TECHNICAL MEMORANDUM

DATE 1 February 2021 **Reference No.** 20360083-009-M-RevA

TO Mark Erskine, Public Transport Authority

CC

FROM Keely Mundle **EMAIL** kmundle@golder.com

BYFORD RAIL EXTENSION – GROUNDWATER AND SURFACE WATER LEVEL MONITORING EVENT – JANUARY 2021

1.0 INTRODUCTION

This memorandum prepared by Golder Associates Pty Ltd (Golder) presents the results of monthly groundwater level monitoring as part of the hydrogeological assessment for the METRONET Byford Rail Extension (BRE; the Project). The work has been carried out for the Public Transport Authority (PTA) in accordance with the scope of work outlined in the technical memorandum "Preliminary Environmental Water Monitoring Network, Byford Rail Extension Project" (Golder 2020a). This scope of work requires Golder to provide groundwater level monitoring within monitoring wells and surface water locations over a period of six months from November 2020. Noted that, water quality monitoring (WQM) events are also part of this scope of work but are to be collected on a quarterly basis. Accordingly, this report relates only to the water level measurements.

The location of the project alignment and position of the monitoring wells is shown on Figure 1.

2.0 OBJECTIVES

The objectives of the monthly groundwater level monitoring reports are to:

- Provide the results of the ongoing monitoring of groundwater levels.
- Comment on any observed trends.

3.0 SCOPE OF WORK

The groundwater and surface water monitoring event was undertaken on 13 January 2021. The monitoring event included the following scope of work:

- Manual water level measurements at 13 monitoring locations (refer Section 4.1) including two historical Water Corporation wells (SED05 and SES17) and a private well (MB09).
- Collection of logger data from newly installed wells and surface water location.
- Preparation of this memorandum.

4.0 WATER LEVEL MONITORING

4.1 Monitoring Network

Golder Wells

Golder's monitoring wells (MW01, MW01b, MW02, MW02b, MW03, MW04, and MW04b) were installed by Direct Push Probing Pty Ltd (DPP) over the period 12 and 13 November 2020 (refer Golder 2020b – 20360083-005-TM-RevA). Out of seven wells, four are monitoring the Superficial aquifer (deep wells, MW01 to MW04) and three are monitoring the potential presence of perched groundwater (shallow wells, MW01b, MW02b, and MW04b).

Water Corporation Wells

Three historical Water Corporation (WC) monitoring wells, SES10, SES17, and SED05 were proposed to be included in the program. Only wells SES17 and SED05 were included in the monitoring network as SES10 is not suitable for water level gauging (Golder 2020c).

Private Well

The well MW04 was found dry following its installation; however, shallow groundwater was measured within one private well (MB09), located in a paddock approximately 450 m west of MW04. Accordingly, this private well has been added to the monitoring network.

WSP Wells

WSP has been engaged by PTA to install eight groundwater monitoring wells at four locations along the alignment as part of the geotechnical investigation pertaining to the BRE project. Each monitoring location monitors both the Superficial aquifer (deeper wells – BH3, BH5, BH6, and BH7) and the potential presence of perched groundwater (shallow wells – BH3A, BH5A, BH6A, and BH7A).

At the time of the monitoring event, the followings were observed:

- Deep wells covered by a monument were locked and therefore not accessible by Golder.
- BH5 and BH5A are located within the rail reserve and Golder could not obtain an authorisation to access the area.
- BH7A was noted to be blocked with mud.
- The PVC pipe in BH3A was found broken and could not be dipped.

Overall, only one WSP well (BH6A) could be monitored during January monitoring event.

Photographs of the WSP wells are provided in Attachment A.

Surface water locations

Two surface water locations (SW01 and SW02) have been considered for this monitoring program to monitor the potential relationship between surface water and groundwater levels. Golder has not received authorisation from WC to access the SW04 location, therefore this location could not be monitored.

A summary of the monitoring locations coordinates and elevation and a summary of the newly installed wells (Golder and WSP) construction details are provided respectively in Table A1 and Table A2 at the end of this report.

4.2 Rainfall

Figure A shows the monthly rainfall distribution recorded at Jandakot Airport for the period of November 2020/January 2021. The graph indicates that rainfall during this period was minimal.

