)
115.2
115.1
115.0
114.9
114.8
114.7
114.6
114.5
Cumulative Rainfall Departure (mm)
-75
-225
-375
-525
-675
-825
-975
-1125
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
MB03 (Manual)
MB03 (Logger)
Base Screen Elevation (mAHD)
CRD

Figure B32

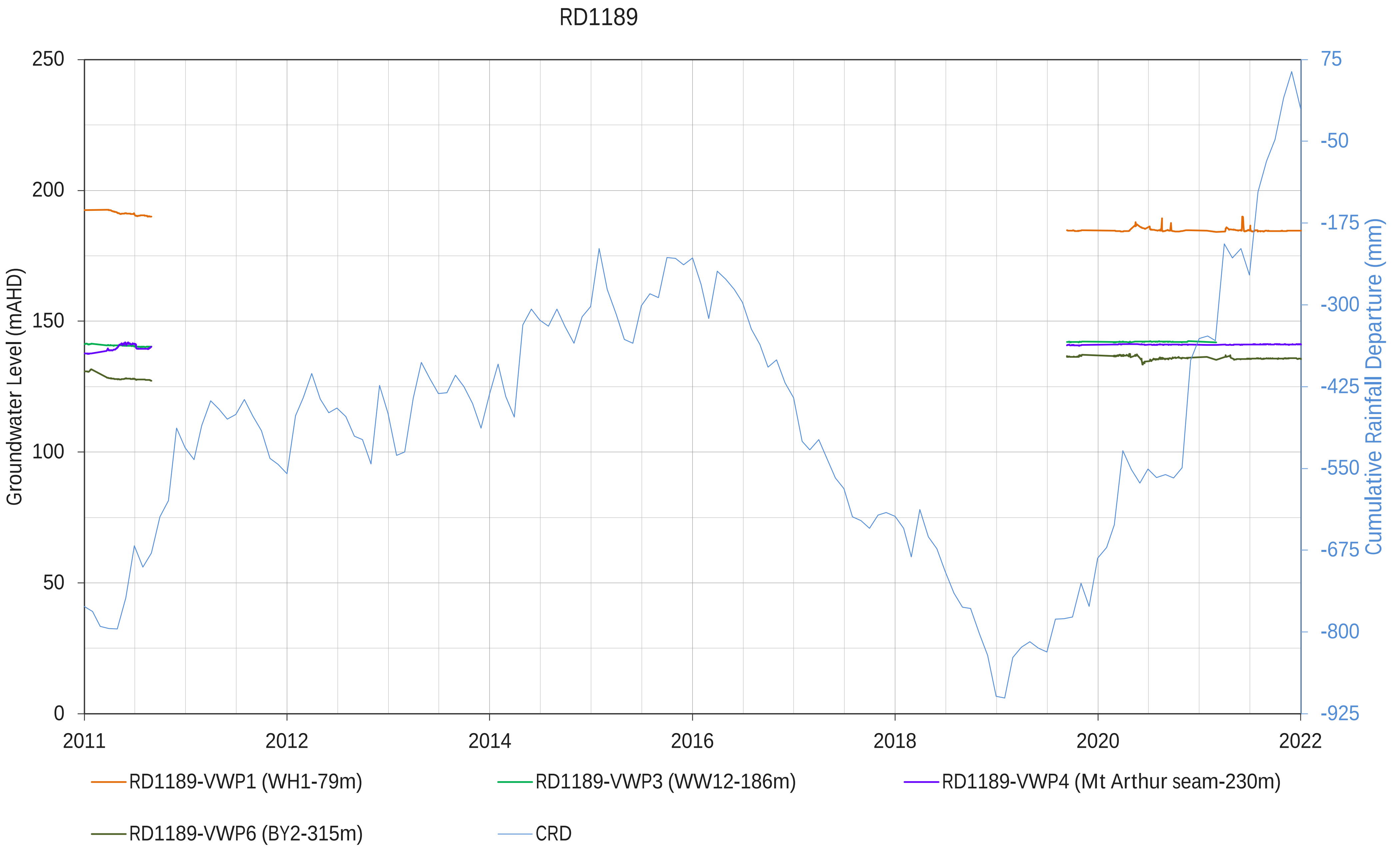

RD1189
Groundwater Level (mAHD)
Cumulative Rainfall Departure (mm)
250
200
150
100
50
0
75
-50
-175
-300
-425
-550
-675
-800
-925
2011
2012
2014
2016
2018
2020
2022
RD1189-VWP1 (WH1-79m)
RD1189-VWP3 (WW12-186m)
RD1189-VWP4 (Mt Arthur seam-230m)
RD1189-VWP6 (BY2-315m)
CRD

Figure B33

RD1192
Groundwater Level (mAHD)
Cumulative Rainfall Departure (mm)
155
150
145
140
135
130
125
125
-50
-225
-400
-575
-750
-925
2011
2012
2014
2016
2018
2020
2022
RD1192-VWP1 (WB1-61m)
RD1192-VWP2 (RB3-80m)
RD1192-VWP3 (BK1-148.5m)
CRD

Figure B34

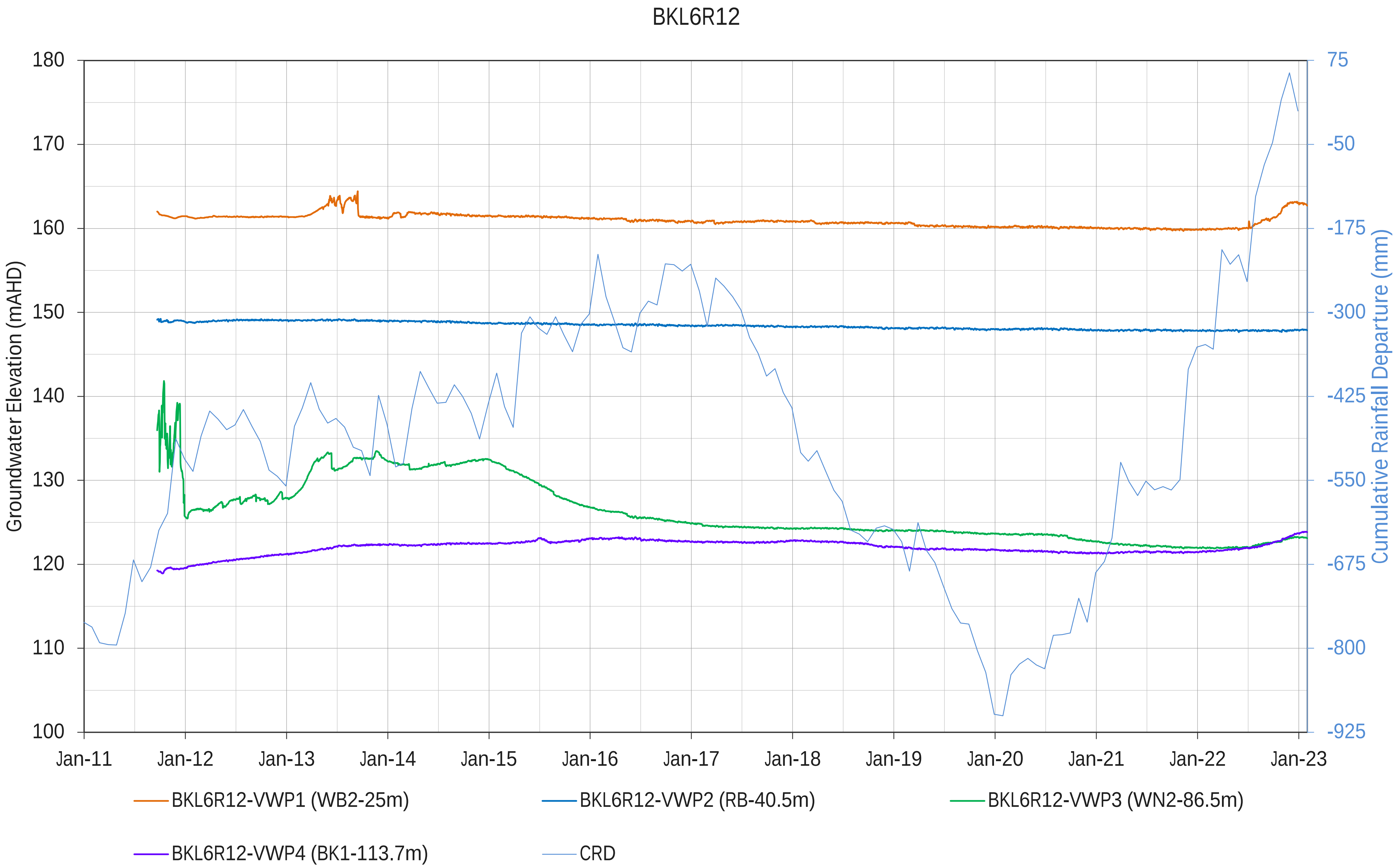

BKL6R12
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
180
170
160
150
140
130
120
110
100
75
-50
-175
-300
-425
-550
-675
-800
-925
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
BKL6R12-VWP1 (WB2-25m)
BKL6R12-VWP2 (RB-40.5m)
BKL6R12-VWP3 (WN2-86.5m)
BKL6R12-VWP4 (BK1-113.7m)
CRD