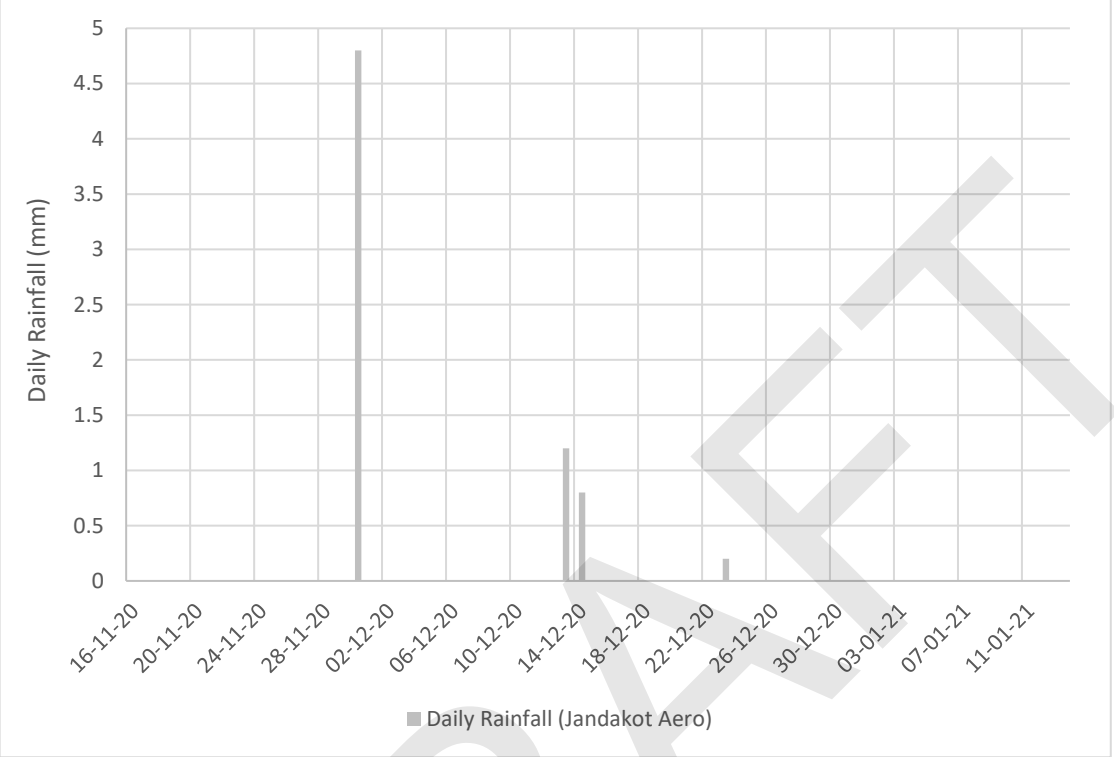

Figure A: Daily Rainfall Distribution (Jandakot Airport) – November 2020/January 2021

4.3 Groundwater Levels

Groundwater levels were measured manually using a water dipper and were referenced to surveyed ground/surface level.

Manual groundwater levels measurements are provided in Table A. Data from the loggers were collected on 13 January 2021 and monitoring data has been presented in a hydrograph in Attachment A.

4.4 Surface Water

Surface water levels were measured using a water dipper and a measuring tape and were referenced to surveyed referenced point. At the time of this monitoring event, Golder noted the followings:

- The logger installed at the surface water location SW01 has been stolen therefore only a manual water level could be provided for this monitoring event (see photographs in Attachment A).
- The creek at SW02 was found to be dry (see photographs in Attachment A).

Subsequently, no logger data were collected during this monitoring event.

Manual water levels are presented in Table A along with the groundwater levels. Monitoring data has been presented in a hydrograph in Attachment A.

5.0 DISCUSSION

The results presented in Attachment A (Figures 1 to 4) indicate that:

- Groundwater levels show a decrease (up to 1.69 m) between December 2020 and January 2021 in locations that could monitored during this period (12), which is consistent with the current climate conditions (summer season, minimal rainfall).
- The creek where SW02 is located was found completely dry since the 16 December 2020. This is also consistent with the current climate conditions (summer season, minimal rainfall).
- At the time of this monitoring event, perched water was present within only one shallow well (MW01b). Data at MW01 and MW01b indicate a relationship (a similar slightly downward trend with little variation) between perched water and the aquifer at this location. There is a downward vertical gradient between the perched and Superficial aquifer. The surface water level, information is limited due to the loss of the transducers, but results indicate a steady surface water level. The surface water levels are also higher than the groundwater level measured in both the perched and Superficial aquifer, which indicates that during the dry period the Wungong Brook may not be groundwater dependent at this location. The perched groundwater ranges between 0.4 and 1 m below the stream water level and therefore may be connected to the groundwater during the wet period when groundwater levels are anticipated to rise.
- The surface water level at SW02 is approximately 10 m more than the groundwater (MW02) and variations in the surface water level are not reflected in the groundwater level. This indicates that currently there is likely no connection between groundwater and surface water.
- Groundwater level at MW03 was noted to decreased suddenly between 2 and 3 am and again between 7 and 8 am every second night from 26 November 2020. Construction wells details and data logged during drillings works indicate that the aquifer is confined in this area (groundwater level at MW03 higher than the base of the CLAY formation). Information from the Water Register[1] indicate the presence of a 5C licence well (160738) located within a park (Massell Way) about 200 m to the south-west of MW03. The 5C licenced well abstracts groundwater from the Superficial Aquifer. In a confined aquifer the coefficient of storage is very low and the groundwater level drawdown from an abstracting well can extend a great distance. Accordingly, variations observed on MW03 hydrograph are likely to correspond to pumping cycle of the 5C licenced well. PTA has lodged a query with the City of Armadale to confirm the location of the abstraction well.
- One well (MW04), which monitors the Superficial aquifer, was dry. However, MB09, which is located approximately 450 m to the west of the well, indicated the presence of groundwater around 35.07 m AHD.
- Shallow groundwater was also monitored within the WCs wells and BH6A (WSP well) at depth between 36.07 and 49.375 m AHD.

In summary, manual groundwater level were measured within eleven groundwater monitoring wells and two surface water locations. Loggers data were collected from four monitoring wells (MW01, MW01b, MW02, and MW03) and the two surface locations (SW01 and SW02). Collected data indicates a general decrease of groundwater levels in all monitoring locations between December 2020 and January 2021. Further monitoring at these locations should provide further information regarding potential relationships between groundwater and surface water, especially during the period of high-water (winter season).

[1] DWER (2021) - https://maps.water.wa.gov.au/#/webmap/register

Water levels measurements are to be collected monthly, with the next scheduled event to be conducted in February 2021. Water quality results are to be collected on a quarterly basis and therefore will be collected in February 2021 as well. As part of these works additional groundwater monitoring wells (i.e. MB09, BH6A, BH7A, BH3A, and BH5A) will be sampled if possible.

6.0 IMPORTANT INFORMATION

Your attention is drawn to the document – "Important Information Relating to this Report", which is included in Attachment B of this memorandum. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder has under the contract between it and its client.

REFERENCES

Golder Associates (2020a) Preliminary Environmental Water Monitoring Network, Byford Rail Extension Project, Technical Memorandum Reference 20360083-001-M-Rev2 Dated 14 October 2020.

Golder Associates (2020b) Byford Rail Extension – Factual Well Completion Technical Memorandum Reference 20360083-005-M-RevA Dated 08 December 2020.

Golder Associates (2020c) Byford Rail Extension – Groundwater and surface water level monitoring event – DECEMBER 2020 Reference 20360083-008-M-RevA Dated 22 December 2020.

GOLDER ASSOCIATES PTY LTD

Océane Piaia
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Attachments: Figure 1 – Location Plan
Table A1 – Monitoring Network Survey
Table A2 – Groundwater Wells Construction Details
Table B – Manual Water Level Measurements
A – Hydrographs and Photographs
B – Important Information

https://golderassociates.sharepoint.com/sites/132159/project files/6 deliverables/009 january gw memo/20360083-009-tm-reva.docx

Figure 1 – Location Plan

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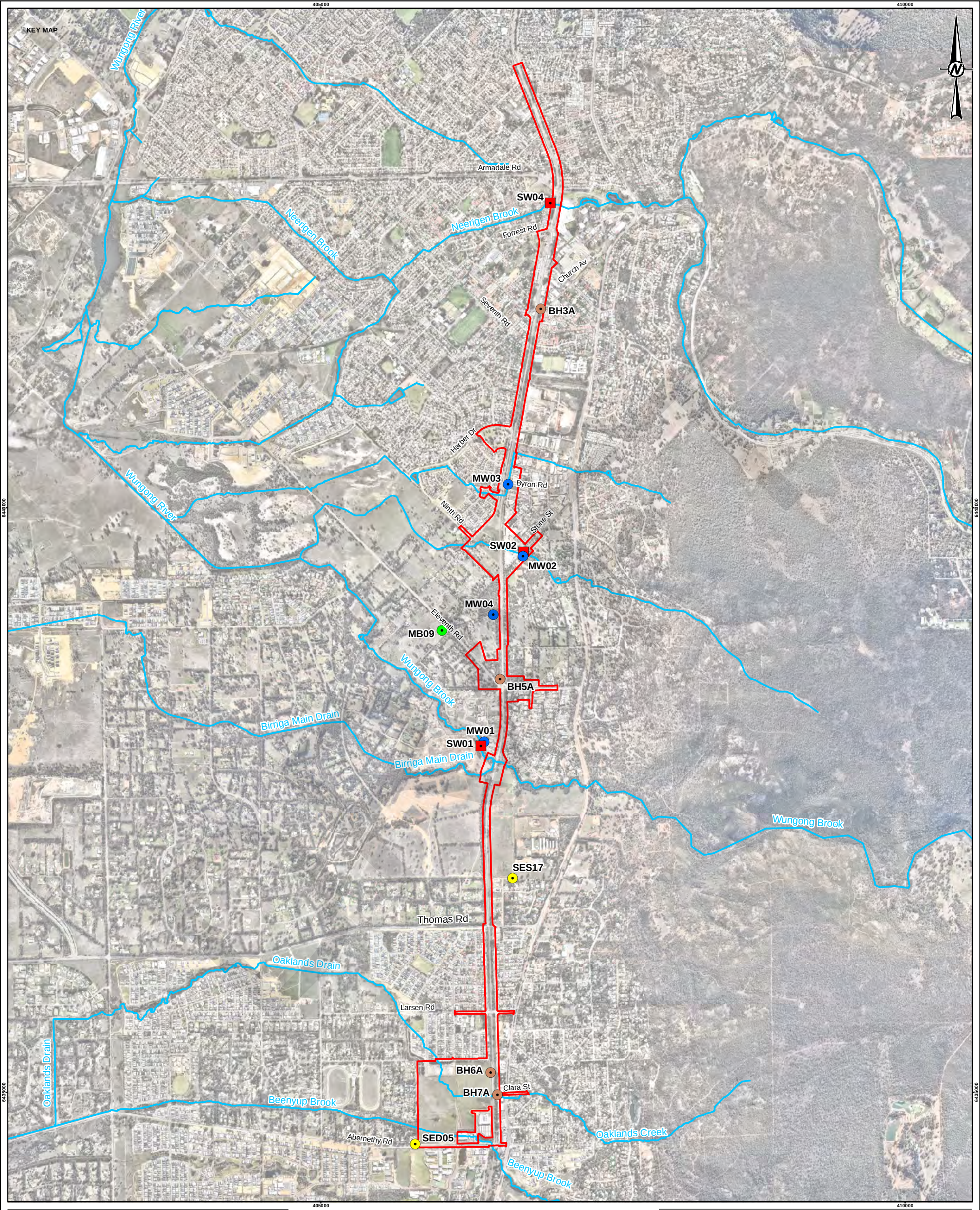

LEGEND

GOLDER MONITORING LOCATION

- GROUNDWATER WELL
- SURFACE WATER

PRIVATE WELL

- GROUNDWATER WELL

WATER CORPORATION MONITORING LOCATION

- GROUNDWATER WELL

WSP MONITORING LOCATION

- GROUNDWATER WELL
- BRE Project Envelope
- Surface Water

0 500 1,000

1:30,000 METRES

NOT FOR CONSTRUCTION

DRAFT

NOTE:
1. COORDINATE SYSTEM: GDA 1994 MGA ZONE 50

REFERENCES:
INSET BASE DATA SOURCED FROM STREET PRO DATA 2009.
AERIAL IMAGE SOURCED FROM NEARMAP
DEPARTMENT OF WATER AND REGULATION DATABASES