Figure B35

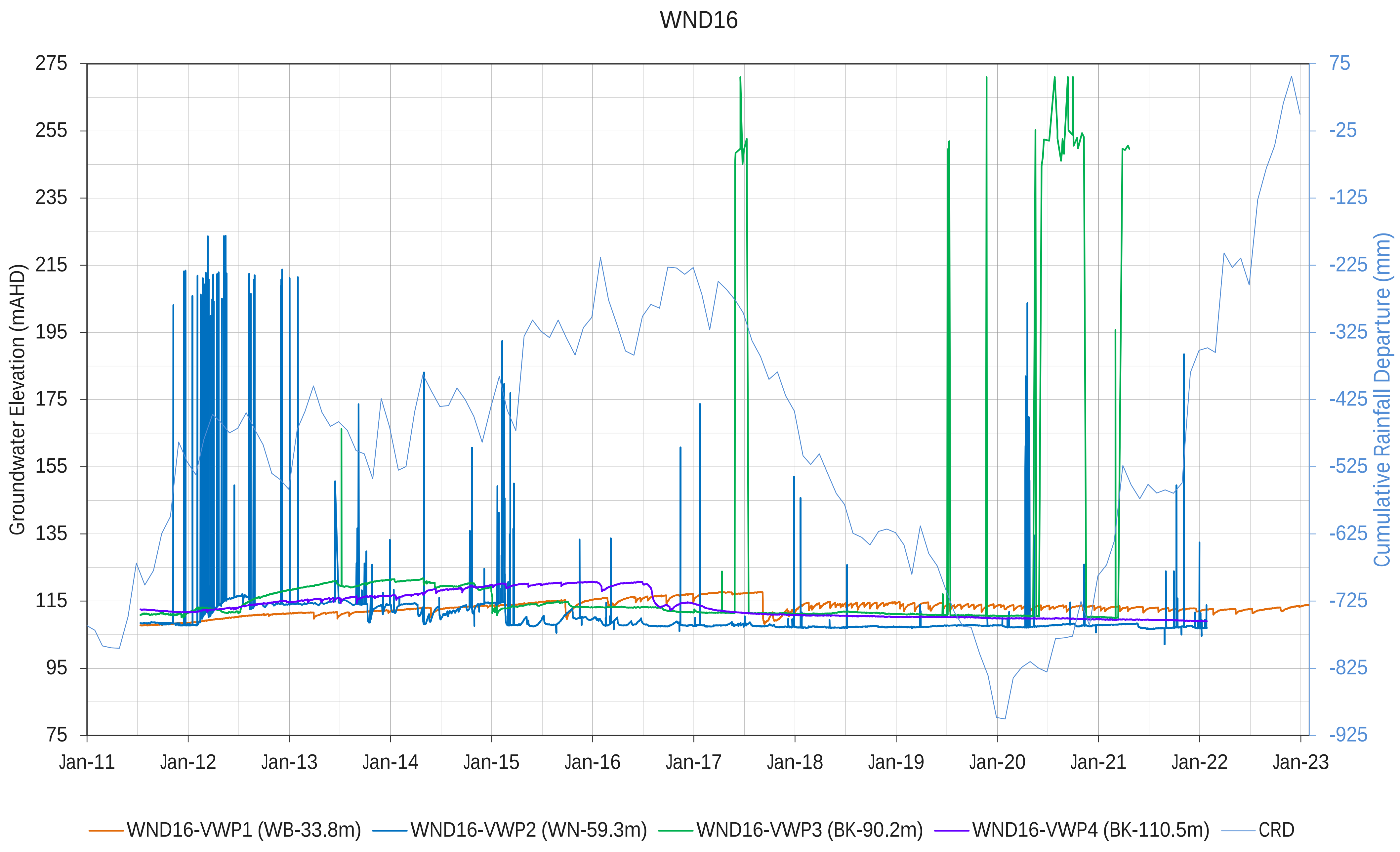
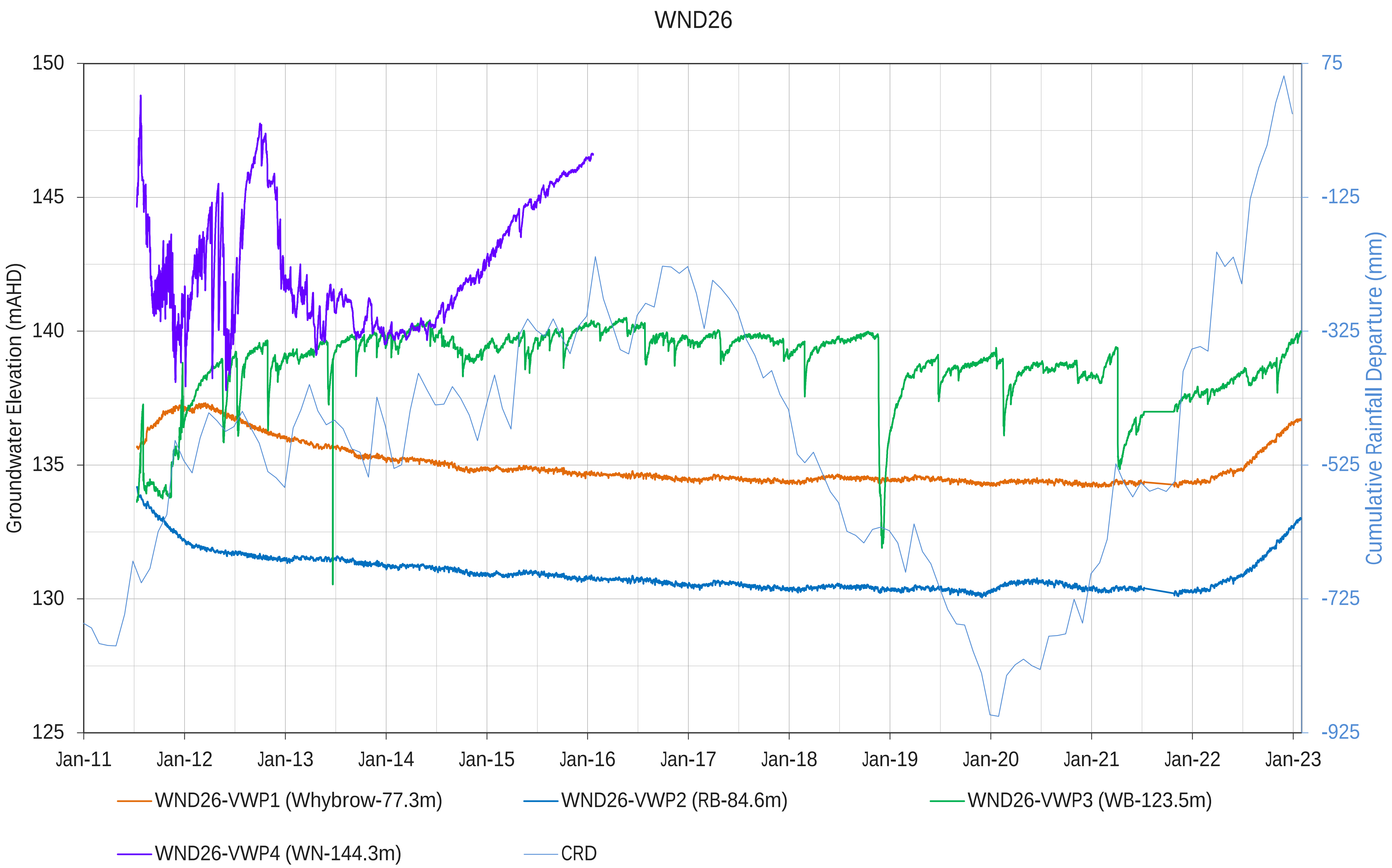
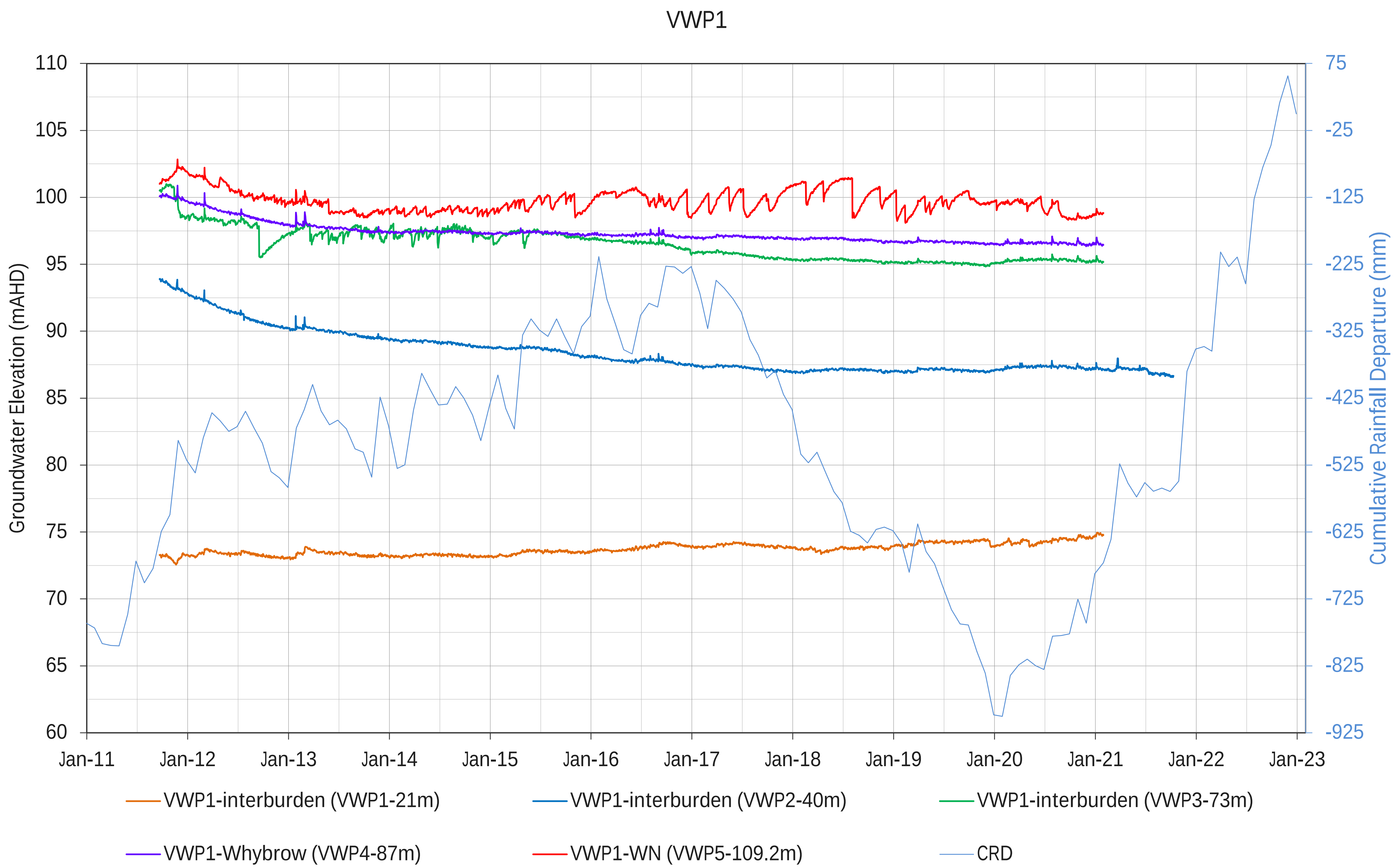

WND16
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
275
255
235
215
195
175
155
135
115
95
75
75
-25
-125
-225
-325
-425
-525
-625
-725
-825
-925
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
WND16-VWP1 (WB-33.8m)
WND16-VWP2 (WN-59.3m)
WND16-VWP3 (BK-90.2m)
WND16-VWP4 (BK-110.5m)
CRD

Figure B36



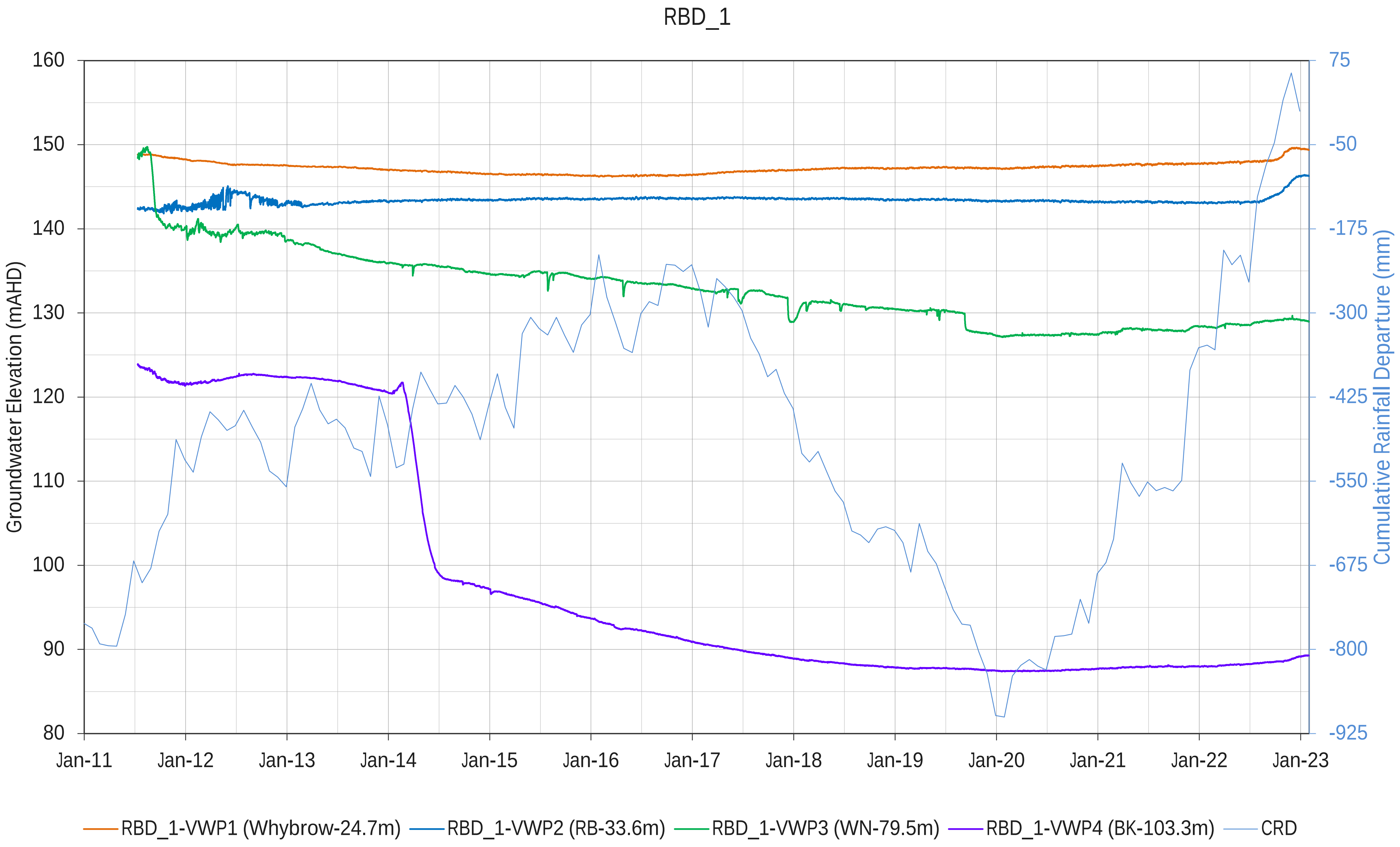
WND26
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
150
145
140
135
130
125
75
-125
-325
-525
-725
-925
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
WND26-VWP1 (Whybrow-77.3m)
WND26-VWP2 (RB-84.6m)
WND26-VWP3 (WB-123.5m)
WND26-VWP4 (WN-144.3m)
CRD