CLIENT
PUBLIC TRANSPORT AUTHORITY

CONSULTANT
GOLDER

YYYY-MM-DD	2021-01-15
DESIGNED	OP
PREPARED	AM
REVIEWED	AL
APPROVED	AL

PROJECT
BYFORD RAIL EXTENSION

TITLE
GROUNDWATER AND SURFACE WATER MONITORING EVENT - JANUARY 2021

PROJECT NO.	CONTROL	REV.	FIGURE
20360083	009 TM	A	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ISO A3

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Table A
Monitoring Network Survey and (Golder & WSP) Groundwater Wells Construction Details

Table A1: Summary of Monitoring Network

Well ID	Surveyed Easting (MGA94)	Surveyed Northing (MGA94)	Surface Elevation (m AHD)
MW01	406399.84730	6437996.96301	39.857
MW01b	406399.65199	6437997.89189	39.853
MW02	406730.95449	6439584.74617	54.534
MW02b	406730.15606	6439585.51174	54.538
MW03	406605.60754	6440198.31688	49.465
MW04	406477.14366	6439083.19637	50.895
MW04b	406476.20716	6439082.88166	50.881
MB09	406038.30104	6438949.98020	41.254
SES17	406644.03	6436830.46	38.67
SED05	405810.50697	6434554.88025	49.864
BH3A	406878.6365	6441634.952	55.34
BH5A	406546.1781	6438540.283	46.43
BH6A	406445.9781	6435165.342	51.65
BH7A	406442.7181	6434985.648	53.12
SW01	406370.97330	6437962.68201	38.933
SW02	406737.20	643922.90	53.340

Table A2: Groundwater Well Installation Summary

Well ID	Well Screen Information				
	Screened Intervals (m bgl)		End of Borehole (m bgl)	Protective cover	Screened Material
	From	To			
MW01	4.0	8.0	8.5	Gatic	CLAY, Sandy CLAY
MW01b	0.5	2.5	2.5	Gatic	SAND, Silty SAND with gravels
MW02	12.0	15.0	15.0	Gatic	Sandy CLAY
MW02b	1.0	2.0	2.0	Gatic	Gravelly Silty SAND
MW03	13.5	16.5	16.5	Gatic	Sandy CLAY
MW04	4.0	8.0	10.2	Gatic	Sandy CLAY
MW04b	0.5	3.0	3.0	Gatic	Gravelly SAND & Sandy CLAY
BH03	14	20	20	Gatic	SAND
BH03A	0	1.3	1.3	Monument	GRAVEL
BH05	14	20	20	Gatic	SAND, Clayey SAND & Sandy CLAY
BH05A	0	0.8	0.8	Gatic	SAND
BH06	9	15	15	Monument	MUDSTONE, Clayey Sand & SAND
BH06A	0	2.4	2.4	Gatic	Clayey Gravelly SAND, Sandy Gravelly CLAY
BH07	9	15	15	Monument	Clayey SAND & SAND
BH07A	0	0.85	0.85	Monument	Silty SAND & Clayey Gravelly SAND

Table B
Manual Water Level Measurements

Table B: Manual Water Level Measurements

Test Location	Location Type	Ground Level	Reference Point	Date of Measurement	Comment	Depth to Water	Depth to Water (mbRP)	Water Level (m AHD)
		RL m AHD	RL m AHD			m bgl		RL m AHD
MW01	Groundwater	39.857	-	12-11-20	Non-Stabilised	2.61	-	37.247
MW01	Groundwater	39.857	-	16-11-20	Stabilised	1.95	-	37.907
MW01	Groundwater	39.857	-	24-11-20	Stabilised	1.71	-	38.147
MW01	Groundwater	39.857	-	16-12-20	Stabilised	2.05	-	37.807
MW01	Groundwater	39.857	-	13-01-21	Stabilised	2.36	-	37.497
MW01b	Groundwater	39.853	-	44147.00	Non-Stabilised	Dry	-	-
MW01b	Groundwater	39.853	-	16-11-20	Stabilised	1.52	-	38.333
MW01b	Groundwater	39.853	-	24-11-20	Stabilised	1.65	-	38.203
MW01b	Groundwater	39.853	-	16-12-20	Stabilised	1.94	-	37.913
MW01b	Groundwater	39.853	-	13-01-21	Stabilised	2.245	-	37.608
MW02	Groundwater	54.534	-	13-11-20	Non-Stabilised	11.88	-	42.654
MW02	Groundwater	54.534	-	16-11-20	Stabilised	11.74	-	42.794
MW02	Groundwater	54.534	-	24-11-20	Stabilised	11.63	-	42.904
MW02	Groundwater	54.534	-	16-12-20	Stabilised	12.02	-	42.514
MW02	Groundwater	54.534	-	13-01-21	Stabilised	12.585	-	41.949
MW02b	Groundwater	54.538	-	13-11-20	Non-Stabilised	*Dry to 1.95*	-	Perched water not present
MW02b	Groundwater	54.538	-	16-11-20	Stabilised	*Dry to 1.95*	-	Perched water not present
MW02b	Groundwater	54.538	-	24-11-20	Stabilised	*Dry to 1.95*	-	Perched water not present
MW02b	Groundwater	54.538	-	16-12-20	Stabilised	*Dry to 1.94*	-	Perched water not present
MW02b	Groundwater	54.538	-	13-01-21	Stabilised	*Dry to 1.955*	-	Perched water not present
MW03	Groundwater	49.465	-	13-11-20	Non-Stabilised	7.3	-	42.165
MW03	Groundwater	49.465	-	16-11-20	Stabilised	6.165	-	43.3
MW03	Groundwater	49.465	-	24-11-20	Stabilised	6.25	-	43.215
MW03	Groundwater	49.465	-	16-12-20	Stabilised	6.985	-	42.48
MW03	Groundwater	49.465	-	13-01-21	Stabilised	7.605	-	41.86
MW04	Groundwater	50.895	-	12-11-20	Non-Stabilised	*Dry to 8.375*	-	Below 42.52
MW04	Groundwater	50.895	-	16-11-20	Stabilised	*Dry to 8.375*	-	Below 42.52
MW04	Groundwater	50.895	-	24-11-20	Stabilised	*Dry to 8.37*	-	Below 42.52
MW04	Groundwater	50.895	-	16-12-20	Stabilised	*Dry to 8.36*	-	Below 42.52
MW04	Groundwater	50.895	-	13-01-21	Stabilised	*Dry to 8.36*	-	Below 42.52