Figure B37



VWP1
Groundwater Elevation (mAHD)
110
105
100
95
90
85
80
75
70
65
60
Cumulative Rainfall Departure (mm)
75
-25
-125
-225
-325
-425
-525
-625
-725
-825
-925
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
VWP1-interburden (VWP1-21m)
VWP1-interburden (VWP2-40m)
VWP1-interburden (VWP3-73m)
VWP1-Whybrow (VWP4-87m)
VWP1-WN (VWP5-109.2m)
CRD

Figure B38



RBD_1
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
160
150
140
130
120
110
100
90
80
75
-50
-175
-300
-425
-550
-675
-800
-925
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
Jan-23
RBD_1-VWP1 (Whybrow-24.7m)
RBD_1-VWP2 (RB-33.6m)
RBD_1-VWP3 (WN-79.5m)
RBD_1-VWP4 (BK-103.3m)
CRD

Figure B39

APPENDIX C

Groundwater Quality and Trigger Levels (only sites within the TARP)

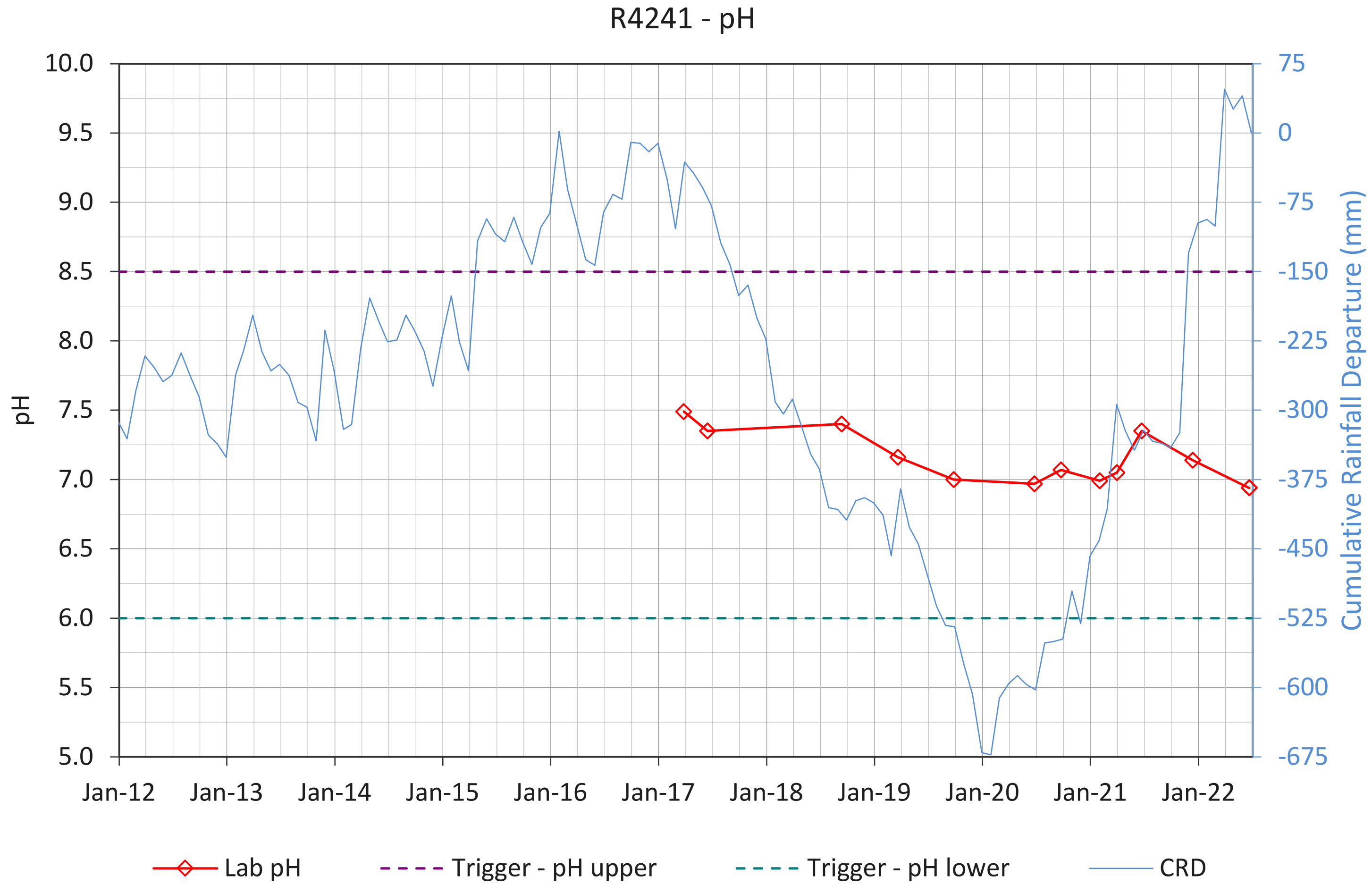


Figure C1

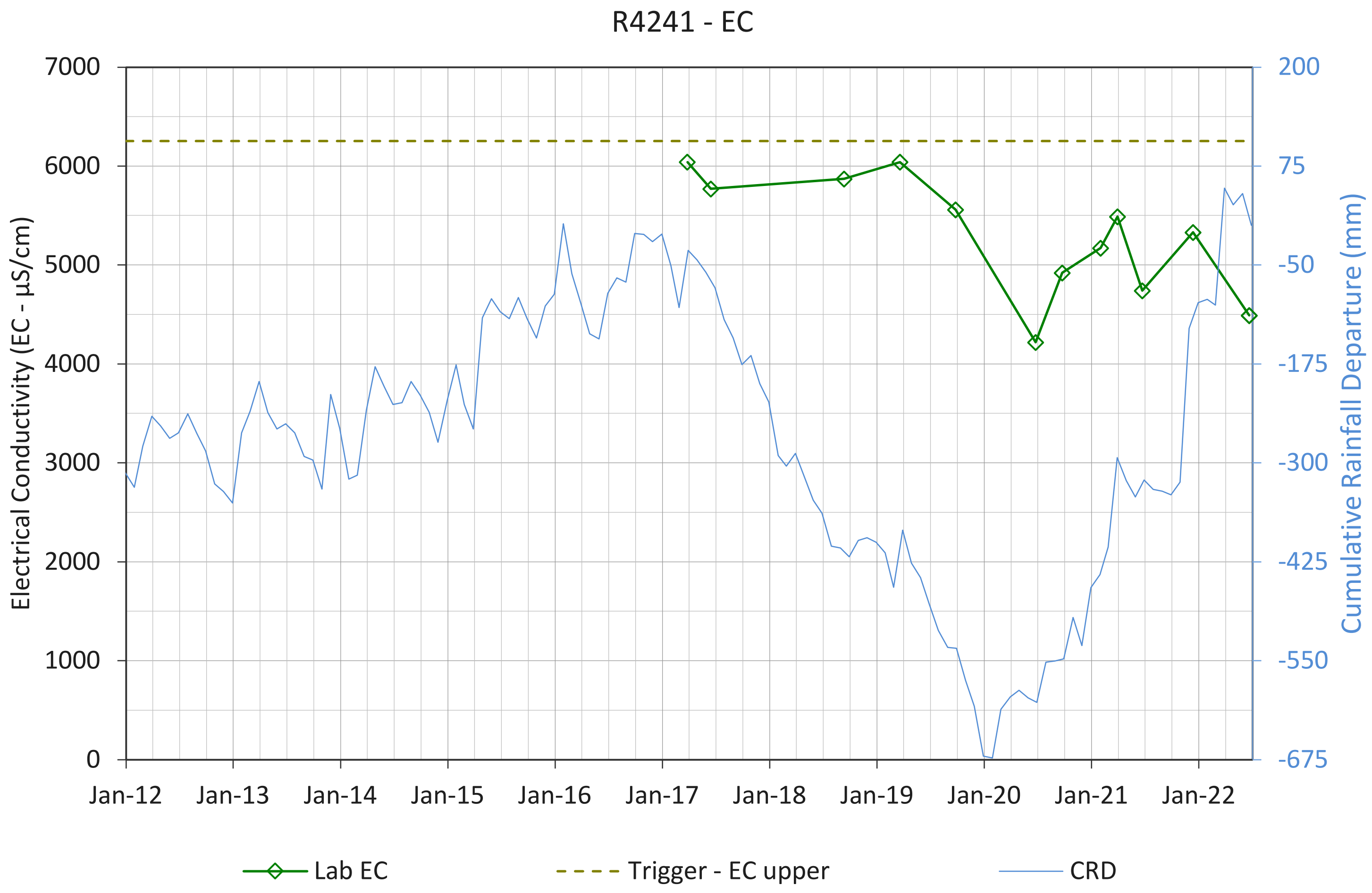


Figure C2

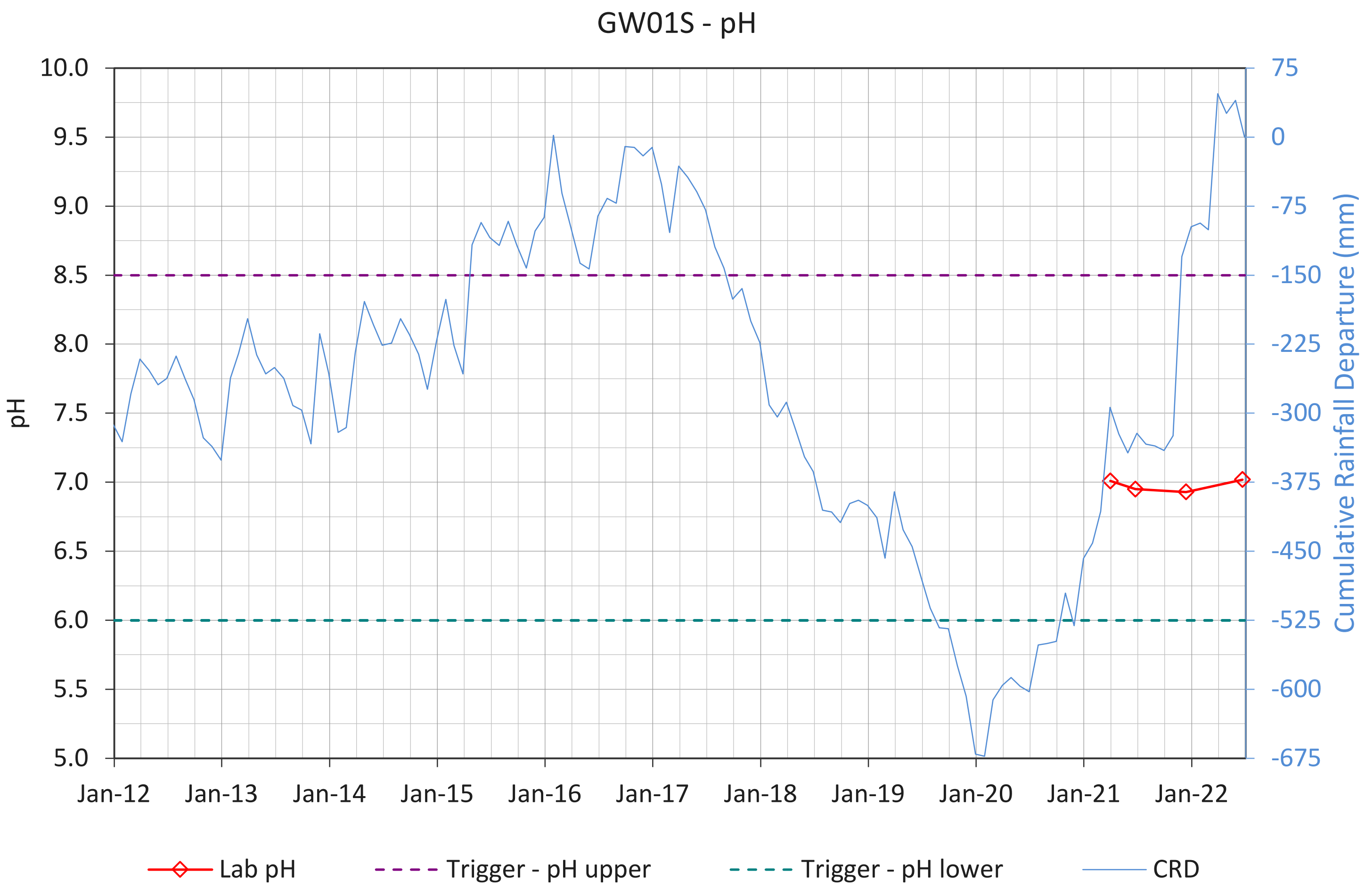


Figure C3

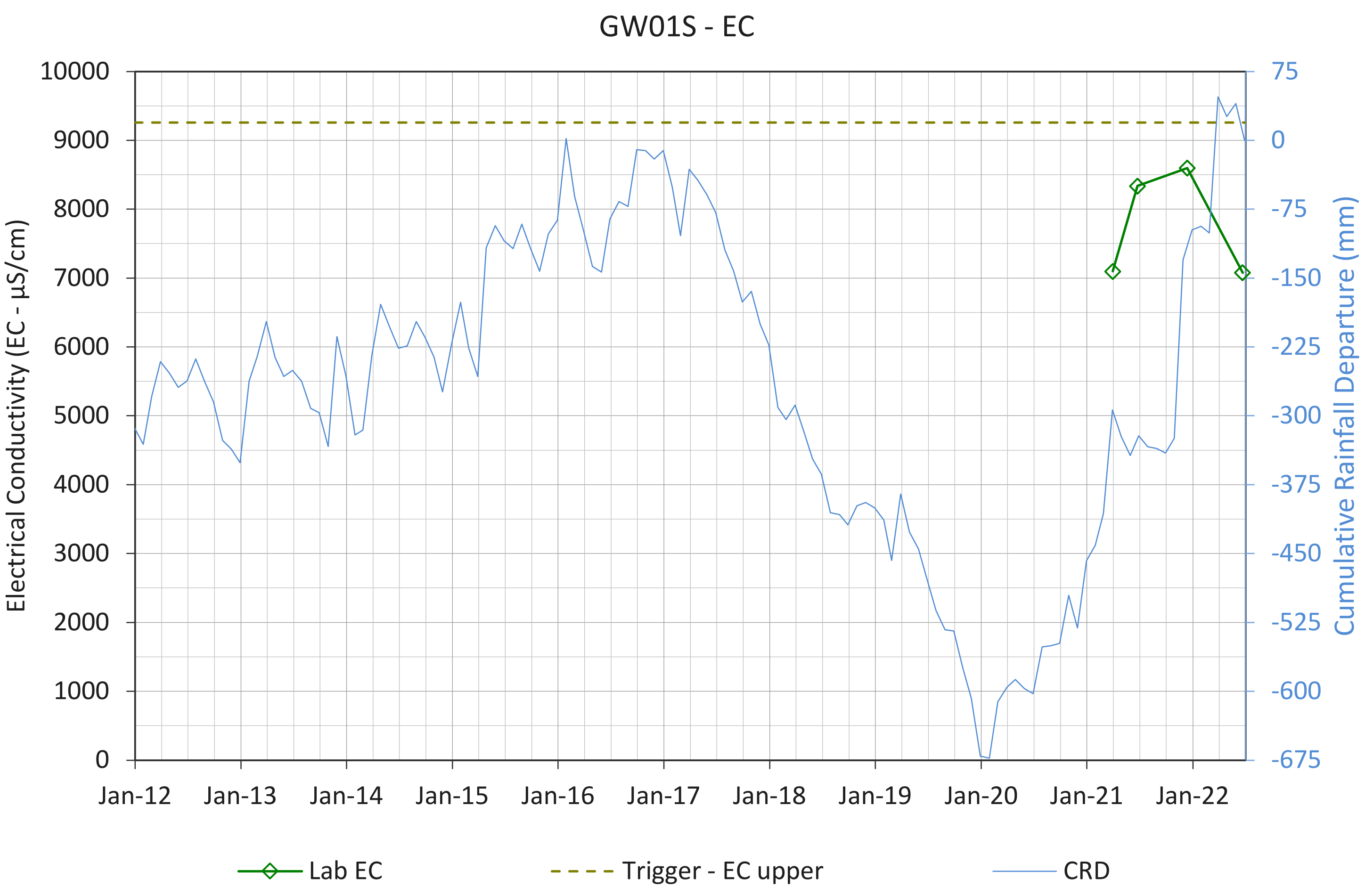


Figure C4

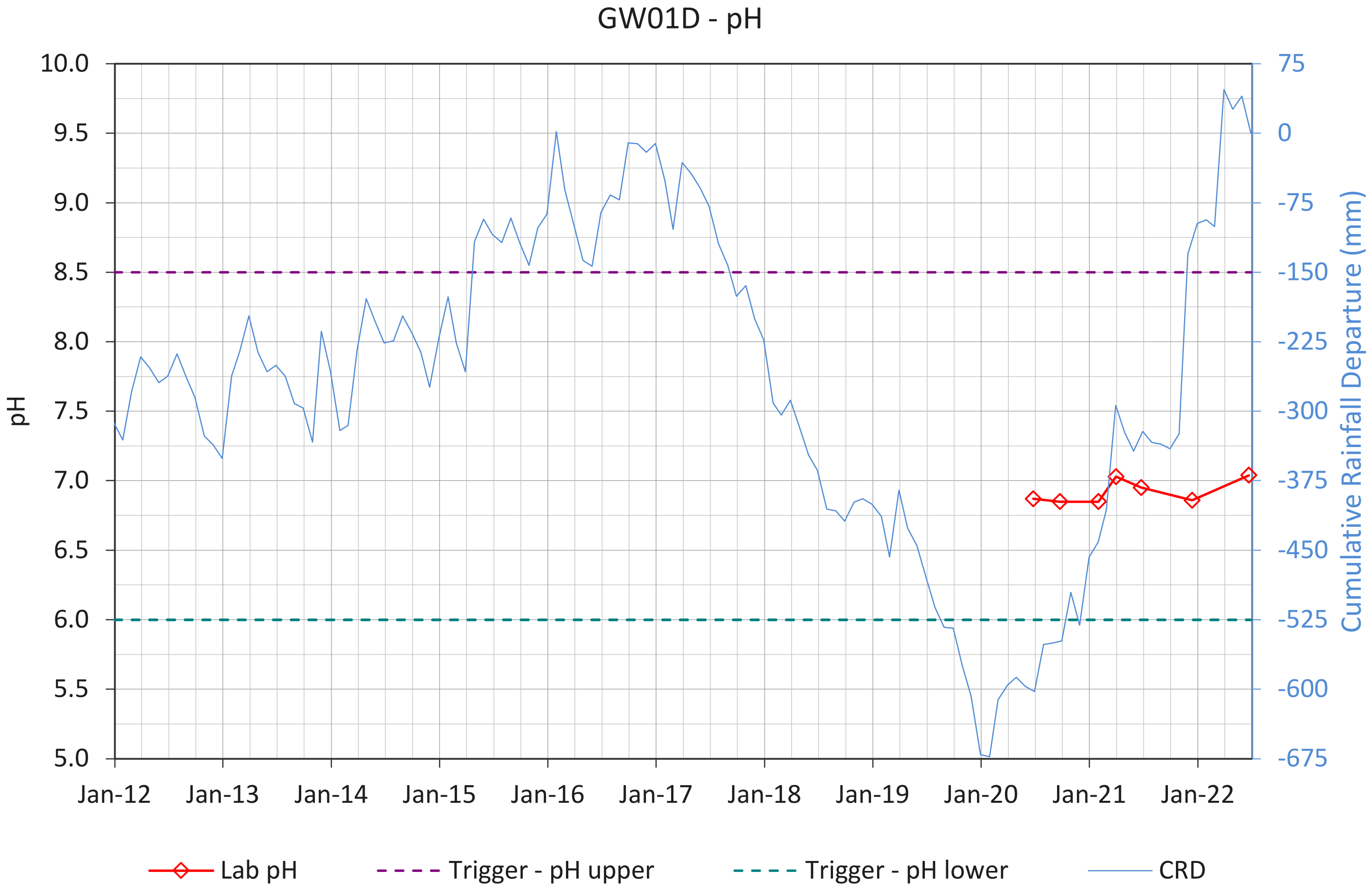
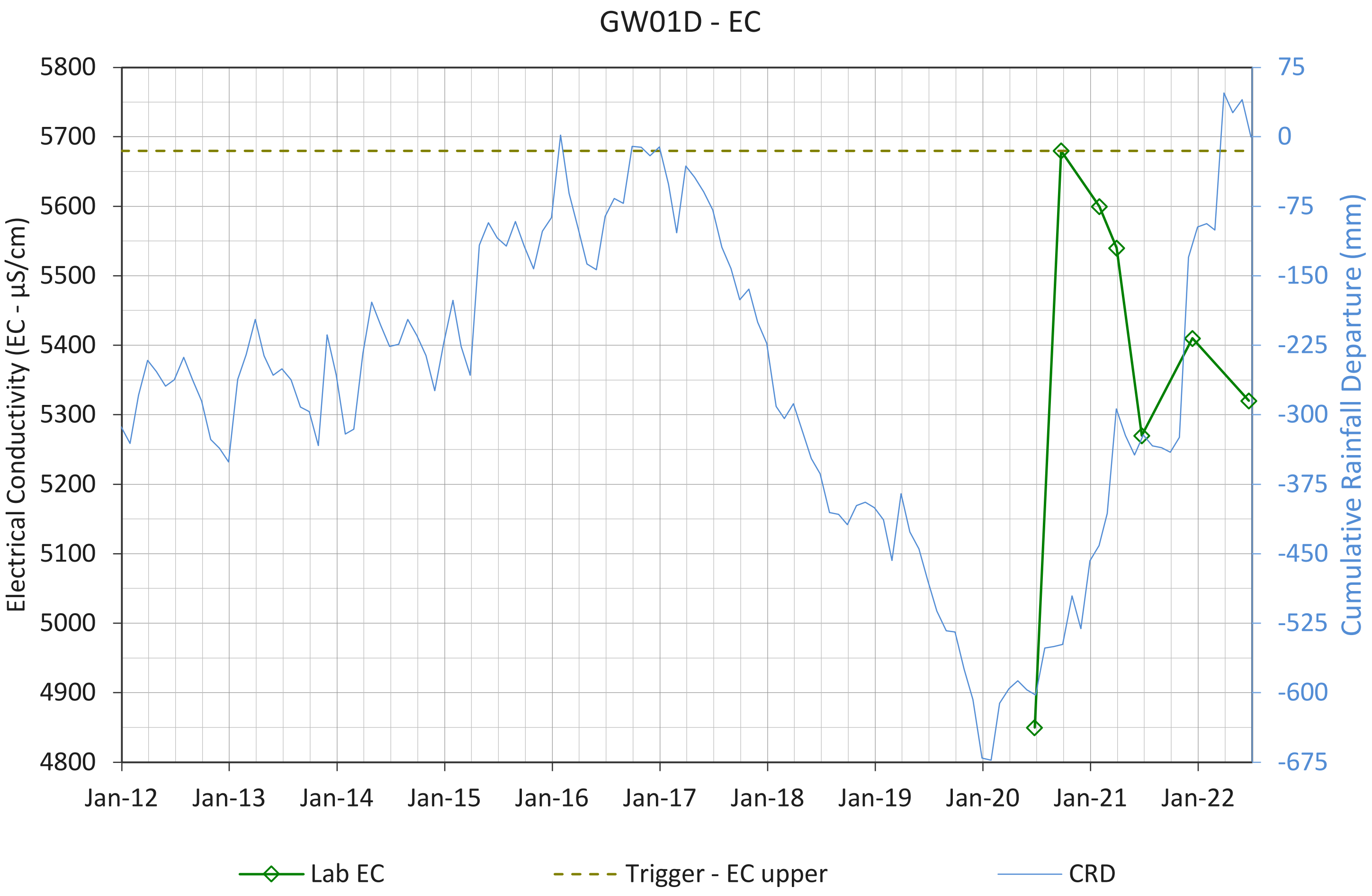