Table B: Manual Water Level Measurements

Test Location	Location Type	Ground Level	Reference Point	Date of Measurement	Comment	Depth to Water	Depth to Water (mbRP)	Water Level (m AHD)
		RL m AHD	RL m AHD			m bgl		RL m AHD
MW04b	Groundwater	50.881	-	12-11-20	Non-Stabilised	*Dry to 2.845*	-	Perched water not present
MW04b	Groundwater	50.881	-	16-11-20	Stabilised	*Dry to 2.845*	-	Perched water not present
MW04b	Groundwater	50.881	-	24-11-20	Stabilised	*Dry to 2.82*	-	Perched water not present
MW04b	Groundwater	50.881	-	16-12-20	Stabilised	*Dry to 2.815*	-	Perched water not present
MW04b	Groundwater	50.881	-	13-01-21	Stabilised	*Dry to 2.815*	-	Perched water not present
MB09	Groundwater	41.254	-	24-11-20	Stabilised	3.9	-	37.354
MB09	Groundwater	41.254	-	16-12-20	Stabilised	4.49	-	36.764
MB09	Groundwater	41.254	-	13-01-21	Stabilised	6.18	-	35.074
SED05	Groundwater	49.864	-	07-12-20	Stabilised	5.805	-	44.059
SED05	Groundwater	49.864	-	16-12-20	Stabilised	5.95	-	43.914
SED05	Groundwater	49.864	-	13-01-21	Stabilised	7.1	-	42.764
SES17	Groundwater	38.67	-	07-12-20	Stabilised	1.33	-	37.34
SES17	Groundwater	38.67	-	16-12-20	Stabilised	1.715	-	36.955
SES17	Groundwater	38.67	-	13-01-21	Stabilised	2.6	-	36.07
SW01	Surface Water	-	38.933 [A]	02-12-20	Surveyor	-	-	38.592
SW01	Surface Water	-	38.933 [A]	02-12-20	Manual	-	0.345	38.588
SW01	Surface Water	-	38.933 [A]	16-12-20	Manual	-	0.325	38.608
SW01	Surface Water	-	38.933 [A]	13-01-21	Manual	-	0.33	38.603
SW02	Surface Water	-	53.34 [A]	02-12-20	Surveyor	-	-	52.928
SW02	Surface Water	-	53.34 [A]	02-12-20	Manual	-	0.28	53.06
SW02	Surface Water	-	53.34 [A]	16-12-20	Manual	-	*Dry*	*Dry*
SW02	Surface Water	-	53.34 [A]	13-01-21	Manual	-	*Dry*	*Dry*
BH6A	Groundwater	51.65	-	13-01-21	Stabilised	2.275	-	49.375

Notes:

[A] Reference measurement of weir.

RL - Reduced Level

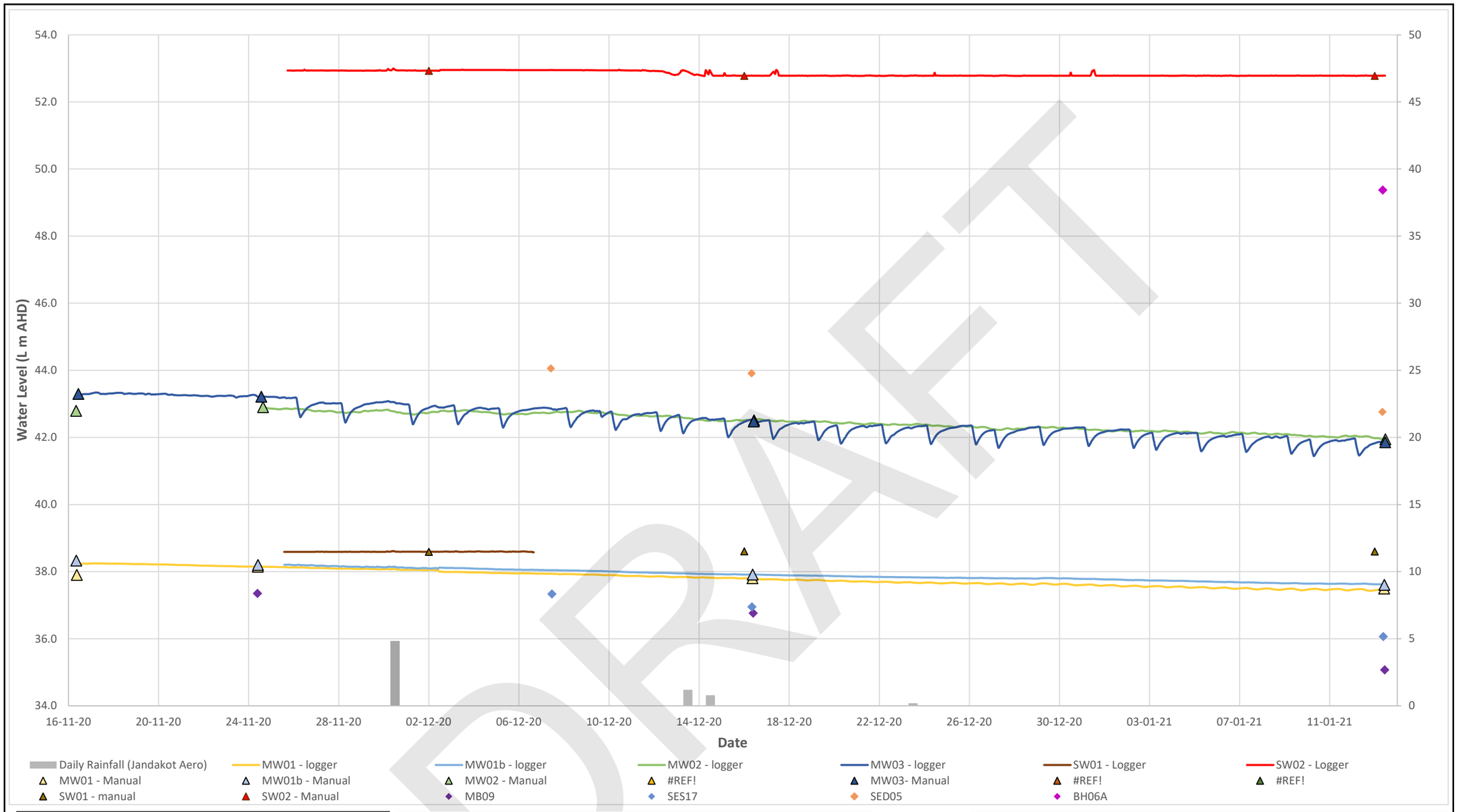
m AHD - metres Australian Height Datum

m bgl - metres below ground level

ATTACHMENT A

Hydrographs and Photographs

Attachment A: Hydrographs



NOTES:
1. THE MONITORING WELLS MW02b, MW04 AND MW04b ARE CURRENTLY DRY.
2. THE DRAIN WHERE SW03 IS LOCATED AND THE POND WHERE SW02 IS LOCATED ARE CURRENTLY DRY.
3. SW04 LOCATION IS CURRENTLY INACCESSIBLE.

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GOLDER

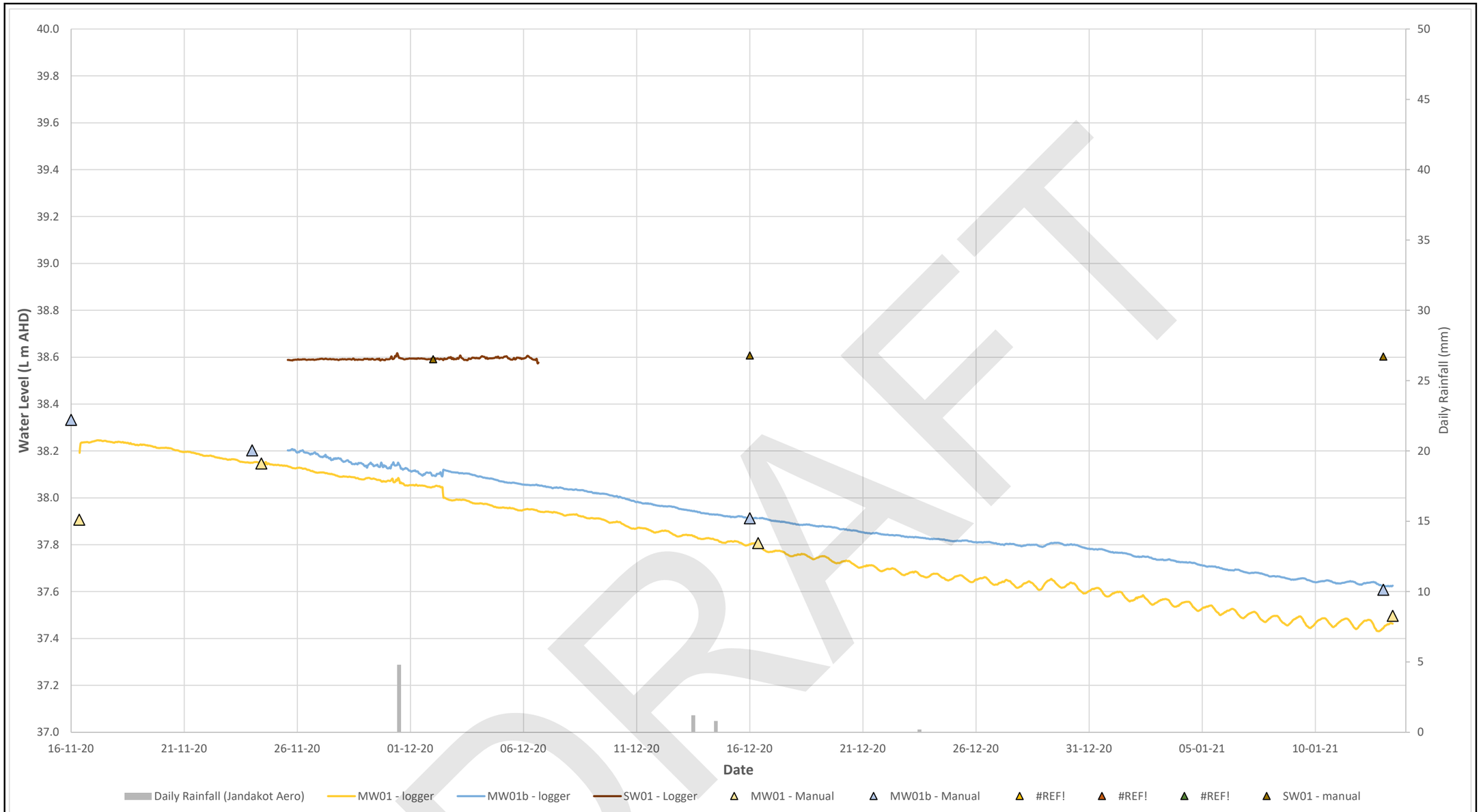
DD/MM/YY	29-01-21
PREPARED	OP
DESIGNED	OP
REVIEWED	AL
APPROVED	AL