Figure C5



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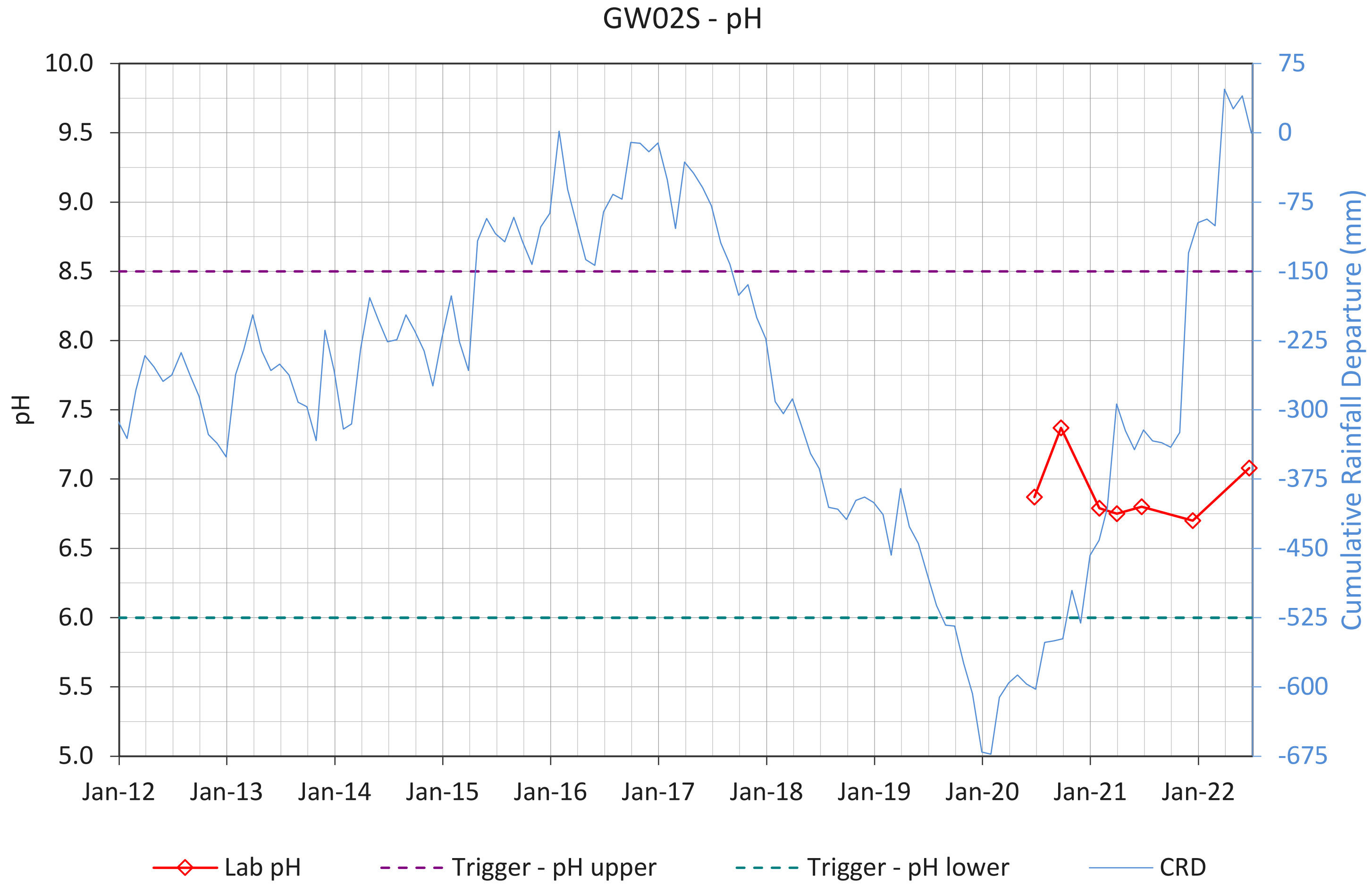

Figure C7

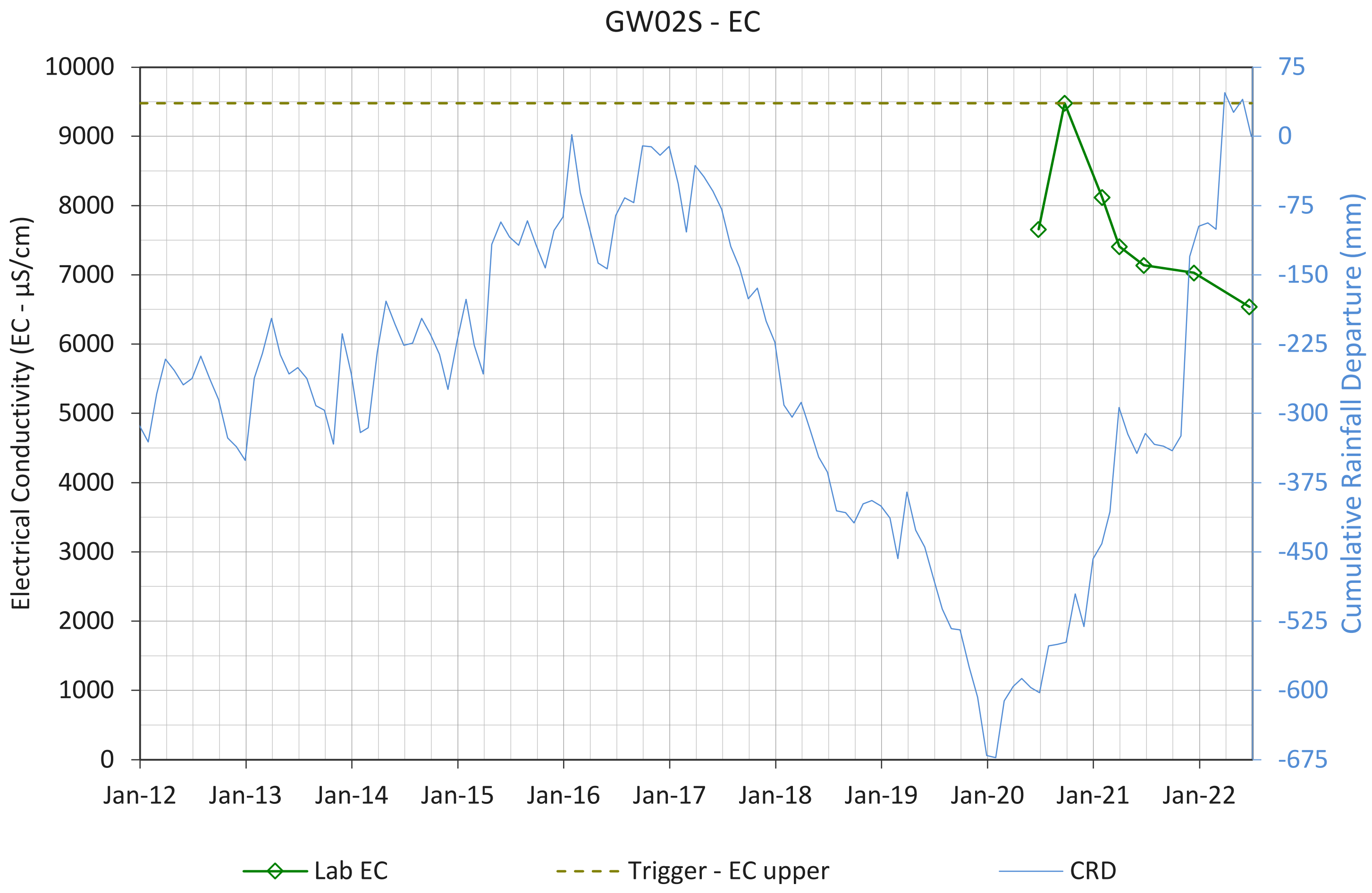

Figure C8

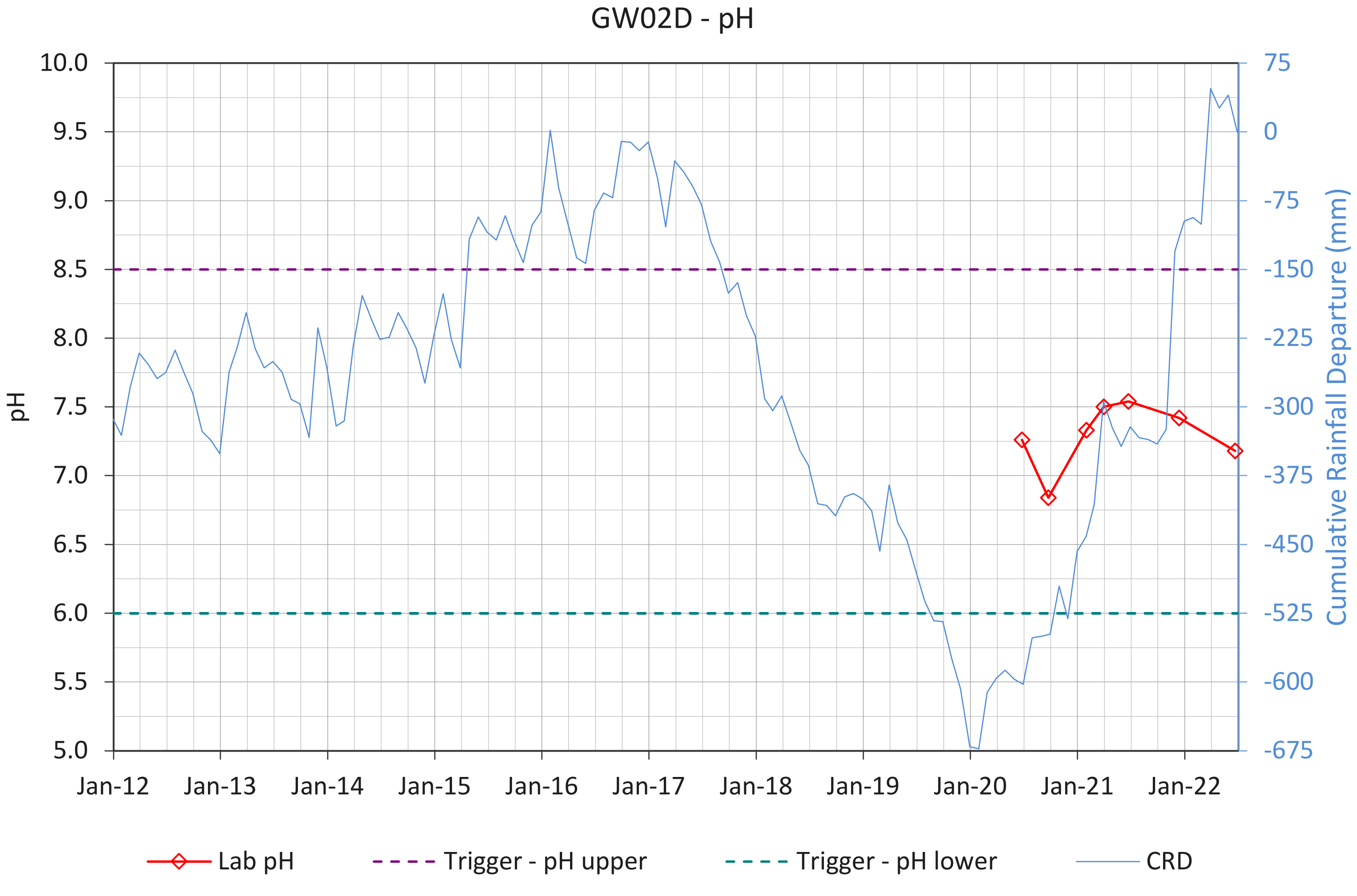

Figure C9

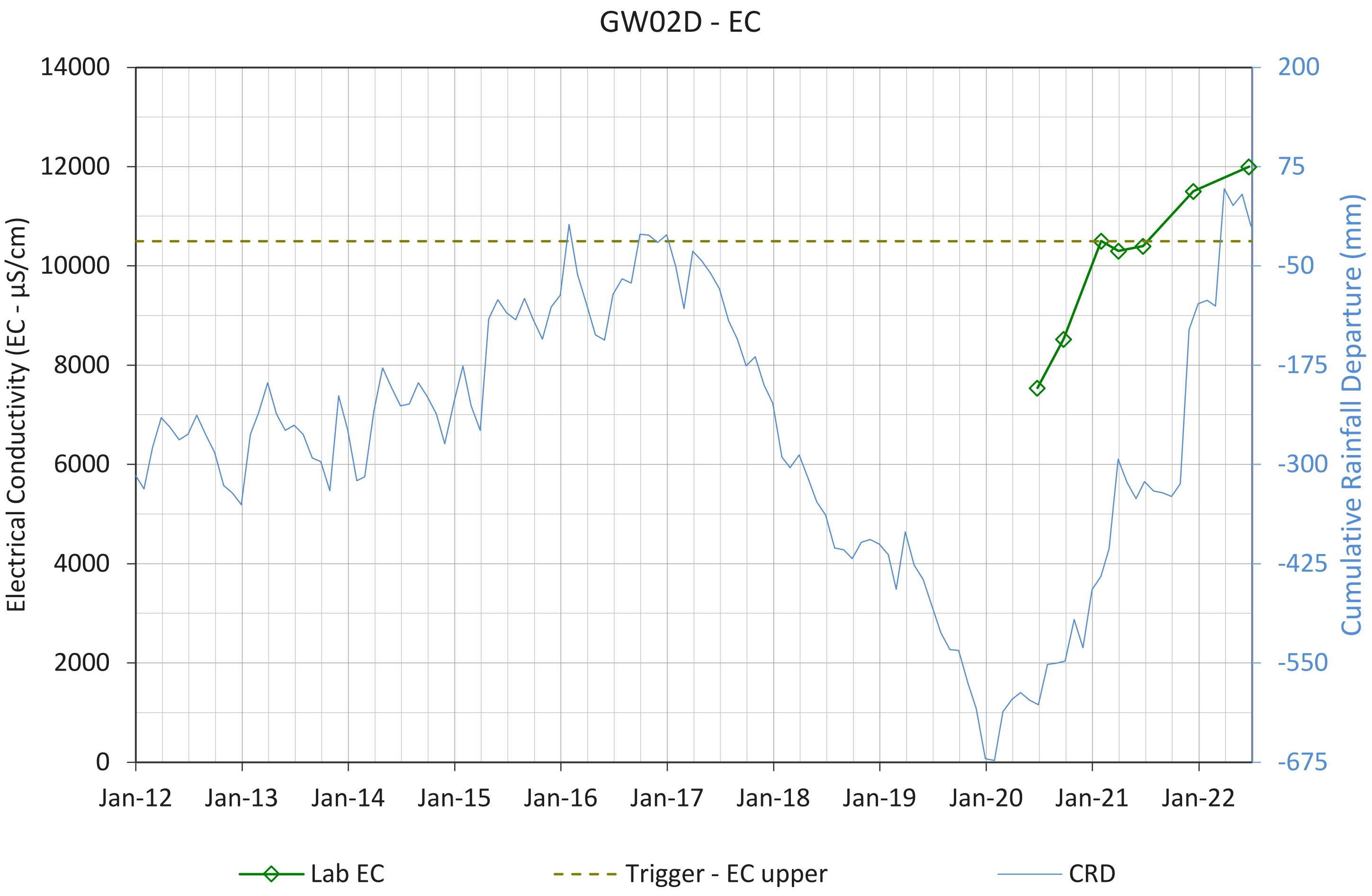

Figure C10

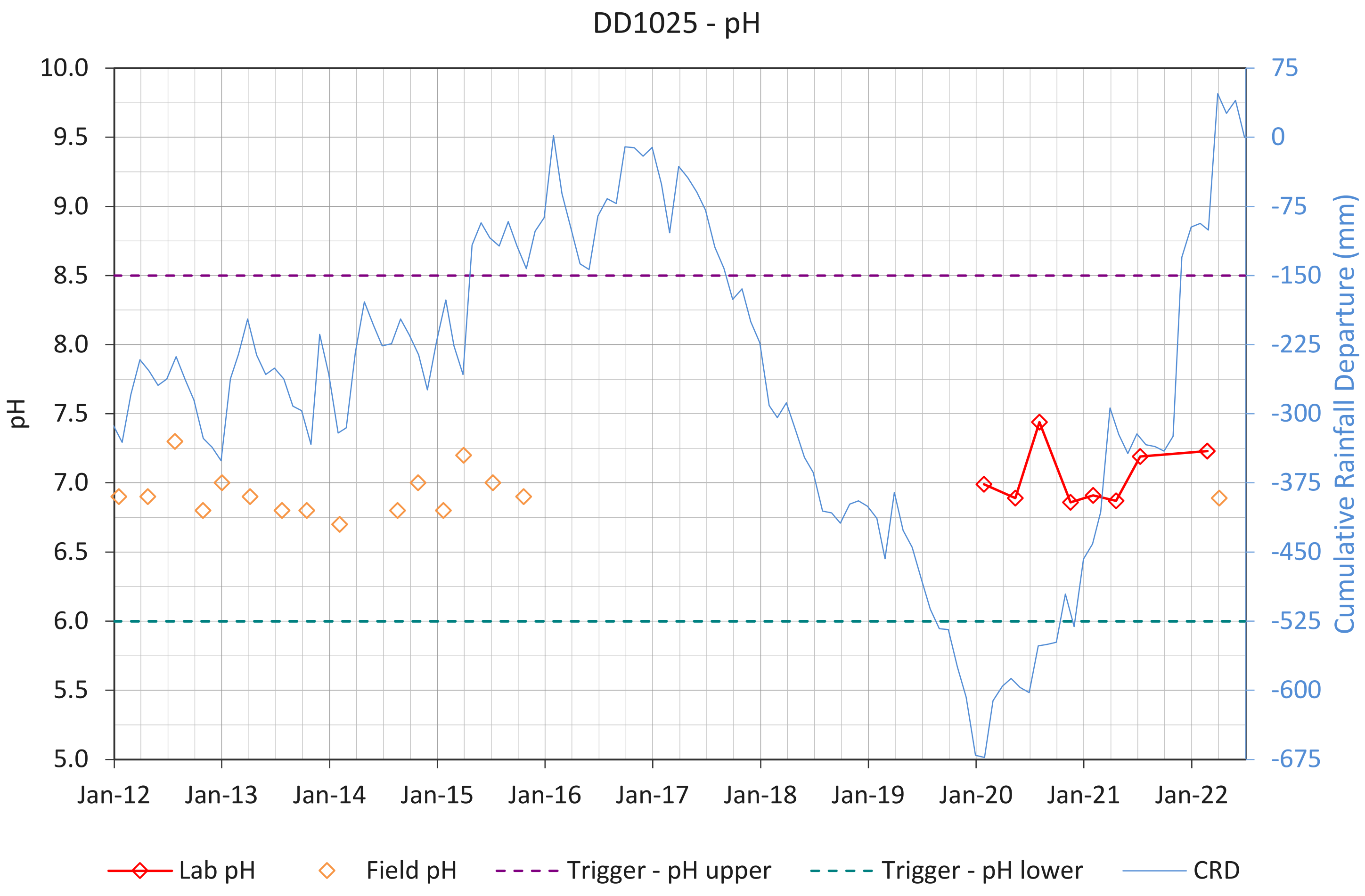

Figure C11

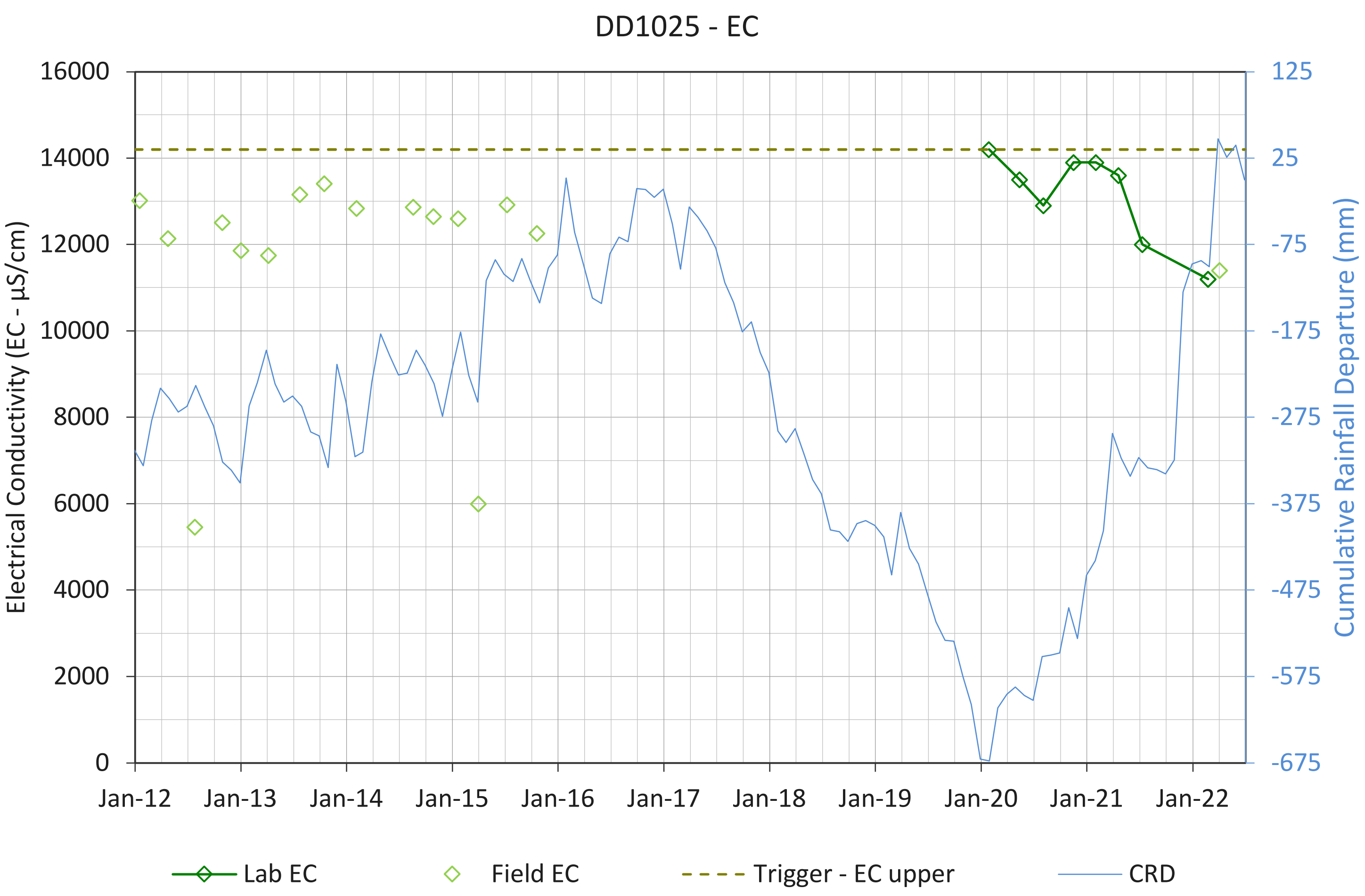

Figure C12

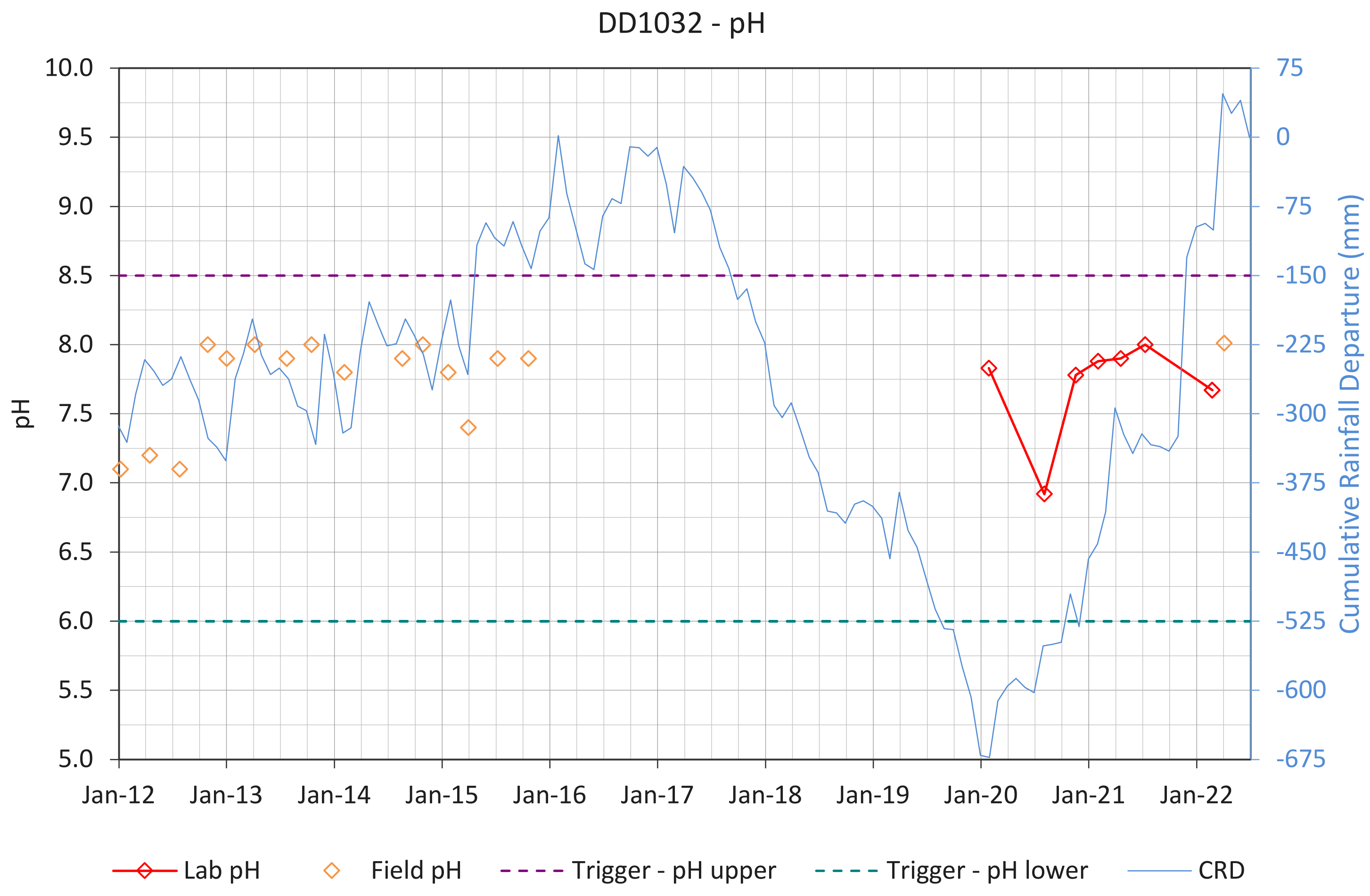

Figure C13

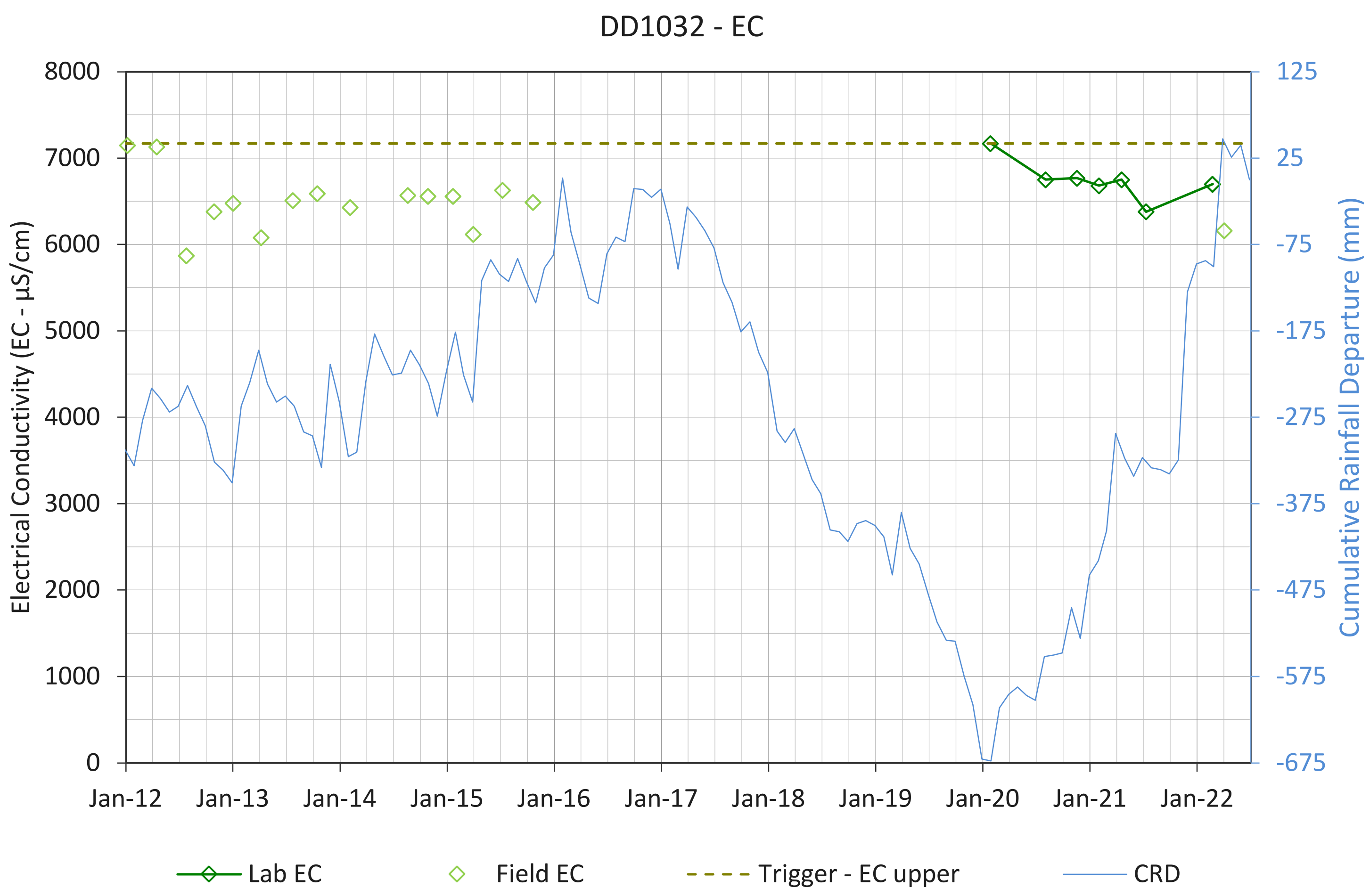

Figure C14

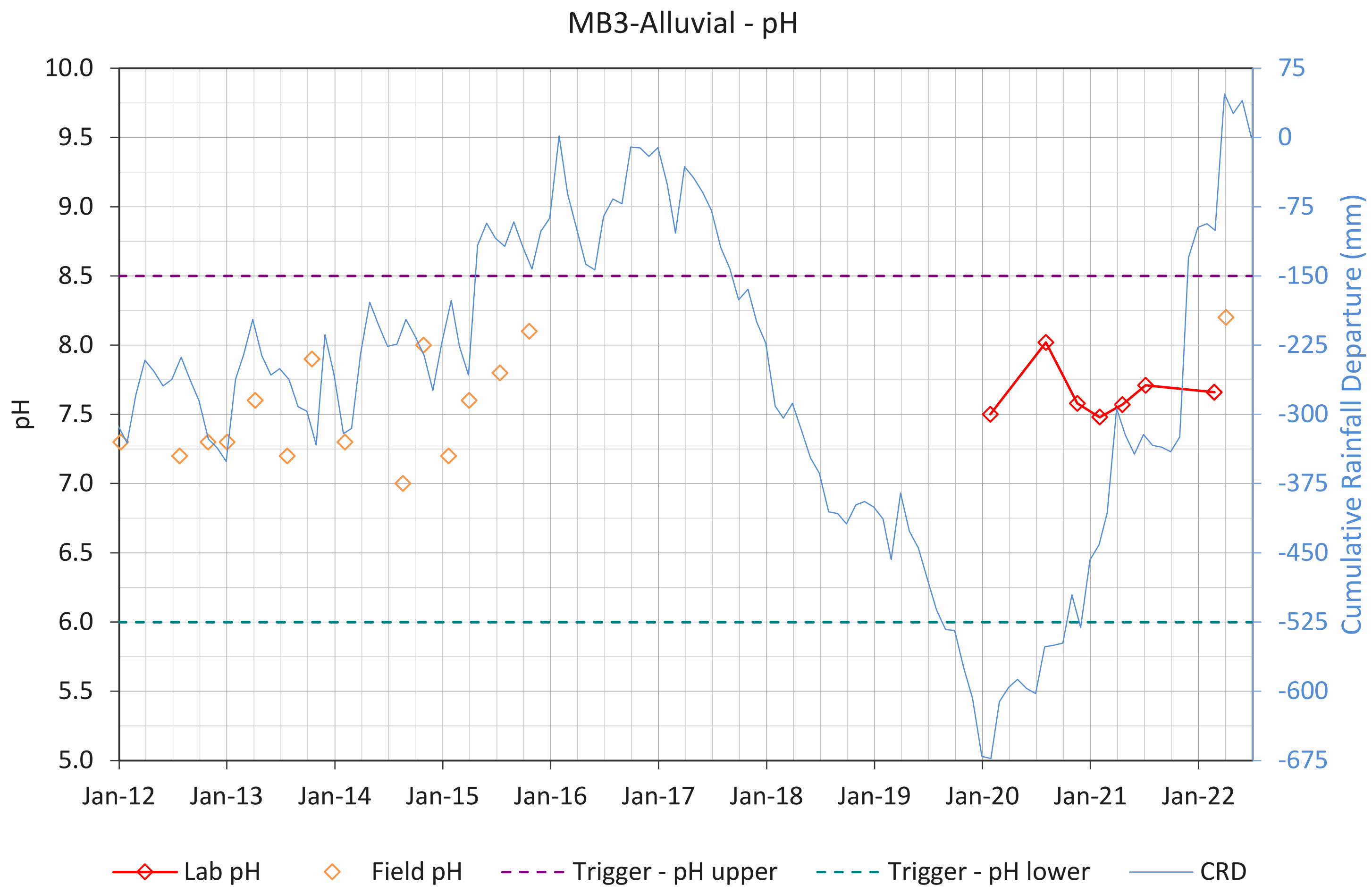

Figure C15

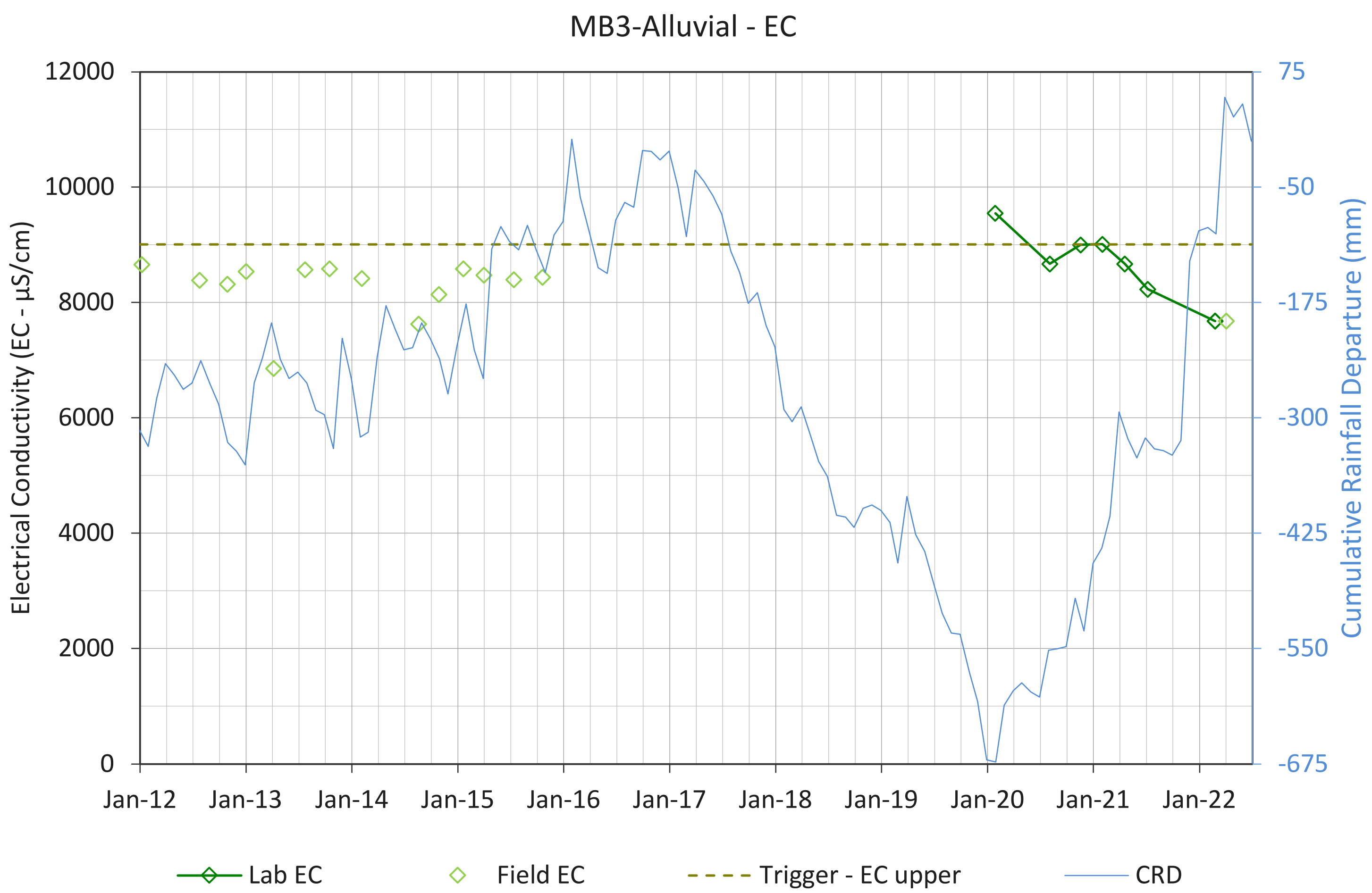

Figure C16

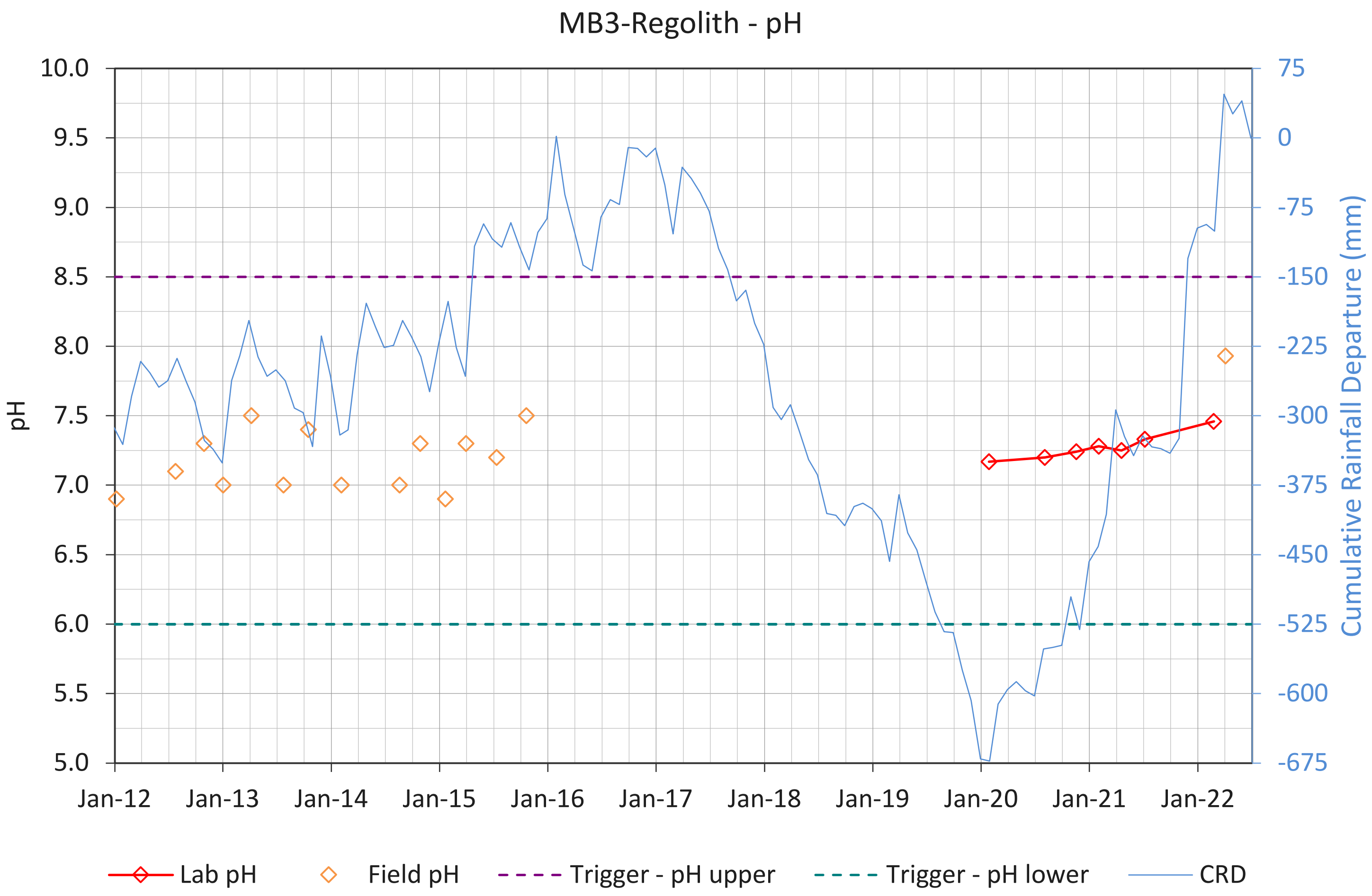

Figure C17

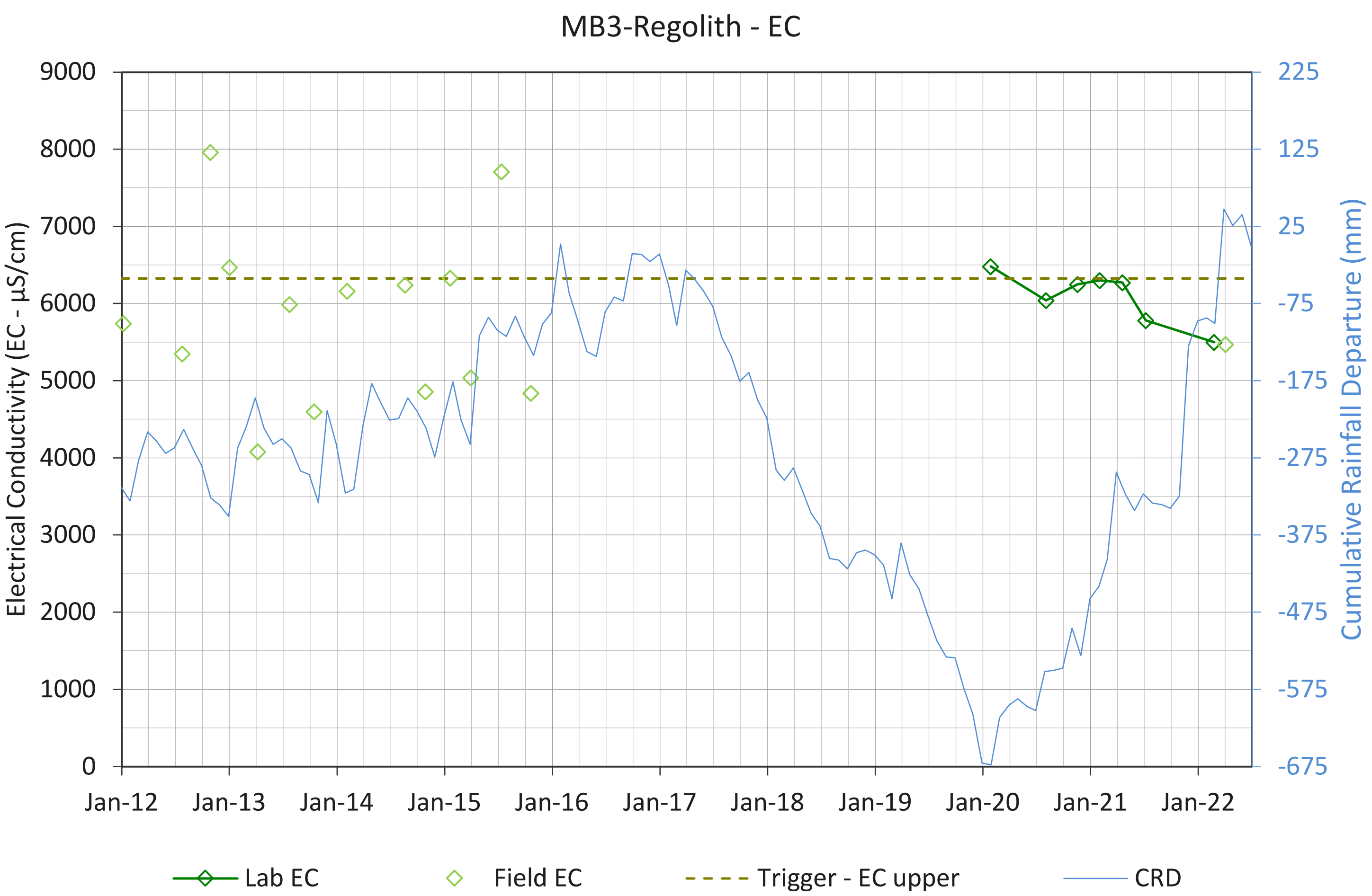

Figure C18