PROJECT
20360083 - Byford Rail Extension

TITLE
WATER LEVELS (RL m AHD) - ALL LOCATIONS
16 NOVEMBER 2020 TO 13 JANUARY 2021

PROJECT No.	CONTROL	REV.	FIGURE
20360083	9	A	**1**

Attachment A: Hydrographs



NOTES:

1. THE LOGGER LOCATED AT SW01 WAS MOVED BETWEEN THE 02 AND THE 16 DECEMBER 2020. BETWEEN THE 16 DECEMBER 2020 AND THE 13 JANUARY 2021, THE LOGGER WAS STOLEN. THEREFORE, NO DATA COULD BE COLLECTED FROM THE 2 DECEMBER 2020.

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GOLDER

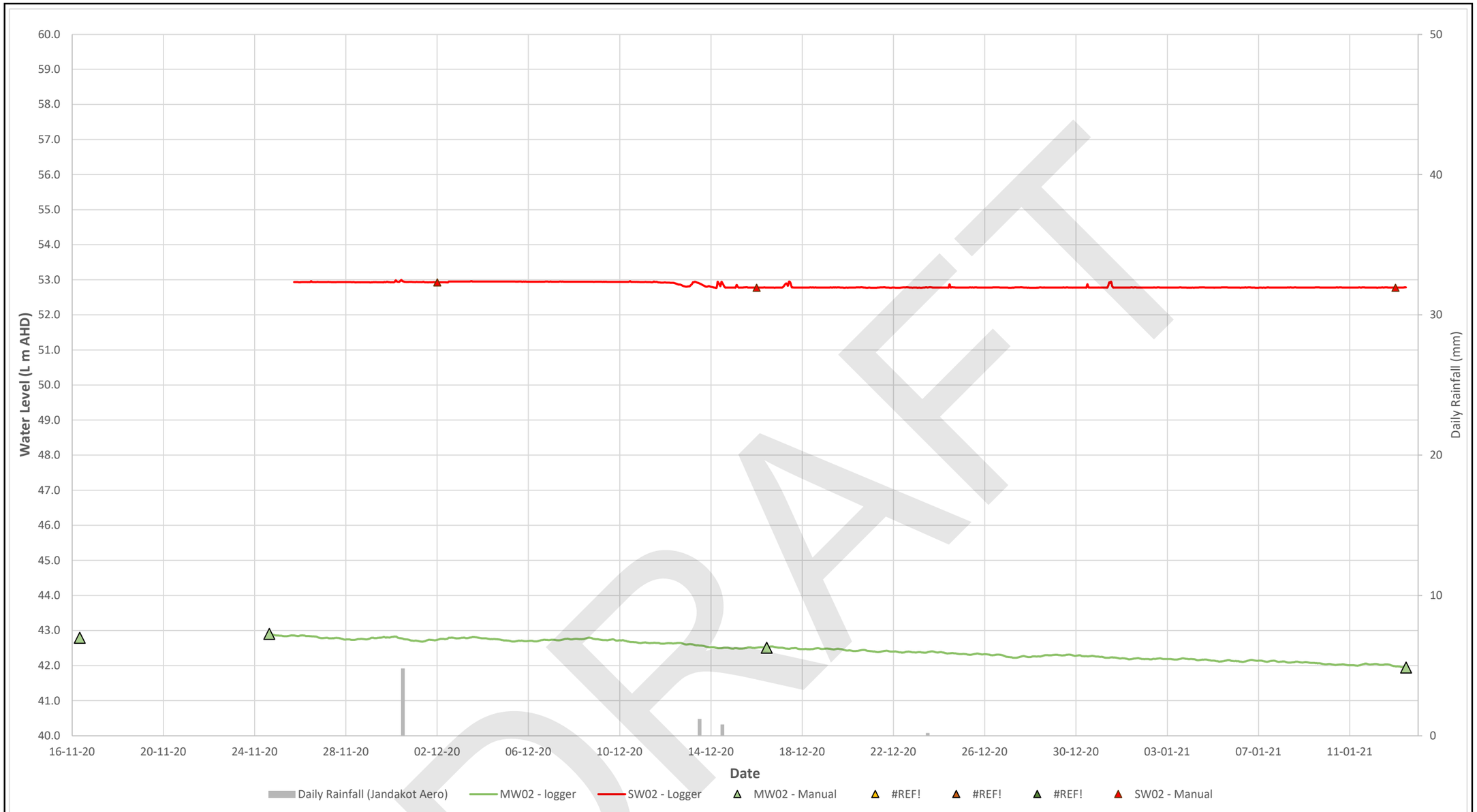
DD/MM/YY	29-01-21
PREPARED	OP
DESIGNED	OP
REVIEWED	AL
APPROVED	AL

PROJECT
20360083 - Byford Rail Extension

TITLE
WATER LEVELS (RL m AHD) - MW01/SW01 LOCATION 16 NOVEMBER 2020 TO 13 JANUARY 2021

PROJECT No.	CONTROL	REV.	FIGURE
20360083	9	A	**2**

Attachment A: Hydrographs



NOTES:
1. THE SHALLOW MONITORING WELL MW02b, WHICH MONITORS PERCHED WATER CONDITIONS, IS CURRENTLY DRY.
2. THE CREEK WHERE SW02 IS LOCATED IS CURRENTLY DRY.

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GOLDER

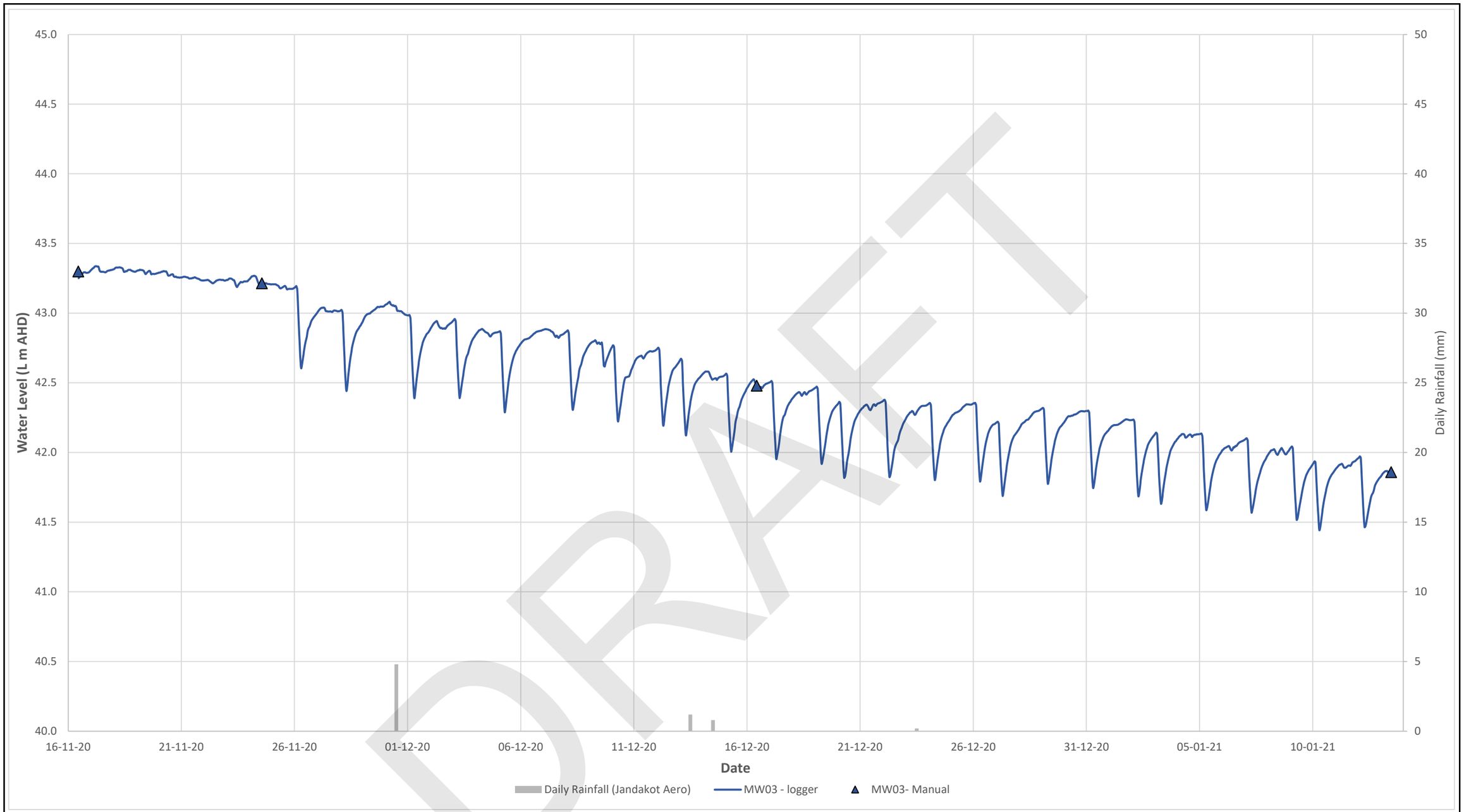
DD/MM/YY	29-01-21
PREPARED	OP
DESIGNED	OP
REVIEWED	AL
APPROVED	AL

PROJECT
20360083 - Byford Rail Extension

TITLE
WATER LEVELS (RL m AHD) - MW02/SW02 LOCATION
16 NOVEMBER 2020 TO 13 JANUARY 2021

PROJECT No.	CONTROL	REV.	FIGURE
20360083	9	A	**3**

Attachment A: Hydrographs



NOTES:
1. THE DRAIN WHERE SW03 IS LOCATED IS CURRENT DRY

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CONSULTANT
GOLDER

DD/MM/YY	29-01-21
PREPARED	OP
DESIGNED	OP
REVIEWED	AL
APPROVED	AL

PROJECT
20360083 - Byford Rail Extension

TITLE
WATER LEVELS (RL m AHD) - MW03/SW03 LOCATION 16 NOVEMBER 2020 TO 13 JANUARY 2021

PROJECT No.	CONTROL	REV.	FIGURE
20360083	9	A	**4**

BH3 (Flush Gatic) & BH3A (Monument)

BH5 & BH5A (Flush Gatics) – Rail Reserve

BH6 (Monument) & BH6A (Flush Gatic)

BH7 & BH7A (Monuments)

SW02 – Dried Creek

SW02 – Dried Creek

SW02 – Logger's location dry

SW01 - Stolen

ATTACHMENT B

Important Information

The document ("Report") to which this page is attached and of which this page forms a part has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

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The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification.