



Contact: David Hilton - Executive Manager Operations

LICENCE COMPLIANCE REPORT 2022/23

PREFACE

This report is prepared by Western Murray Irrigation Limited (WMI) as part of licence requirements which WMI holds with the NSW Department of Planning and Environment - Water (DPE Water) and the Environmental Protection Authority (EPA). It discusses our annual compliance performance, including the environmental performance and impacts of the works and infrastructure owned or controlled by WMI and the quality of irrigation wastewater discharged from works and infrastructure.

Our environmental programs, which aim to exceed our environmental obligations, demonstrate our commitment to ensuring that our operations do not impact negatively on the environment.

Western Murray Irrigation Limited

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2022/23 Annual Compliance report

INTRODUCTION

WMI supplies water to customers in its three irrigation areas, Buronga, Coomealla and Curlwaa under Combined Approval Number 60CA581273. The Statement of Approval has a date of effect 01 July 2004 and expiry of 23 February 2030. Details of the Statement of Approval can be found at: https://waterregister.waternsw.com.au/water-register-frame.

Operating licence for Western Murray Irrigation was renewed and amended for a period of ten years on 24th January 2018, published in NSW Government Gazette No 10 of 25th January 2018:

Government Notices

WATER MANAGEMENT ACT 2000

Sections 123 and 124

RENEWAL AND AMENDMENT OF OPERATING LICENCE

NOTICE is given that, pursuant to sections 123 and 124 of the *Water Management Act 2000*, the Governor of New South Wales has, on 24th January 2018, renewed and amended the Operating Licence of Western Murray Irrigation Limited, for a period of ten years. The renewed Operating Licence commences on the day this notice is published in the NSW Government Gazette.

[n2018-247]

This Compliance Report details the monitoring and reporting activities undertaken by WMI during the 2022/23 financial year to comply with the water management licences. It also outlines irrigation development data that explains the trends in monitoring results.

All mapping details are using projected coordinate system: GDA-1994- MGA-Zone 54.

STATEMENT OF APPROVAL 60CA581273 - COMPLIANCE OF CONDITIONS

Take of Water

MW0655-00001

All water supply works authorised by this approval take water in compliance with the conditions of the access licence under which water is being taken.

MW2452-00001

Water is taken through metering equipment that meet the following requirements:

- A. The metering equipment accurately measures and records the flow of all water taken through the water supply work authorised by this approval.
- B. Status of metering equipment compliance with the current Australian Standard AS 4747: 'Meters for non-urban supply':
 - Buronga pump station meter (1) is pattern approved to NMI-M-10; installed/commissioned 05May21.
 - Coomealla pump station meters (1-6) are pattern approved to NMI-M-10; installed/commissioned 01July2021.
 - Curlwaa pump station meters (1-2) are pattern approved to NMI-M-10. Installed/commissioned 12July21(1) and 12Jun21(2)

Commissioning of Telemetry for DAS – WMI are working with NRAR/DPIE-Water to commission our existing telemetry in accordance with 'Marketing engagement policy for metering and telemetry; Part 3 – Assessment process for 'other telemetry systems'; WMI have submitted a proposal and followed up several times with no resolution from NRAR/DPIE-Water.

- C. All metering equipment is sited and installed at a place in the pipe, between the water source and the first discharge outlet. There is no flow of water into or out of the pipe, between the water source and the metering equipment.
- D. The metering equipment is always operated and maintained in a proper and efficient manner. Calibration/Verification are carried out approximately each year.

Metering Calibration Certificates

Buronga Pump Station.

Tre	esca	Tresc Mile I	al (Australi 16 William End South,	a) Pty Ltd St SA 5031		
	INSTRU	MENT CALL	BRATIO	NREPORT		
Western Mur	ray Irrigation Limited	l		Calib	oration ID: 1	163404
Contact : Davi	id Hilton	City : Daretor	1	F	M Task No :	
Phone : 0429	9183619	State : NSW		v	Vork Order : 2	3.051958
Address : 5 Taj	pio Street	Postcode: 2717				
Instrument ID	BGA MAIN			Manufacture	r: Siemens	
Description	1Y Verification of BGA M ModBus address	lain Flowmeter -		Mode	I: MAG5100W 6000 CT	with MAG
Calibrated	19/Jul/2023			Seria	I: 974403H280 N1MO07504	5
Location	Buronga Pumps			Classification	1: Critical Item	
Area Equipment ID	BURONGA PUMPS			Previous Inst Statu	s: In Service	
Origin of Stated A Calibration Type Document ID:	Accuracy :	Manufacturer Speci In Service VERIFICATION	ification			
Group # Group Name	1 Verification		Gro	Test Type : TaskLi up Result : Pass	st.bpl	
Step # Step			Result	Comments		
1 Converte	r Test (Enter Pass / Fail in Commen	t)	Completed	Pass		
2 Sensor In	sulation (Enter Pass / Fail in Comm	nent)	Completed	Pass		
3 Sensor M	lagnetism (Enter Pass / Fail in Com	ment)	Completed	Pass		
4 Enter WC)# in Notes on Verification Report		Completed			
Test Instruments	Used During the Calibrat	ion:				
<u>Test Instrument ID</u> STIN313	<u>Description</u> Seimens Magflo Verificator	<u>Manufacturer</u> Siemens	Model Numb 083F5060	er <u>Serial Number</u> 00519N089	Last Cal Date 29/07/2022	Next Cal Date 29/07/2023
Calibration Result	Calibration S	uccessful	Performe	d By :	Neil Zander	
Finalized By :	Denise Harrison		Finalized	Date :	20/07/2023	
Calibration Freque	ency : Annual		Next Cal	ibration Date	19/07/2024	
Amb. Temp. (DEG	.C) :		Amb. Hu	midity (%R.H.):		
Trescal (Australia) Pty Ltc Report of Calibration app obtained from Trescal (Au International System of Li	d certifies that the above listed instru lies only to the Item being calibrated, ustralia) Pty Ltd. The quality systems inth (Si) via national metmiony institut	ment meets or exceeds all identified above and shall of Trescal (Australia) Pty L tes that are signatories to t	specifications as a not be reproduced, td are in compliand the CIPM Muturel R	stated in the referenced pro except in full, unless writte the with ISO9001. Measurer econnition Agreement	cedure (unless otherw in permission for an ap nents in this calibration	ise noted). This proved abstract is n are traceable to the



INSTRUMENT CALIBRATION REPORT					
Western Murray Irrigation Limited				Calibra	ation ID: 163392
Contact : David	d Hilton	City : Dareton	L	PM	Task No :
Phone : 0429183619 State :		State : NSW		Wo	rk Order : 23.051958
Address : 5 Tap	io Street 1	Postcode: 2717			
Instrument ID	PUMP A			Manufacturer:	Siemens
Description	1Y Verification of Coomea	lla Pumps - PUMP /	A	Model:	MAG5100W with MAG 6000 CT
Calibrated	19/Jul/2023			Serial:	982003H280 / N1M9215020
Location	Coomealla Pumps			Classification:	Critical Item
Area			F	revious Inst Status:	In Service
Equipment ID	COOMEALLA PUMPS				
		Calibration	1 Data		
Origin of Stated A	couracy	Manufacturer Speci	fication		
Calibration Type:		In Service			
Document ID:		VERIFICATION			
Group #	1		Т	est Type : TaskList.	bpl
Group Name	Verification		Grou	p Result : Pass	
Step # Step			Result	Comments	
1 Converter	Test (Enter Pass / Fail in Comment	t)	Completed	Pass	
2 Sensor Ins	ulation (Enter Pass / Fail in Comm	ent)	Completed	Pass	
3 Sensor Ma	agnetism (Enter Pass / Fail in Com	nent)	Completed	Pass	
4 Enter WO	# in Notes on Verification Report		Completed		
Test Instruments	Used During the Calibrati	on:			
Test Instrument ID STIN313	<u>Description</u> Seimens Magflo Verificator	<u>Manufacturer</u> Siemens	Model Number 083F5060	Serial Number 00519N089	Last Cal Date Next Cal Date 29/07/2022 29/07/2023
Calibration Result	C 13 - C - C		Parformed	Dec. 31.	-1 7 1

Calibration Result: Finalized By :	Calibration Successful Denise Harrison	Performed By : Finalized Date :	Neil Zander 20/07/2023
Calibration Frequency :	Annual	Next Calibration Date	19/07/2024
Amb. Temp. (DEG.C) :		Amb. Humidity (%R.H.):	

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INSTRUMENT CALIBRATION REPORT Western Murray Irrigation Limited Calibration ID: 163394 Contact : David Hilton PM Task No : City : Dareton State : NSW Phone: 0429183619 Work Order : 23.051958 Address : 5 Tapio Street Postcode: 2717 Instrument ID PUMP B Manufacturer: Siemens Model: MAG5100W with MAG Description 1Y Verification of Coomealla Pumps - PUMP B 6000 CT Serial: 982203H280 / Calibrated 19/Jul/2023 N1MO025053 Location Coomealla Pumps Classification: Critical Item Previous Inst Status: Failed Calibration Area Equipment ID COOMEALLA PUMPS Calibration Data Manufacturer Specification Origin of Stated Accuracy Calibration Type: In Service VERIFICATION Document ID: Group # 1 Test Type : TaskList.bpl Group Name Verification Group Result : Pass Step # Step Comments Result 1 Converter Test (Enter Pass / Fail in Comment) Completed Pass 2 Sensor Insulation (Enter Pass / Fail in Comment) Completed Pass 3 Sensor Magnetism (Enter Pass / Fail in Comment) Completed Pass 4 Enter WO# in Notes on Verification Report Completed Test Instruments Used During the Calibration: Test Instrument ID Description Last Cal Date Next Cal Date Manufacturer Model Number Serial Number STEN313 Seimens Magflo Verificator Siemens 083F5060 00519N089 29/07/2022 29/07/2023 Calibration Result: Performed By : Neil Zander Calibration Successful Finalized By : Denise Harrison Finalized Date : 20/07/2023 Next Calibration Date 19/07/2024 Calibration Frequency : Annual

Amb. Temp. (DEG.C) :

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Amb. Humidity (%R.H.):



INSTRUMENT CALIBRATION REPORT

Western Mur	ray Irrigation Limited			Calibr	ation ID: 163395
Contact : Davi	d Hilton	City : Daret	on	PM	Task No :
Phone : 0429	183619	State : NSW		Work Order : 23.051958	
Address : 5 Ta	nio Street	Postcode : 2717			
Instrument ID	PUMP C			Manufacturer:	Siemens
Description	1Y Verification of Coomea	lla Pumps - PUM	PC	Model:	MAG5100W with MAG 6000 CT
Calibrated	19/Jul/2023			Serial:	982303H280 / N1M9045205
Location	Coomealla Pumps			Classification:	Critical Item
Area	_		1	Previous Inst Status:	Failed Calibration
Equipment ID	COOMEALLA PUMPS				
		Calibrat	on Data		
On the second		<u>Canorau</u>	ie Data		
Origin of Stated	Accuracy	Manufacturer Sp	ecification		
Calibration Type		In Common			
Document ID:		III Service			
	•	VERIFICATION			
Crown #		VERIFICATION		Tot Tarre . Tablin	L_1
Group #	1 Verification	VERIFICATION	1	Test Type : TaskList.	bpl
Group # Group Name	1 Verification	VERIFICATION	Grou	Test Type : TaskList. up Result : Pass	bpl
Group # Group Name <u>Step # Step</u>	1 Verification	VERIFICATION	Grou <u>Result</u>	Test Type : TaskList. up Result : Pass <u>Comments</u>	bpl
Group # Group Name <u>Step # Step</u> 1 Converte	1 Verification r Test (Enter Pass / Fail in Comment	VERIFICATION	Grou <u>Result</u> Completed	Test Type : TaskList up Result : Pass <u>Comments</u> Pass	bpl
Group # Group Name Step # Step 1 Converte 2 Sensor In	1 Verification r Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comme) ent)	Grou <u>Result</u> Completed Completed	Test Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass	bpl
Group # Group Name <u>Step # Step</u> <u>1 Converte</u> <u>2 Sensor In</u> <u>3 Sensor M</u>	1 Verification r Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm lagnetism (Enter Pass / Fail in Comm	() ent) nent)	Grou <u>Result</u> Completed Completed Completed	Test Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass	bpl
Group # Group Name Step # Step 1 Converte 2 Sensor In 3 Sensor M 4 Enter WC	1 Verification r Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm Jagnetism (Enter Pass / Fail in Comm ⊯ in Notes on Verification Report	() ent) nent)	Grou <u>Result</u> Completed Completed Completed Completed	Iest Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass	bpl
Group # Group Name Step # Step 1 Converte 2 Sensor In 3 Sensor M 4 Enter WO	Verification Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm lagnetism (Enter Pass / Fail in Comm # in Notes on Verification Report	() ent) nent)	Grou <u>Result</u> Completed Completed Completed Completed	Iest Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass	bpl
Group # Group Name Step # Step 1 Converte 2 Sensor In 3 Sensor M 4 Enter WC	1 Verification Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm lagnetism (Enter Pass / Fail in Comm ⊯ in Notes on Verification Report Used During the Calibration	i) ent) ent) on:	Grou <u>Result</u> Completed Completed Completed Completed	Iest Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass	bpl
Group # Group Name Step # Step 1 Converte 2 Sensor In 3 Sensor M 4 Enter WC Test Instrument ID	1 Verification Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm lagnetism (Enter Pass / Fail in Comm # in Notes on Verification Report Used During the Calibration Description	i) i) int service VERIFICATION i) int i) int	Grow <u>Result</u> Completed Completed Completed Completed Model Numbe	Iest Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass Pass 	bpl Last Cal Date Next Cal Date
Group # Group Name Step # Step 1 Converte 2 Sensor In 3 Sensor M 4 Enter WC Test Instruments Test Instrument ID STIN313	I Verification r Test (Enter Pass / Fail in Comment sulation (Enter Pass / Fail in Comm lagnetism (Enter Pass / Fail in Comm)# in Notes on Verification Report Wised During the Calibration Description Seimens Magflo Verificator	() () () () () () () () () () () () () (Grow <u>Result</u> Completed Completed Completed Completed Model Numbe 083F5060	Iest Type : TaskList. up Result : Pass <u>Comments</u> Pass Pass Pass Pass <u>Pass</u> <u>Pass</u> <u>Comments</u> <u>Pass</u> <u>Pass</u> <u>Pass</u> <u>Pass</u>	bpl Last Cal Date Next Cal Date 29/07/2022 29/07/2023

	2		
Calibration Result:	Calibration Successful	Performed By :	Neil Zander
Finalized By :	Denise Harrison	Finalized Date :	20/07/2023
Calibration Frequency :	Annual	Next Calibration Date	19/07/2024
Amb. Temp. (DEG.C) :		Amb. Humidity (%R.H.):	
-			

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Tree	Fee	Tresca	al (Australia	a) Pty Ltd	
		Mile F	16 William Ind South	St SA 5031	
			ina ooaan,	0/10001	
	INSTRUM	MENT CALIF	BRATION	REPORT	
Western Murr	ay Irrigation Limited			Calibra	ation ID: 163396
Contact : David	Hilton	City : Dareton		PM	Task No :
Phone : 04291	83619	State : NSW		Wo	rk Order : 23.051958
Address : 5 Tapi	io Street P	ostcode: 2/1/			
Instrument ID	PUMP D			Manufacturer:	Siemens
Description	1Y Verification of Coomeal	la Pumps - PUMP I	D	Model:	MAG5100W with MAG 6000 CT
Calibrated	19/Jul/2023			Serial:	982503H280 / N1MO025057
Location	Coomealla Pumps			Classification:	Critical Item
Area			1	Previous Inst Status:	Failed Calibration
Equipment ID	COOMEALLA PUMPS				
		Calibration	Data		
Origin of Stated A	ccuracy]	Manufacturer Specie	fication		
Calibration Type:	1	In Service			
Document ID:		VERIFICATION			
Group #	1		1	fest Type : TaskList.	bpl
Group Name	Verification		Grou	p Result : Pass	-1-
Step # Step			Result	Comments	
1 Converter 1	Test (Enter Pass / Fail in Comment))	Completed	Pass	
2 Sensor Insu	ılation (Enter Pass / Fail in Comme	nt)	Completed	Pass	
3 Sensor Mag	gnetism (Enter Pass / Fail in Comm	ient)	Completed	Pass	
4 Enter WO#	in Notes on Verification Report		Completed		
Test Instruments	Used During the Calibratio	n:			
Test Instrument ID	Description	Manufacturer	Model Number	serial Number	Last Cal Date Next Cal Date
STEN313	Seimens Magflo Verificator	Siemens	083F5060	00519N089	29/07/2022 29/07/2023
Calibration Result:	Calibration St	iccessful	Performed	By: Ne	eil Zander
Finalized By :	Denise Harrison		Finalized I	Date: 20	/07/2023
Calibration Frequen	cy: Annual		Next Cali	bration Date 19	/07/2024
Amb. Temp. (DEG.C):):		Amb. Hun	nidity (%R.H.):	

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INSTRUMENT CALIBRATION REPORT					
Western Murr	ray Irrigation Limited			Calibr	ation ID: 163397
Contact : David	d Hilton	City : Dareton		PM Task No :	
Phone : 0429	183619	State : NSW		Wo	rk Order : 23.051958
Address : 5 Tapio Street		Postcode: 2717			
Instrument ID	PUMP E			Manufacturer:	Siemens
Description	1Y Verification of Coomea	lla Pumps - PUMP I	E	Model:	MAG5100W with MAG 6000 CT
Calibrated	19/Jul/2023			Serial:	982603H280 / N1M9045190
Location	Coomealla Pumps			Classification:	Critical Item
Area Equipment ID	COOMEALLA PUMPS		F	Previous Inst Status:	Failed Calibration
		Calibration	1 Data		
Origin of Stated A	coursey	Manufacturer Speci	fication		
Calibration Trme		In Service			
Document ID:		VERIFICATION			
Document 1D.					
Group #	1		Т	est Type : TaskList.	bpl
Group Name	Verification		Grou	p Result : Pass	-
Step # Step			Result	Comments	
1 Converter	Test (Enter Pass / Fail in Comment)	Completed	Pass	
2 Sensor Ins	ulation (Enter Pass / Fail in Comm	ent)	Completed	Pass	
3 Sensor Ma	agnetism (Enter Pass / Fail in Com	nent)	Completed	Pass	
4 Enter WO	# in Notes on Verification Report		Completed		
Test Instruments	Used During the Calibrati	on:			
Test Instrument ID	Description	Manufacturer	Model Number	Serial Number	Last Cal Date Next Cal Date
STIN313	Seimens Magflo Verificator	Siemens	083F5060	00519N089	29/07/2022 29/07/2023
Calibration Result:	Calibration S.	naaaceful	Performed	By : M	ail Zander
Finalized By :	Denise Harrison	uccessiui	Finalized I	Date: 20	/07/2023

 Amb. Temp. (DEC.C):
 Amb. Humidity
 (%6R.H.):

 Trescal (Australia) Pty Ltd certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). This Report of Calibration applies only to the item being calibrated, identified above and shall not be reproduced, except in full, unless written permission for an approved abstract is obtained from Trescal (Australia) Pty Ltd. The quality systems of Trescal (Australia) Pty Ltd are in compilance with ISO9001. Measurements in this calibration are traceable to the International System of Units (Si) via national metrology institutes that are signatories to the CIPM Mutual Recognition Agreement.

Next Calibration Date

19/07/2024

Calibration Frequency :

Annual



INSTRUMENT CALIBRATION REPORT

	INSTRUMENT CALIBRATION REPORT					
Western Mur	Western Murray Irrigation Limited			Calibration ID: 163399		
Contact : Davi	d Hilton	City : Daretor	1	PM Task No :		
Phone : 0429	183619	State : NSW		Work Order : 23.0519		958
Address : 5 Ta	pio Street	Postcode: 2717				
	-					
Instrument ID	PUMP F			Manufacturer:	Siemens	
Description	1Y Verification of Coom	ealla Pumps - PUMP	F	Model:	MAG5100W with 6000 CT	MAG
Calibrated	19/Jul/2023			Serial:	979503H280 / NIM9045212	
Location	Coomealla Pumps			Classification:	Critical Item	
Area	-		1	Previous Inst Status:	In Service	
Equipment ID	COOMEALLA PUMPS					
		Calibratio	n Data			
Origin of Stated Accuracy Manufacturer Specification						
Calibration Type		In Service				
Document ID:	•	VERIFICATION				
2000						
Group #	1		1	fest Type : TaskList	.bpl	
Group Name	Verification		Grou	p Result : Pass	•	
Step # Step			Result	Comments		
1 Converte	r Test (Enter Pass / Fail in Comme	nt)	Completed	Pass		
2 Sensor In	sulation (Enter Pass / Fail in Com	ment)	Completed	Pass		
3 Sensor M	lagnetism (Enter Pass / Fail in Co	nment)	Completed	Pass		
4 Enter W0	# in Notes on Verification Report	t	Completed			
Test Instruments	Used During the Calibra	tion:				
Test Instrument ID	Description	Manufacturer	Model Number	r Serial Number	Last Cal Date Next	Cal Date
STEN313	Seimens Magflo Verificato	r Siemens	083F5060	00519N089	29/07/2022 29/0	07/2023
Calibration Result	Calibration	Successful	Performed	Bv: N	eil Zander	
Finalized By :	Denise Harrison	Successiu	Finalized I	Date: 20	0/07/2023	
Calibration Freque	ncy: Annual		Next Cali	bration Date 1	9/07/2024	

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Amb. Humidity (%R.H.):

Amb. Temp. (DEG.C) :

Origin of Stated Accuracy

Calibration Type:



Trescal (Australia) Pty Ltd 16 William St Mile End South, SA 5031

INSTRUMENT CALIBRATION REPORT

Western Murray Irrigation Limited		Calibra	ation ID: 163400	
Contact : Dav	id Hilton	City : Dareton	PM	Task No :
Phone : 0429	9183619	State : NSW	Wo	rk Order : 23.051958
Address : 5 Ta	ipio Street	Postcode: 2717		
Instrument ID	CWA MAIN	T	Manufacturer:	Siemens
Description	1Y Verification	of Curlwaa Pumps - CWA	Model:	MAG5100W with MAG
	MAIN			6000 CT

 Description
 1Y Verification of Curlwaa Pumps - CWA MAIN

 Calibrated
 19/Jul/2023

 Location
 Curlwaa Pumps

 Area
 Equipment ID

 CURLWAA PUMPS
 Manufacturer: Siemens Model: MAG5100W with MAG 6000 CT Serial: 918903H480 / N1MO09508 Classification: Critical Item Previous Inst Status: In Service

Calibration Data
Manufacturer Specification
In Service
VERIFICATION

Documen	at ID: VERIFIC	ATION	
Group # Group N	1 Vame Verification	Te Group	est Type : TaskList.bpl p Result : Pass
Step #	Step	Result	Comments
1	Converter Test (Enter Pass / Fail in Comment)	Completed	Pass
2	Sensor Insulation (Enter Pass / Fail in Comment)	Completed	Pass
3	Sensor Magnetism (Enter Pass / Fail in Comment)	Completed	Pass
4	Enter WO# in Notes on Varification Report	Completed	

Test Instruments Used During the Calibration:												
Test Instrument ID STIN313	<u>Description</u> Seimens Magflo Verificator	<u>Manufacturer</u> Siemens	Model Number 083F5060	<u>Serial Number</u> 00519N089	Last Cal Date 29/07/2022	Next Cal Date 29/07/2023						
Calibration Result: Finalized By :	Calibration Su Denise Harrison	ıccessful	Performed By Finalized Dat	y: te:	Neil Zander 20/07/2023							
Calibration Frequen Amb. Temp. (DEG.O	ncy: Annual		Next Calibra Amb. Humid	ition Date ity (%R.H.):	19/07/2024							

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Trescal (Australia) Pty Ltd 16 William St Mile End South, SA 5031

INSTRUMENT CALIBRATION REPORT

INSTRUMENT CALIBRATION REFORT											
Western Mur	ray Irrigation Limited	I		Calibr	ation ID: 1	63401					
Contact : Davi	id Hilton	City : Daretor	1	PM	f Task No :						
Phone : 0429	0183619	State : NSW		Wo	rk Order : 2	3.051958					
Address : 5 Ta	pio Street	Postcode: 2717									
	-										
Instrument ID	CWA BYPASS			Manufacturer:	Siemens						
Description	1Y Verification of Curlwa	a Pumps - CWA		Model:	MAG5100W	with MAG					
	Bypass - ModBus address				6000 CT						
Calibrated	19/Jul/2023			Serial:	978303H280	/					
					N1M904520	0					
Location	Curlwaa Pumps			Classification:	Critical Item						
Area			I	Previous Inst Status:	In Service						
Equipment ID	CURLWAA PUMPS										
Calibration Data											
Origin of Stated A	Accuracy	Manufacturer Spec	ification								
Calibration Type		In Service									
Document ID:		VERIFICATION									
Group #	1		1	fest Type : TaskList	.bpl						
Group Name	Verification		Grou	p Result : Pass							
Step # Step			Result	Comments							
1 Converte	r Test (Enter Pass / Fail in Commer	ut)	Completed	Pass							
2 Sensor In	sulation (Enter Pass / Fail in Comm	nent)	Completed	Pass							
3 Sensor M	agnetism (Enter Pass / Fail in Com	ument)	Completed	Pass							
4 Enter WO	# in Notes on Verification Report	-	Completed								
			· · ·								
Test Instruments	Used During the Calibrat	ion:									
Test Instrument ID	Description	Manufacturer	Model Number	serial Number	Last Cal Date	Next Cal Date					
STEN313	Seimens Magflo Verificator	Siemens	083F5060	00519N089	29/07/2022	29/07/2023					
Calibration Result	Calibration S	uccessful	Performed	By: N	eil Zander						

Finalized By : Denise Harrison Finalized Date : 20/07/2023 Calibration Frequency : Next Calibration Date 19/07/2024 Annual Amb. Temp. (DEG.C) : Amb. Humidity (%R.H.):

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Water Management Works

MW3192-00001

Government-provided metering equipment is not installed on any of WMI water supply works authorised by this approval, any water taken using the works is metered as detailed at MW2452-00001 above.

MW0491-00001

All works authorised by this approval remain in use; there are presently no plans to decommission the works.

Monitoring and Recording

MW2338-00001

The metered usage is recorded electronically at least every 15 minutes and stored on WMI servers; historical data can be accessed back at least 10 years. Live, end of day and end of month meter readings are also available on the WWW: http://orderwater.westernmurray.com.au/PumpTotalisers_sql.asp.

MW2336-00001

The purpose for which water is taken is based on the WMI Crop Report. It is not feasible to create a record each time water is used for type, area, dates of planting and harvesting of each individual owner's crop.

MW2337-00001

The following information is recorded electronically for each 15-minute period that all water is taken:

- A. Time, date, volume of water, start and end times and flowrate.
- B. The access licence number under which the water is taken; also, our order system records individual customer orders; each customer meter is read each quarter.
- C. The approval number under which the water is taken.
- D. Volume of water taken for domestic consumption and/or stock watering is not recorded separately; this is recorded on customer metered outlets.

MW0482-00001

A water meter is installed on all water supply works authorised by this approval, the meter reading is recorded at least every 15 minutes.

MW2339-00001

All works are metered, the WaterNSW data loggers were removed off all works approvals by WaterNSW (or their representatives) this year. The metered records are sent directly to WaterNSW every 15 minutes and daily to MDBA via telemetry; Historical records are also recorded on WMI servers. Western Murray Irrigation are still pursuing options with NRAR/DPIE-Water regarding connection to DAS (Eagle-Eye), utilising our existing telemetry/business systems.

Reporting

MW0051-00001

WMI are not aware any breaches of the conditions of this approval.

Other Conditions - Monitoring and Recording

DK5891-00004

Monitoring and Reporting has been carried out as specified in the 'Western Murray Irrigation Limited Monitoring and Reporting Plan for 60CA581273', dated 16 March 2018, as below.

WMIL – MONITORING AND REPORTING PLAN FOR COMBINED APPROVAL 60CA581273

Schedule 1 – Requirements

The Approval Holder of 60CA 581273 has provided all data in the format detailed in each specific requirement of the Monitoring and Reporting Plan, unless otherwise authorised by NRAR. The data has been submitted to the nominated officer within NRAR.

Reporting and Notification Requirements:

Submission of an Annual Compliance Report.

Condition 1

The Approval Holder has, by the 31st of October each year, submitted to the Minister an electronic copy of an Annual Compliance Report for the preceding water year (from 1 July to 30 June).

Condition 2

Following are plans of Western Murray Irrigation Limited Infrastructure for the year 2022/23.

Condition 2.1

Area of Operations, existing on 30 June 2023, showing, to the Minister's satisfaction, the boundary of all included land and including any amendments made by the inclusion and exclusion of lands in accordance with sections 131 and 135 of the *WMA 2000*, and showing the boundary of any other land water is suppled to that are not included in the Area of Operations. Zero changes to area of operations in financial year 2022/23; Buronga will show significant losses to operational area in the following 1-3 years as urbanisation takes over irrigable land.



WMI Operational Area

Condition 2.2

Plans showing current location of Major water courses, Authorised works and supply infrastructure, Drainage infrastructure, Drainage disposal sites and Monitoring sites.



W01 – Buronga supply. Area of operations.



Buronga drainage infrastructure



Buronga - Extent of area (square metres) that are temporarily inundated to store drainage and storm water (evaporation basins).



Buronga Active Piezometers



W02 - Coomealla supply.



Coomealla Drainage Infrastructure



Coomealla and Curlwaa - Extent of area (square metres) that are temporarily inundated to store drainage and storm water (evaporation basins).



Coomealla Piezometers



W03 - Curlwaa pumping plant and supply infrastructure



Curlwaa Drainage Infrastructure



Curlwaa piezometers

Statement of Compliance

Condition 2.3

WMI is in compliance of Approval number 60CA581273.

Groundwater monitoring results showing destroyed, dry, inactive, and active piezometers are included in this report.

The Saltwater Interception Scheme (SIS) is a government project and has operated since the late 1960's under various configurations; maintained by government until 1995 and WMI thereafter. NRAR have informed WMI on 18August2021 there is a requirement for a separate works approval and WAL to operate the SIS. WMI has requested further information from NRAR investigating why there is a requirement for WMI to pursue a separate works approval and WAL for a SIS, this is a government project and is already a part of our combined Water Supply Work Approval and Water Usage approval (e-mail dated 29Aug2023 – Attached).

WMI has attached a consultant's groundwater hydrogeologist report October 2020, this is a long-term audit of our groundwater control and monitoring. This has been used to establish the best course of action for destroyed piezometers. Extract from report:

Recommendations for Groundwater Monitoring

It is recommended that WMI continue monitoring within their operating network to comply with conditions of the water use approval, maintain a consistent data set, and ensure the collection of time series salinity data (which is not routinely collected as part of state monitoring. For the WMI monitoring program going forward the following recommendations may be adopted to confirm and or improve confidence in monitoring data quality. This includes:

■ Confirm correct bore location details by taking GPS co-ordinates at each site comparing the results to the existing WMI records and NSW government records to identify the correct dataset. Complete (extract from GIS)

■ Measure total bore depth during the next annual monitoring round and comparison of this data to known construction details to confirm that monitoring bores remain open to the aquifer. Complete

Exclude dry bores from ongoing monitoring where the 2019-2020 monitoring data indicates the screen is mostly or completely blocked.

Not yet excluded, screens maybe OK, bore depths not reaching low water table. This will become apparent after floods Nov22-Mar23.

■ Survey the natural surface elevation and reference elevation of bores in the current network where this data is unavailable (10 bores) so that depth to water measurements can be compared to river levels and changes in groundwater gradients can be assessed.

Not started.

■ It is recommended that a selection of bores in the WMI network (20%) are surveyed. This data can be compared to the existing data to assess the accuracy of reference elevation data as most sites have no documented survey methodology. Additional survey may then be required to improve confidence in groundwater elevations and the assessment of groundwater trends.

Not started.

Several bores within the WMI networks have been destroyed or are listed as dry, despite this the existing monitoring data provides a relatively good spatial coverage of the irrigation footprint to identify the potential impacts of irrigation and drainage. However, it is recommended that the network distribution be reviewed following the collection of data listed above, particularly confirmation of correct bore locations and measurement of total bore depth. This data can then be used to identify gaps in the current monitoring network and determine if existing bores not currently monitored by WMI can be included in the annual monitoring round or if replacement bores are required where there are gaps. It is then recommended that a groundwater monitoring plan be developed and presented to the regulator to provide an agreed monitoring strategy going forward. This should also include an update of the agreed set of reporting outputs or performance indicators to be included in the annual compliance report.

To be completed after Surveys.

It is also recommended that WMI continue the collection of 3 yearly crop report data to capture changes in irrigation methods, irrigated area, and crops. This is a valuable data set and can be used to support the analysis of groundwater trends.

Recommendations for SIS Operations

The review of the operational and monitoring data indicates that the Curlwaa SIS does not need to operate under current conditions and there is currently no need to refurbish tubewell 1. However, groundwater monitoring data should continue to be collected annually and reviewed against trigger levels to provide a safeguard if groundwater levels begin to rise. Groundwater levels should be reviewed in the context of rainfall and river level data as hydrograph analysis shows that the floodplain aquifer responds to flood and rainfall events which may result in rises in groundwater levels that are only short term. Irrigation supply and method data should also be reviewed with groundwater trends. Previous communications with Department of Natural Resources by WMI have suggested a trigger level of 31.8mAHD (i.e., 1m above pool level) as a trigger to reinstate SIS operation. This trigger level is considered reasonable however it is also proposed that if groundwater levels rise to 31.3 MAHD (0.5m above pool level) this should trigger a review of SIS operations and the development of a plan to reinstate pumping. This is to prevent a significant time lag for reinstating groundwater pumping if the 31.8mAHD level is reached.

All tubewells are operational after successful rehabilitation; they have been running continuously since November 2022 to today's date of 13Oct23.

It has been noted Schedule One – 'Authorised Supply Works' needs to be updated: W02 Work details should read:

5 Variable axial flow pumps of 63ML/day each.

3 Variable centrifugal pumps of 10 ML/day each

Five original (55.2MLD) pumps have been replaced with more efficient 63MLD pumps; last pump was installed Sep2023.

3 small variable centrifugal pumps of 10, 10, 10 MLD – used as auxiliary/winter pumps.

Condition 2.4

Data from all monitoring required by this Monitoring and Reporting Plan has been supplied in electronic format, including:

- PDF of this report.
- Original Excel spreadsheets used for calculations and presentations within this report.
- Other original documents forming part of this report.

Condition 2.5

Condition 2.5 has been broken down into Salinity, Discharge, Groundwater, Extraction and Water use, monitoring data.

Condition 2.5-Salinity

There have been no significant salt load discharges and no changes to any works or practices that could lead to increased impact trends on the River Murray. Average EC from the river for this year is 216μ S, well above the normal range of $100-150 \mu$ S/cm; this is due to significant flooding from Nov22 – Mar23.

a) Comparable salinity import data for at least 2 years (5 years):

	Т	otal Salt	Imports (Tonnes)		
Month	2018/19	2019/20	2020/21	2021/22	2022/23	5 Yr RA
July	46	22	29	14	24	27
August	79	46	22	42	30	44
September	135	77	86	93	25	83
October	149	100	94	152	32	105
November	127	147	292	142	124	166
December	242	354	494	447	509	409
January	417	289	328	583	685	460
February	256	200	262	455	633	361
March	170	151	175	268	549	263
April	97	53	122	107	200	116
Мау	23	31	61	20	135	54
June	38	34	19	21	37	30
Year to Date	1,718	1,439	1,904	2,301	2,810	2,035
Total	1,779	1,504	1,984	2,343	2,982	2,118
Average EC	163	138	139	114	216.01	154

O:\Supply\WMIL Supply Figures\WMIL Supply 2022-23\[WMIL Daily Flows ALL Stations 2022-23.xlsx]Monthly Salt Summary

Western Murray Irrigation Limited



The chart shows seasonal water usage affecting salt imports for each month; Note the increase in 22-23 during the Nov-Mar flood event. For annual trends, see para 2.5 Salinity (b).

Annual	2018/19	2019/20	2020/21	2021/22	2022/23	5 Yr RA
Av. EC	99	95	124	142	216	132
GL	28.1	24.8	25.1	25.7	21.6	25.0
100 Tonnes	17.8	15.0	19.8	23.4	29.8	21.2
ML/T	15.8	16.5	12.7	11.0	7.2	11.8

b) Comparable Salinity import data for a year being at least 5 years prior:

O:\Supply\WMIL Supply Figures\WMIL Supply 2022-23\[WMIL Daily Flows ALL Stations 2022-23.xlsx]Monthly Salt Summary



This chart shows the effect of EC on annual salt imports.

(c There are no new targets identified, the salt imports are controlled purely by the salt content of the river and quantity of water extracted. The annual EC average has been calculated by daily salt imported in tonnes /daily water pumped in GL/0.64; this gives a true average EC of 'imported' water. This is an identified benchmark although we have no control over this.

d) Although supply is well below the 5-year average (21.6/25.0GL), average EC has also increased therefore salt imports have again increased.

Condition 2.5-Discharge

a) Discharges from all drainage outfalls for the 2022/23 year:

	Buronga	1	C	comeal	la		Curlwaa		Total			
т	otal Drainage	e	т	otal Drainage	e	т	otal Drainage	9	Total Drainage			
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	
63.35	1,068	43.32	900.01	2,154	1240.74	19.80	1,357	17.20	983.17	1526.63	1301.26	
D	rainage Basi	ns	D	rainage Basi	ns	D	rainage Basi	ns	Drainage Basins			
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	
63.35	1,068	43.32	569.65	2,160	787.43	19.80	1,357	17.20	652.80	1528.58	847.96	
	Flood Plains	5		Flood Plains	5		Flood Plains	5		Flood Plain	S	
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	
0.00	NA	0.00	300.44	2,146	412.69	0.00	NA	0.00	300.44	2146.31	412.69	
	Murray River			Murray River			Murray River		Murray River			
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	
0.00	NA	0.00	29.93	2,120	40.61	0.00	NA	0.00	29.93	2120.42	40.61	

O:\Supply\WM IL Supply Figures\WM IL Supply 2022-23\[WM IL Daily Flows ALL Stations 2022-23.xlsx]M onthly Salt Summary

Drai	Drainage water (ML) - Comparable data for last 2 years													
	Drainage Basins 21/22	Flood Plains 21/22	Murray River 21/22	Drainage Basins 22/23	Flood Plains 22/23	Murray River 22/23								
Jul	4.77	3.33	0.00	11.35	2.37	0.00								
Aug	6.98	3.55	0.24	24.04	2.21	0.00								
Sep	17.82	2.07	0.37	22.71	5.60	0.60								
Oct	30.03	3.83	0.83	115.84	19.04	1.79								
Nov	39.65	9.36	0.37	52.86	9.22	2.07								
Dec	55.09	19.65	1.57	69.80	24.38	1.97								
Jan	56.46	15.23	1.83	111.11	19.96	1.98								
Feb	49.85	17.14	3.38	96.31	92.20	7.26								
Mar	43.91	7.17	1.79	55.42	69.22	8.19								
Apr	49.58	8.83	14.21	31.39	12.42	1.46								
May	29.85	10.64	4.10	23.02	17.56	2.96								
Jun	19.47	9.84	2.52	38.95	26.26	1.66								



	Salt Exports (T) - Comparable data for last 2 years														
	Drainage Basins 21/22	Flood Plains 21/22	Murray River 21/22	Drainage Basins 22/23	Flood Plains 22/23	Murray River 22/23									
Jul	6.70	4.47	0.00	13.79	3.73	0.00									
Aug	10.27	4.74	0.29	28.62	3.21	0.00									
Sep	27.77	2.78	0.47	31.65	8.10	0.79									
Oct	41.96	5.09	0.83	146.86	20.42	2.20									
Nov	55.50	12.00	0.36	64.71	16.46	2.64									
Dec	66.82	25.18	1.86	85.05	26.69	2.62									
Jan	60.59	20.05	2.08	127.42	20.57	2.43									
Feb	60.24	23.55	5.16	141.41	99.79	9.99									
Mar	53.53	9.49	2.38	80.53	149.34	12.37									
Apr	62.47	10.27	16.44	39.04	14.37	1.93									
May	38.84	13.58	3.61	27.00	15.35	2.90									
Jun	28.26	14.43	3.59	61.90	34.67	2.76									



b) Comparable discharge data for a year being at least 5 years prior:





c) The majority of the drainage water trend follows the irrigation demand and to a lesser degree rainfall events. 2022/23 irrigation supply was 98.65% of the 5-year average; Rainfall was 358.0mm, above the 50-year average of 284.6mm considerably more than the last 4 years; there was an increase in drainage water, possibly in line with the increase in rainfall. September 2019 WMI introduced pulsed hydrogen peroxide dosing, currently at 4 hours a day at 5ppm at all our extraction sites, this is increased up to 24/7 depending on river water quality and demand; This is to control bryozoan growths in the pipeline, aimed at improved water quality at customer outlets; Customers have generally noticed their onfarm filters have been running for longer between backflushes, this has reduced the quantity of backflush water returned to the surface drain system; although when river water quality is bad, peroxide dosing cannot dissolve organic matter in the pipeline.

d) Salt exported follows a similar pattern to drainage water throughout the year; Long term change from dominant furrow irrigation in 1997 to dominant drip irrigation in 2022 has reduced drainage water from 4848ML in 1998/99 to 983ML in 2022/23; exported salt in 1998/99 was 6,538 tonnes, while 2022/23 was 1,301.26 tonnes. If this is compared against salt imports, it appears the imported salt is now being retained on irrigated land; sustained rainfall may control the salinity to some extent.

- Individual salinity and salt load of schedule 1 extraction sites is continued at condition 2.14.
- Individual salinity and salt loads of attachment 1 discharge sites is found at condition 2.15.
- A simple salt balance report is found at condition 2.16.

Flood 22/23

November 2022 – March 2023 was a major flood in our area of operations. Drainage basins and flood plains at Coomealla, Curlwaa and Buronga were inundated with water for this period. The Murray, Darling, Tuckers Creek, Fletchers Lake (usually a dry basin), Gol Gol swamp, and associated flood plains became one body of water. We have reported our discharges to the normal discharge areas, however, most of this drainage water will have flowed

back into the river system, all except Buronga basin discharge. Fletchers Lake and Gol Gol swamp are still very full of water, although no longer connected directly to the river system; these are expected to evaporate over time to back to dry lake beds again. Our drainage water is still being discharged into Fletchers Lake.

Several Piezometers were (and still are) underwater or still inaccessible.



Buronga Irrigation Area and surrounds Jan. 2023



South of Coomealla Irrigation Area Jan. 2023



South-West of Coomealla and Curlwaa Irrigation Areas with Darling/Murray convergence, Jan. 2023.



North-West of Coomealla/Curlwaa Irrigation areas, showing the inundation between Tuckers Creek, Fletchers Lake, and Darling River, Mar. 2023



Recorded flows June - December 2022

Condition 2.5-Groundwater

The Curlwaa salt interception scheme X4 tubewell pumps have been running since October 2022. Following advice from 'Department of Natural Resources' in 2009, pumping may be suspended when groundwater falls to 0.5m above river level. Due to this unique event, we will run the pumps until the river returns to normal level and flows, and the tubewell pumps reduce to a normal flow level i.e., the pumps are usually unable to sustain a steady flow for over 30 minutes.

Recommendations for SIS Operations

The review of the operational and monitoring data indicates that the Curlwaa SIS does not need to operate under current conditions and there is currently no need to refurbish tubewell 1. However, groundwater monitoring data should continue to be collected annually and reviewed against trigger levels to provide a safeguard if groundwater levels begin to rise. Groundwater levels should be reviewed in the context of rainfall and river level data as hydrograph analysis shows that the floodplain aquifer responds to flood and rainfall events which may result in rises in groundwater levels that are only short term. Irrigation supply and method data should also be reviewed with groundwater trends. Previous communications with Department of Natural Resources by WMI have suggested a trigger level of 31.8mAHD (i.e., 1m above pool level) as a trigger to reinstate SIS operation. This trigger level is considered reasonable however it is also proposed that if groundwater levels rise to 31.3 MAHD (0.5m above pool level) this should trigger a review of SIS operations and the development of a plan to reinstate pumping. This is to prevent a significant time lag for reinstating groundwater pumping if the 31.8mAHD level is reached. Western Murray Irrigation | 30 October 2020

Groundwater Monitoring and Salt Interception Scheme Review Page 4

Full details of groundwater at Condition 2.17.

Condition 2.5-Extraction

a) Comparable extraction data (ML) for at least 2 previous years (3 years):

Western Murray Irrigation Limited



2022/23 extraction (ML) was 11% below the 3-year average, a particularly high rainfall year.

b) Comparable extraction data for a year being at least five years (10 years):

Long-term annual extraction

Jun-30	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Buronga	3,289	2,816	2,906	2,892	3,248	3,542	2,338	2,578	2,597	1,969
Coomealla	19,319	18,596	18,376	17,751	19,266	20,584	18,871	19,269	19,496	16,625
Curlwaa	4,534	4,352	4,353	3,660	4,027	3,943	3,607	3,252	3,597	2,976
Total	27,142	25,764	25,635	24,303	26,541	28,069	24,816	25,099	25,691	21,571

O:\Supply\WM IL Supply Figures\WM IL Supply 2022-23\[WM IL Supply 2022-23 YTD.xlsx]Long term totals from 95



Monthly extraction over the past 5 years:

		٦	Total WM	Diversio	ns			WMI Total Supply by Month	
Month	2018/19	2019/20	2020/21	2021/22	2022/23	5 YR AV	7,000		
July	612	335	404	199	351	380		Λ	
August	904	714	268	578	431	579	6,000		
September	1,366	1,204	936	1,213	353	1,014		T-A	
October	2,498	2,193	1,044	1,915	349	1,600	5,000 -		
November	2,583	2,967	3,710	1,879	973	2,422			
December	4,435	5,071	4,885	5,365	4,292	4,810	4,000 -		2018/19
January	6,472	4,945	4,718	5,587	5,274	5,399	3.000		2019/20
February	3,995	3,364	3,794	4,493	4,542	4,038	3,000		
March	2,881	2,165	2,451	2,656	2,929	2,616	2.000		
April	1,437	841	1,748	1,261	1,109	1,279	2,000		
Мау	371	444	879	257	762	543	1.000 -		
June	514	572	262	287	208	368	1,010		
Year to Date	28,067	24,816	25,099	25,691	21,572	25,049			
Total	28,067	24,816	25,099	25,691	21,572	25,049		144 Jack Parts Jose Andre Andre Harr Star Star Star	
O:\Supply\WML Supply Fi	gures\WMIL Supply	2022-23\[WMIL Dai	ly Flows ALL Static	ons 2022-23.xlsx]M	onthly Supply Sum	hary		he redue of Maye Dear My Key.	c)

Long-term extraction shows a marked reduction in water usage; utilisation of irrigation area is presently at 79% (2021), 1997 this was 98%; Irrigable area has increased by 9% from 1997. Water savings have largely been achieved by a change from dominant furrow irrigation in 1997 to dominant drip irrigation in 2021:



Figure 5: Western Murray Irrigation - irrigation methods from 1997 to 2021

(2021 WMI Crop Report, p15)

d) Long-term climate tends to go through long periods of drought followed by heavy rainfall. 2022/23 was well above average annual rainfall 430.8mm (286.6mm 50-year average), concentrated around late winter and spring.

Cumulative Ra	ainfall Tot	als											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
2022/23	4.6	43.4	96.8	206.4	272.6	283.6	308.4	309.8	315.2	338.2	350.6	430.8	
50 Yr Average	23.5	48.5	75.1	105.1	132.0	158.6	184.5	204.3	220.4	240.8	264.4	286.6	
Max Year in 50	26.4	55.6	112.2	204.4	314.6	461.4	588.4	771.6	891.4	903.2	916.4	926.6	2010/11
Min Year in 50	2.6	5.0	29.2	32.4	35.6	36.6	38.4	39.2	71.4	79.4	90.0	97.4	1982/83
O:\Supply\WML Supp	ly Figures\WM	IL Supply 20	22-23\[2022-	23 Weather I	Data.xls]BOM	A Rainfall							

Rainfall mm (Original data from B.O.M. - Mildura Airport)

Condition 2.5-Water Use

- a) 2022/23 WMI extracted 21,572ML for water use (see 2.5 Extraction a), this report), this was used predominantly for horticulture with a small amount of this allocated for General Security (86.9ML) and Domestic and Stock use (560ML).
- b) WMI crops are planned to be surveyed every three years, (COVID19 delayed the 2021 report, by one year):

			1997	2003	2006	2009	2012	2015	2018	2021		
		5,000	1									
		4 000				_						
		4,000				645	675	740	705	645		
	ares	3,000	1,180	935	920	810		=		_		
	hect	2 000					795	735	690	785		
		2,000		2 650	2.550							
		1,000	2,295	2,030	2,550	2,320	2,160	1,995	1,915	1,965		
		0										
		0									% in	Change
Cro	p type		1997	2003	2006	2009	2012	2015	2018	2021	2021	1997-2021
	Grape dried		1,105	735	535	285	295	265	230	125	3%	-980
	Grape	e table	45	90	80	55	60	60	75	145	4%	+100
lent	Grape	e wine	1,145	1,825	1,935	1,980	1,805	1,670	1,610	1,695	42%	+550
mar	Citrus	5	1,180	935	920	810	795	735	690	785	19%	-395
Per	Fruit	tree	30	20	30	40	85	110	170	140	3%	+110
	Nut tr	ree	0	5	5	5	10	25	35	20	<1%	+20
	Other	r	5	5	20	20	35	30	20	25	1%	+20
lal	Field	crop	105	55	60	30	40	55	55	75	2%	-30
asor	Veg. o	cucurbit	25	35	55	50	105	155	240	190	5%	+165
Se	Veg. o	other	35	20	30	25	50	50	75	40	1%	+5
Vac	ant P ²		25	110	185	645	675	740	705	645	16%	+620
Vac	Vacant S ³		55	95	105	135	120	180	160	195	5%	+140
Tota	al irriga	ble (ha)	3,755	3,930	3,960	4,080	4,075	4,075	4,065	4,080	100%	+325
Dor	ninant		citrus			w	vine grape	is .				

ure 2: Western Murray Irrigation - crop types from 1997 to 2021

² Vacant P: not irrigated but previously an irrigated permanent planting ³ Vacant S: not irrigated but previously an irrigated seasonal crop

It has been noticed the horticulture business is gaining some momentum within Coomealla Irrigation Area. Short term trends indicate more irrigable land is being put back into production; this will also increase water usage which will challenge our infrastructure in its current configuration.

c) We are pumping less water annually than 1997, but drip irrigation puts excessive intra-day pressure on our infrastructure (designed around furrow irrigation); days above 40C create very high peaks of demand from drip

irrigation systems, targeted pipeline upgrades are necessary to alleviate the intra-day demand, the first upgrade completed in spring 2022 was to alleviate two bottlenecks in our system.



Coomealla relift pump station emphasises demand at peak season (2021/22). Three rain events can be clearly seen effecting demand in November, January, and February. When Coomealla relift pump station is above 450L/s, customer pressure drops below service level; 2022/23 season was a low demand season, and relatively cool summer, those highs were not present for this season.

Condition 2.6

The following have been identified as possible data omissions and discrepancies with an explanation of action undertaken/proposed to remedy the monitoring and reporting deficiency.

a) Several destroyed piezometers have not been replaced; however, consideration is being given to which piezometers are required to achieve the appropriate reporting coverage with consultation with a groundwater hydrogeologist. Rehabilitation of several piezometers have been attempted in 2017/18; work is now ongoing to rehabilitate more piezometers. Several piezometers have recorded ground water to a measurable level since the flood in 22/23. Piezometers have been checked for GPS location and updated; several were found incorrect. All positions are now recorded to our GIS system as GDA94, we would like to update to GDA2020, but current hand-held GPS do not come with GDA2020 as an optional coordinate system. As built screen depths have been updated from historical files where possible, See condition 2.17.

Condition 2.7

All files including the Compliance Report and all associated Excel spread sheets have been provided, as a record of monitoring and testing data for discharged water salinity and volume and groundwater conditions. These are provided in an unrestricted access, electronic format.

Condition 2.8

"Salinity Training Manual"; Published by NSW Department of Primary Industries, June 2014 is used as a reference for understanding the effects of salination and methods for monitoring and control. Quality assurance is achieved by annual calibration of our extraction meters for extraction volume. MDBA website is used for salinity readings from Wentworth weir. Volume of exports is measured by V-notch or meters; Salinity is measured with a salinity meter which is calibrated before every use with a test solution. As part of EPA reporting, at least once a year (depending on drainage flow) drainage water samples are sent to consultants 'Pinion Advisory-Mildura' for NATA approved laboratory testing for chemical content (at NMI, 105 Delhi Road, North Ryde, NSW 2113). Piezometers are measured in accordance with the works approval. Training is also carried out, so at least 3 staff are familiar with the current monitoring procedures. Consultants are used for advice when required.

New Measures to Limit Groundwater Recharge and Discharge of Salt

Condition 2.9

A continuing trend towards drip irrigation requires much finer filtration, this requires more frequent operation of filter backflush systems; Hydrogen peroxide treatment was introduced in 2019/20 to stop the growth of pipeline bryozoans and other organic growths, it has reduced backflush water at the on-farm filtration systems, and reduced flows into the surface drainage system, thereby reducing groundwater recharge and discharge of salt.

The water table has been above trigger-level (1M above normal lock pool) since 23 Oct 2023, and was a significant flood from November 2022 - March 2023. During this time deep drainage to the river was isolated to prevent river water backfilling the deep drainage system; Tubewell pumps have been operational since October 2023. Although drainage water for Coomealla and Curlwaa Irrigation Areas was discharged to Fletchers Lake, Fletchers Lake was later inundated and became part of the river system. The lake filled and overflowed to surrounding areas as indicated by aerial images at Flood 22/23.

Fletchers Lake was disconnected from the river system when the flow stopped flowing back to the river around June 2023. All flood plains were underwater during this period.

The flood caused a massive mobilisation of stored salt into the river system, although this was diluted due to the extraordinary flows of > 200GL/Day.

Reporting on Water Management

Condition 2.10

In respect of each water supply work listed in schedule one (of the Monitoring and Reporting Plan for Combined Approval 60CA581273) the reconciled monthly water volumes in megalitres are as follows:

 a) Extracted under water access licences held by the approval holder. Domestic + Stock, General Security and High Security are <u>not</u> metered separately. There is a 2.4ML totalised discrepancy between Water NSW statements and WMI reported figures.

Water NSW - Reconciled Usage														
IWAS Statement														
Туре	Type WAL ML													
HS	60AL581271	20,961.7												
DS	60AL581272	490.0												
DS	60AL682421	34.0												
DS	60AL583565	36.0												
GS 60AL583086 47														
	Total	21,569.1												

WMI – Reconciled Usage for each Authorised supply works

		BURG	ONGA			COOM	EALLA			CURL	WAA						
															TOTAL		
Month	2020/21	2021/22	2022/23	3 Yr RA	2020/21	2021/22	2022/23	3 Yr RA	2020/21	2021/22	2022/23	3 Yr RA	2020/21	2021/22	2022/23	3 Yr RA	%
July	43	30	50	41	287	127	242	219	74	41	59	58	404	199	351	318	110%
August	26	58	48	44	197	413	316	309	45	107	67	73	268	578	431	425	101%
September	109	136	49	98	652	863	260	592	175	214	44	144	936	1,213	353	834	42%
October	133	215	31	126	757	1,410	273	813	154	290	45	163	1,044	1,915	349	1,103	32%
November	374	185	82	214	2,890	1,422	758	1,690	446	272	133	284	3,710	1,879	973	2,187	44%
December	482	480	349	437	3,837	4,190	3,429	3,819	566	696	514	592	4,885	5,365	4,292	4,848	89%
January	427	552	484	488	3,752	4,330	4,116	4,066	538	705	673	639	4,718	5,587	5,274	5,193	102%
February	370	416	392	393	2,973	3,503	3,553	3,343	451	574	597	541	3,794	4,493	4,542	4,276	106%
March	288	293	271	284	1,788	1,935	2,175	1,966	375	428	483	429	2,451	2,656	2,929	2,679	109%
April	209	153	125	162	1,290	913	788	997	249	195	196	213	1,748	1,261	1,109	1,372	81%
Мау	85	41	72	66	649	182	545	458	145	35	145	108	879	257	762	633	120%
June	32	38	17	29	196	209	171	192	34	40	20	31	262	287	208	252	82%
Year to Date	2,578	2,597	1,970	2,382	19,269	19,496	16,625	18,464	3,252	3,597	2,976	3,275	25,099	25,691	21,571.5	24,120	89.4%
Total	2,578	2,597	1,970	2,382	19,269	19,496	16,625	18,464	3,252	3,597	2,976	3,275	25,099	25,691	21,572	24,120	
	OIS WALLS	A. Conversion Revenue	- 2022 220 08845 0.000	- 2022 22 VTD													

b) No other water access licences were used for extraction.

c) No water was extracted for environmental or river operational purposes.

d) All water is delivered to customers except for leakage and scouring; leakage is so minute it is not measurable with any confidence, scouring used 38.94ML.

Condition 2.11

Water discharged from (drainage) sites listed in Attachment 1:

This "Drainage" water is a combination of:

- Groundwater from the deep drainage system, this drains the farms of excessive water from irrigation and rain events, these drains were very active when furrow irrigation was dominant.
- Surface water from the surface drain system, from backflush, deep drains discharge and rain events.
- a) Discharged without credit:
 - 953.24 ML was retained in area of operations i.e., drainage basins and flood plains, not to the river.
 - 29.93 ML was discharged to Murray River.

b) Nil discharges for environmental or river operational purposes.

Condition 2.12

- a) Discharged without credit (not including rain or evapotranspiration rates).
 - Buronga 1,970ML water extracted from river, 0.0ML scoured to drains, 63.35ML discharged to drainage basins.
 - Coomealla 16,626ML water extracted from river, 38.32ML scoured to drains, 870.09ML discharged to drainage basins and flood plains, 29.93ML drained to river.
 - Curlwaa 2,976ML extracted from river, 0.618ML scoured to drains, 19.80L discharged to drainage basins.
- b) Negligible losses in fully pipelined network <10ML (0.05%).
- c) No change to offline storages (balance towers) they are a fixed size metal cylinder, kept at a constant height to maintain pressure on the pipelined systems, i.e., part of the pipelined system. Coomealla tower (1995) is approximate 2ML (0.01% of annual use), Curlwaa tower (1986) is approximately 0.6ML (0.017% of annual use), they have been at the same level (except maintenance) since construction.

Water Extraction and Supply Balance	ML)

	Buronga	Coomealla	Curlwaa
Extracted under water access licence held by the approval holder	1,969	16,625	2,976
Extracted under any other water access licences nominating that work	0	0	0
Extracted for environmental or river operational purpose under agreement with and for Water	0	0	0
Delivered in total to the approval holders customers	1,941	16,217	2,928
Discharged without credit (Scouring)	0	38	1
Discharged for environmental or river operational purpose under agreement with Water NSW or	0	0	0
Net channel losses	0	0	0
Escaped	0	0	0
Recycled	0	0	0
Evapourated	0	0	0
Within Channel rainfall	0	0	0
Change in water storage volume	0	0	0
Seepage	0	0	0
Change in the volume of water held in off-line storages	0	0	0
Extraction minus discharge	28	370	47
%	1.44%	2.23%	1.59%

C:\Users\david\Desktop\WMIL Supply 2022-23\[Pumped Vs Field Meters.xls]2022-23

The small discrepancies of extraction minus discharge are considered acceptable metering errors (<5%).

Condition 2.13

The estimated annual values in measurement units requested for:

- a) Rainfall = 430.8mm
- b) Evapotranspiration = 1,541mm
- c) Water deliveries for horticulture = 91% = 19,118ML
- d) Water deliveries for summer crops = 8% = 1,681ML
- e) Water deliveries for winter crops = 1% = 210ML

Table	e 2: Western I	Murray Irrig	gation - irr	igated crops in 2021
Cro	p type	2021 (ha)	2021 %	Description
	Grape dried	125	3%	
	Grape table	145	4%	
L.	Grape wine	1,695	42%	
manen	Citrus	785	19%	Mainly navel varieties. Other citrus includes; blood orange, grapefruit, lemon, lime, mandarin, common orange, pomelo, tangelo and Valencia.
Per	Fruit tree	140	3%	Mainly avocado, fig and stone fruit. Also, date palm, jujube, olive and pomegranate.
	Nut tree	20	<1%	Almonds
	Other	25	1%	Mainly nurseries. Other includes; berries, fresh flowers, native plants and tree plantations.
-	Field crop	75	2%	Mainly pasture and fodder crops.
asona	Veg. cucurbit	190	5%	Mainly melons. Other cucurbits include pumpkin and zucchini.
Se	Veg. other	40	1%	Mainly asparagus. Other vegetables included; beans, chilli, eggplant, peas, sweet corn and tomato.
Tota	al irrigated (ha)	3,240	79%	
ant	Vacant P	645	16%	Vacant (not irrigated), previously an irrigated permanent crop
Vac	Vacant S	195	5%	Vacant (not irrigated), previously an irrigated seasonal crop
Tota	al irrigable (ha)	4,080	100%	

WMI Crop Report 2021, p.10

- f) Water deliveries for Domestic and Stock = 560ML.
- g) Application areas for the water uses c) to f) estimated from locally relevant crop water use factors. = 3,240ha.
- h) The distribution of irrigation intensity (ML/ha/year) in at least three intensity ranges for the main supply sub-division areas.

Five intensity ranges total Ha of ML/Ha over a period of 5 years for each irrigation area; if there is no market for grapes, the growers will cut back on the water to minimal requirements to only keep the vines alive:



O:\Supply\WMIL Supply Figures\WMIL Supply 2022-23\[ML per Ha charts:xlsx]Sheet2

Buronga looks erratic, this is due to a lot of replanting, urbanisation, one large irrigator taking supply from another water source and Buronga being a small system. The 4-6ML/Ha range has trended up strongly over the past 2 seasons, while the >8ML/Ha has trended down.



O:\Supply\WMIL Supply Figures\WMIL Supply 2022-23\[ML per Ha charts.xlsx]Sheet2

Coomealla has also had a lot of replanting and redevelopment of previously dry blocks. The >8ML/Ha has trended down over the past 2 seasons while the range of 0-2 & 2-4ML/Ha has increased.



O:\Supply\VMIL Supply Figures\VMIL Supply 2022-23\[ML per Ha charts.xlsx]Sheet2

Small increase in large previously dry blocks, but more smaller blocks going dry each year. Curlwaa soil has a high clay content and tends to retain water more than Coomealla and Buronga. This trend has continued into 2022-23

Reporting on Salinity and Saltload

Condition 2.14

The salinity and saltload of extractions at the sites listed in schedule 1, and in accordance with requirements set out in schedule 1:

- Flow ML/Month
- Salt Loads Tonnes/Month
- Salinity micro-Siemens/cm
- In table format

	BURON	GA W01	COOMEA	LLA W02	CURLW	AA W03	Average
Month	ML	Salt (T)	ML	Salt (T)	ML	Salt (T)	EC
July	50	3	242	16	59	4	102
August	48	3	316	22	67	5	109
September	49	3	260	18	44	3	106
October	31	3	273	25	45	4	143
November	82	10	758	96	133	17	198
December	349	41	3,429	407	514	61	185
January	484	63	4,116	535	673	87	203
February	392	60	3,553	491	597	82	218
March	271	51	2,175	407	483	91	293
April	125	22	788	142	196	35	280
Мау	72	13	545	96	145	26	277
June	17	3	171	30	20	4	278
Year to Date	1,970	275	16,625	2,285	2,976	419	216

O:\Supply\WM IL Supply Figures\WM IL Supply 2022-23\[WM IL Supply 2022-23 YTD.xlsx]Salt Loads

All Districts		2022/23	
	ML	Salt (T)	AV EC
Year to Date	21,572	2,979	216

Condition 2.15

The salinity and salt loads of discharges at the sites listed in Attachment 1, and in accordance with the requirements set out in Attachment 1:

- Volume ML/Month
- Salt Load Tonnes/Month
- Monthly min, max, average
- Table format

District		Curlwaa									Locatio	n Details		Туре		Centrifugal Pumps		
Work/Site Ide	ntifier	CW 6								0	Coordinate	es (WGS	84)	Dimensio	ons	80mm &	200mm	
Name		James' H	lighway													X- Sectio	n = 0.04n	n ²
Representing discharg Discharges to Fletchers Lake											586760	E 62259	10N	Capacity		13 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.0	0.0	0.0	7.2	2.2	0.0	1.4	2.8	12.5	0.0	0.0	0.0	19.8 ML	12.5	0.0	2.2	Flow	
Salt Load (T)	0.0	0.0	0.0	0.9	0.3	0.0	0.2	3.3	12.5	0.0	0.0	0.0	17.2 T	12.5	0.0	1.4	FIOW	INU FIUW
Average EC	NA	NA	NA	200	200	NA	200	1,876	3,132	NA	NA	0	1357	3,132	0	1,357	10	42
O:\Supply\WMIL Supply Figures\WMIL Supply 2022-23\[WMIL Supply 2022-23 YTD.xlsx]Salt Loa								Salt Loads	5							5	2	

District	Buronga										Location	n Details		Туре		Weir - 90	° V Notch	۱	
Work/Site Identifier	B1										GDA	94-54		Dimensio	ons	300mm I	Pipe		
Name Representing discharge	Corbett A Discharg	Ave Jes to Bas	in No.1							609	900E	6219	9513N	Capacity		X- Section 2 ML/D	n = 0.07r	n²	
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Site Visits	
Volume (ML)	5.5	6.6	3.3	7.61	8.6	9.2	7.50	2.2	6.361	3.6	1.8	1.0	63.4 ML	9.2	1.0	5.3	Flow	No Flow	
Salt Load (T)	4.1	4.8	2.0	5.40	5.4	6.0	4.33	2.2	4.509	2.9	0.9	0.6	43.3 T	6.0	0.6	3.6	FIOW	NO FIOW	
Average EC	1,172	1,130	951	1,108	991	1,023	902	1,526	1,108	1,261	831	984		1,526	831	1,068	52	0	
O:\DO Files\001 Drainag	ge\000 Dra	ainage Fig	ures\Drai	nage 202	2-23\[WN	IL Draina	ge 2022-2	3.xls]Cor	bett Ave E	31							4	18	

District	Coomea	lla									Locatio	n Details		Туре		Weir - 60)° V Notch	1
Work/Site Identifier	CM 5											0		Dimensio	ons	600mm I	Pipe	
Name Representing discharge	Hollands Discharg	Lake Mai je to Holla	n Deep D Inds Lake	rain						1	E		N	Capacity		X- Sectio 8ML/D	on = 1.13n	1 ²
Month	Jul	Aug	Sep	Oct	Nov	Jun	Totals	Max	Min	Av.	Site	Visits						
Volume (ML)	3.9	4.5	7.1	57.2	14.2	29.3	52.39	59.0	21.6	6.6	6.9	21.1	283.7 ML	59.0	3.9	23.6	Flow	No Flow
Salt Load (T)	6.4	6.6	11.0	82.9	20.6	41.3	63.73	88.3	34.2	7.0	8.4	37.9	408.5 T	88.3	6.4	34.0	FIOW	INU FIUW
Average EC	2,572	2,324	2,418	2,267	2,259	2,206	1,901	2,340	2,479	1,663	1,890	2,812		2,812	1,663	2,250	52	0
O:\DO Files\001 Drainag	e\000 Dra	inage Fig	ures\Drair	nage 2022	2-23\[WM	L Drainag	je 2022-2	3.xls]CM5	HLDD								4	8

Western Murray Irrigation Limited

District Work/Site Identifier	Coomea CM1	lla									Location GDA	n Details 94-54		Type Dimensio	ons	Weir - 90 600mm F	90° V Notch X2 n Pipe			
Name Representing discharge	Risbey's Discharg	Outfall - I je to Tuck	Risbey's I ers Creel	vlain Deep <	Drain &	Branch C	hannel No	D.1 COME	INED	594	809E	6227	149N	Capacity		X- Sectio 16 ML/D	n = 1.13r	m2		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits		
Volume (ML)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7 ML	0.7	0.0	0.1	Flow	No Flow		
Salt Load (T)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.7 T	3.7	0.0	0.3	FIOW	INO FIOW		
Average EC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,906	8,906	8,906	8,906	8,906	2	50		
O:\DO Files\001 Drainage\000 Dra	ainage Figures	Drainage 20	22-23\[WMIL	Drainage 20	22-23.xls]EP	A3 BCDD											Ę	52		

District	Coomea	lla									Locatio	n Details		Type		Weir - 90	V Noter	1
Work/Site Identifier Name Representing discharge	CM2 Risbey's Discharg	Pumps to le to Fletc	o Fletcher hers Lake	rs Lake e						GDA9	4 M54 E5	95763 N6	232045	Dimensio Capacity	ons	600mm Pipe X- Section = 1.13m2 8 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	2.0	12.9	12.3	43.8	27.8	31.3	49.9	32.3	21.3	21.2	14.3	16.8	286.0 ML	49.9	2.0	23.8	Eleve	
Salt Load (T)	3.3	17.2	18.6	57.6	38.4	37.7	59.2	47.6	29.3	29.1	17.7	23.3	378.9 T	59.2	3.3	31.6	FIOW	INO FIOW
Average EC	2,614	2,075	2,364	2,053	2,156	1,881	1,855	2,300	2,154	2,148	1,929	2,162		2,614	1,855	2,070	51	1
O:\DO Files\001 Drainage\000 Dra	iinage Figures	Drainage 20	22-23\[WMIL	Drainage 20	22-23.xls]CN	12 Risbeys Pi	ump Station										5	52

District Work/Site Ide	ntifier	Coomeal CM 7	la							с	Locatior oordinate	n Details s (WGS8	4)	Type Dimensions	Bank & Pipe 150mm Pipe			
Name Representing	discharge	Water's I Discharg	Deep Dra les to Mur	in ray River						595	325E	6226	100N	Capacity	X- Section = 0.07m ² 0.5 ML/D			
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2 ML	0.2	0.0	0.0	Flow	
Salt Load (T)	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3 T	0.3	0.0	0.0	FIOW	INO FIOW
Average EC	NA	NA	NA	1,800	NA	NA	NA	NA	NA	NA	NA	NA		1,800	1,800	1,800	1	51
O:\DO Files\001 D	rainage\000 Dra	inage Figures\	Drainage 202	2-23\[WMIL	Drainage 202	22-23.xls]EP/	5 CM7 Wate	rs Combined				_				_	5	52

		-												_				
District		Coomeall	а								Location	n Details		Туре		Bank & Pi	pe	
Work/Site Identifier		CM 21								C	oordinate	s GDA94-	54	Dimensio	ns	150mm P	ipe	
Name Representing discharge		Old Jetty Discharge	es to Murra	ay River						5962	276E	6225	541N	Capacity		X- Sectior 0.5 ML/D	$n = 0.07 m^2$!
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.0	0.0	0.6	1.5	2.1	2.0	2.0	7.3	8.2	1.5	3.0	1.7	29.7 ML	8.2	0.0	2.5	Flow	
Salt Load (T)	0.0	0.0	0.8	1.9	2.6	2.6	2.4	10.0	12.4	1.9	2.9	2.8	40.3 T	12.4	0.0	3.4	FIOW	INO FIOW
Average EC	NA	NA	2,033	1,943	1,998	2,085	1,912	2,150	2,360	2,062	1,533	2,598		2,598	1,533	2,123	42	10
O:\DO Files\001 Drainage\000 Drain	age Figures\	Drainage 2022	-23\[WMI_Dr	ainage 2022-2	3 xIs1EPA5 CI	//7 Waters Co	mbined										5	2

District Work/Site Identi	ifier	Coomeal CM 12&1	lla I3								Location GDA	n Details 94-54		Type Dimensio	ons	Bank & F 150mm F	'ipe Pipe	
Name Representing di	Deep Drain 342-398 WML Depot senting discharge Discharges to Murray River Flood Plain										140E	6225	448N	Capacity		X- Sectio 0.5 ML/D	n = 0.07r	n ²
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.0	0.0	0.2	1.2	1.6	2.0	0.0	0.0	8.2	1.5	0.8	1.1	26.3 ML	8.2	0.0	1.4	Пани	
Salt Load (T)	0.0	0.0	0.2	1.6	2.0	2.6	0.0	0.0	12.4	1.9	0.7	2.0	36.4 T	12.4	0.0	1.9	FIOW	INO FIOW
Average EC	NA	NA	1,900	1,954	2,006	2,085	0	0	2,360	2,062	1,500	2,750		2,750	0	2,160	36	16
O:\DO Files\001 Drain	nage\000 Dra	ainage Figures	NDrainage 20	22-23\[WMIL	Drainage 20	22-23.xls]CN	112&13 DD34	2-398(Depot	t)								2	7

District		Coomeal	la								Location	n Details		Туре		Bank & F	ripe	
Work/Site Identifie	ər	CM 14									GDA	94-54		Dimensio	ons	150mm F	Pipe	
Name Representing dise	e Wakefield Deep DD352 resenting discharge Discharges to Murray River Flood Plain											6224	817N	Capacity		X- Sectio 0.5 ML/D	n = 0.07r	n²
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	1.4	1.1	1.7	5.8	3.5	7.0	3.6	27.2	29.3	3.3	4.2	5.6	93.7 ML	29.3	1.1	7.8	Flow	
Salt Load (T)	2.1	1.6	2.3	6.8	4.3	6.5	4.3	28.6	30.9	3.6	4.2	6.2	101.4 T	30.9	1.6	8.4	11000	
Average EC	2,353	2,220	2,115	1,819	1,888	1,465	1,872	1,644	1648	1,708	1,552	1,716		2,353	1,465	1,689	52	0
O:\DO Files\001 Drainaç	ge\000 Draina	age Figures\D	rainage 2022	2-23\[WMIL D	rainage 2022	-23.xls]CM14	4 Wakefield D	Сеер									4	18

District Work/Site Ide	ntifier	Coomea CM 15	lla								Location GDA	n Details 94-54		Type Dimensio	ons	Bank & F 150mm F	Pipe Pipe	
Name Representing	discharç	Boronia I Discharg	Deep Drai les to Mur	in - DD36 ray River	5 Flood Pla	iin				597	737E	6224	257N	Capacity		X- Sectio 0.5 ML/D	n = 0.07r	n ²
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.0	0.0	0.7	3.0	1.1	1.3	1.7	2.7	2.8	1.6	1.8	3.5	20.2 ML	3.5	0.0	1.7	Flow	
Salt Load (T)	0.0	0.0	0.8	2.5	2.5	1.3	1.3	1.9	4.0	1.9	1.7	4.0	22.0 T	4.0	0.0	1.8	FIOW	INU FIUW
Average EC	NA	NA	1,929	1,273	3,659	1,500	1,200	1,200	2278.0	1,808	1,500	1,800		3,659	1,200	1,705	39	13
O:\DO Files\001 Dr	ainage\000	Drainage Figu	ures\Drainag	e 2022-23\[W	/MIL Drainage	e 2022-23.xls]CM15 Boro	nia Deep									2	8

District		Coomeal	la								Locatio	n Details		Type		Bank & F	lipe	
Work/Site Identifie	r	CM 17									GDA	94-54		Dimensio	ons	150mm I	Pipe	
Name	me 3rd Allocation Main Deep Drain - DD346 presenting discharge Discharges to Murray River Flood Plain															X- Sectio	n = 0.07r	n²
Representing disc	harge	Discharg	es to Mur	ray River	Flood Pla	in				5983	345E	6223	3751N	Capacity		0.5 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.9	1.1	3.1	8.9	3.0	14.1	12.7	54.4	29.0	6.0	10.8	11.5	155.6 ML	54.4	0.94	13.0	Flow	
Salt Load (T)	1.6	1.7	4.8	9.6	7.6	16.3	12.5	58.6	102.1	7.0	8.7	18.8	249.2 T	102.1	1.6	20.8	FIOW	INO FIOW
Average EC	2,636	2,312	2,432	1,679	3,928	1,800	1,543	1,683	5502.6	1,800	1,262	2,558		5,503	1,262	2,502	52	0
O:\DO Files\001 [)rainage\(000 Draina	aae Fiaure	es\Draina	ae 2022-2	3\[WMIL	Drainage	2022-23.3	kls1CM17	3rd Alloca	tion Deer)					4	8

Condition 2.16

A simple annual salt balance representing the imported, exported and retained salt load for the area associated with each separate water supply work:

WMI Supply Imports

	Buronga		С	oomeall	а		Curlwaa	
Main	Pumping Sta	ation	Main	Pumping Sta	ation	Main	Pumping Sta	ation
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
1,970	218	275	16,625	215	2,285	2,976	220	419

O:\DO Files\001Drainage\000 Drainage Figures\Drainage 2022-23\(WM IL Drainage 2022-23.xls)Area Drainage and Salt Imports

WMI Drainage Outfalls

	Buronga	1	C	coomeall	а		Curlwaa			Total	
т	otal Drainage	9	т	otal Drainage	9	т	otal Drainage	9	т	otal Drainag	je
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
63.35	1,068	43.32	900.01	2,154	1240.74	19.80	1,357	17.20	983.17	1526.63	1301.26
D	rainage Basi	ns	D	rainage Basii	ns	D	rainage Basii	ns	D	rainage Bas	ins
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
63.35	1,068	43.32	569.65	2,160	787.43	19.80	1,357	17.20	652.80	1528.58	847.96
	Flood Plains	5		Flood Plains			Flood Plains			Flood Plain	S
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	300.44	2,146	412.69	0.00	NA	0.00	300.44	2146.31	412.69
	Murray River	•		Murray River			Murray River			Murray Rive	er
ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)	ML	Av. EC	Salt (T)
0.00	NA	0.00	29.93	2,120	40.61	0.00	NA	0.00	29.93	2120.42	40.61

O:\DO Files\001Drainage\000 Drainage Figures\Drainage 2022-23\[WM IL Drainage 2022-23.xls]Area Drainage and Salt Imports

WMI Salt Balance

Salt (T)	Buronga	Coomealla	Curlwaa	Total
Imported	275.00	2,285.00	419.00	2,979.00
Exported to Drainage Basins	43.32	787.43	17.20	847.96
Exported to Murray Flood Plains	0.00	412.69	0.00	412.69
Exported to Murray River	0.00	40.61	0.00	40.61
Retained on Irrigated Land	231.68	1,044.26	401.80	1,677.74

O:\DO Files\001Drainage\000 Drainage Figures\Drainage 2022-23\[WM IL Drainage 2022-23.kls]A rea Drainage and Salt Imports

Re	tained salt T	/ha	
	Buronga	Coomealla	Curlwaa
Irrigated ha	430	2290	515
Tonnes salt retained	232	1044	402
Average T/ha	0.54	0.46	0.78

O:\DO Files\001Drainage\000 Drainage Figures\Drainage 2022-23\[WM IL Drainage 2022-23.xls]Area Drainage and Salt Imports

Reporting Groundwater Requirements

Condition 2.17

The results of monitoring of groundwater conditions by means of piezometers and groundwater control bores (tube-wells) in accordance with the monitoring and reporting requirements set out in Attachment 2.

On advice from NRAR, WMI have had the groundwater monitoring network reviewed by a consultant hydrogeologist 20/21, this report will be sent with the Annual Compliance Report. In accordance with this report the following audit has been started in 2021/22 and has continued through 22/23 although floods held up progress most of the year.

- 100% of WMI controlled Piezometers accounted for. *Complete; some are completely gone (destroyed), some need some work to bring them back into service.*
- GPS location re-established for GDA1994. A two-stage verification has been carried out, desktop utilising GIS and a physical GPS read using a hand-held GPS, a lot of sites are walk-in only.
- AHD, screen depth and overall depth measured and confirmed at each piezometer. There is no way of physically confirming screen depth; overall depth has been measured. Missing AHDs should have been confirmed in 2022-23, flooding of various areas stopped progress. We will try again in 2023/24.
- Assess dry/destroyed piezometers for rehabilitation. Some previously dry piezometers have indicated a reading this season, higher rainfall with high river has pushed the water table higher, we still think some of the piezometers are blocked, work will continue to clean these out. 3 previously destroyed piezometers have been repaired. Some piezometers are completely submerged 'still', post flood, the condition of these will be assessed when the flood water has receded.
- Liaise with other stakeholders to establish a plan of rectification for the whole piezo network. *This will be started once we have completed auditing our existing piezometers.*
- Groundwater control bores (Tubewells) are fully operational; bores have been running between October-March this year, full flows were available Dec-Feb (see attachment 2 p3 for pumping figures); This water would normally discharge to Fletchers Lake however, Fletchers Lake was inundated with flood water from the Murray/Darling/Tuckers Creek system, the water was transferred through James Highway P.S. to a surface drain, all drainage water will have made its way to the river system during this period.
- NRAR has requested WMI apply for separate Works Approvals and WALs for the operation of the tubewells, this is currently queried by WMI, see attached E-Mail in folder 'Groundwater Monitoring and SIS data'.

Attachment 2- p.1

Piezometers are read in accordance with appropriate procedures and standards detailed in: DPI NSW, Salinity Training Manual - 2014, Chapter 13.

				Burong	ja		
		Top of Pipe		Depth below			
		above NS		top of pipe	GDA94	GDA94	
Site ID	Use Y/N	(M)	NS (AHD)	(M)	Easting	Northing	Condition
BGA 39	Y	0.10	38.77	6.87	611,610	6,220,940	6.77
BGA 41	Y	0.10	38.65	5.85	611,866	6,218,570	5.75
BGA 42	Y	0.16	36.84	5.32	610,052	6,217,625	5.16
BGA 49	Y	0.10	38.54	7.46	608,896	6,220,547	7.36
BGA 70	Y	0.15	38.64	6.13	614,390	6,218,577	5.98
BGA 94	N	0.03	37.79	Destroyed	608,949	6,218,151	Destroyed
BGA 112	Y	0.10	38.52	7.42	608,764	6,219,899	7.32
BGA 113	N	0.09	37.21	Destroyed	608,492	6,220,035	Destroyed
BGA1010	Y	0.17	38.58	7.04	613,744	6,219,867	6.87
BGA1011	Y	0.22	33.44	2.73	606,079	6,226,268	2.51
BGA1012	Y	0.15	33.50	3.23	607,960	6,229,259	3.08
BGA1013	Y	0.50	33.15	2.34	612,885	6,221,493	1.84
BGA1080	N	0.16	35.40	Dry	612,168	6,218,409	Dry
BGA1211	Y	0.20		10.27	608,607	6,219,061	10.07
BGA1214	Y	0.30	34.41	2.43	613,603	6,221,382	2.13
GGN 88168	Y	0.55		5.55	611,723	6,221,813	5.00
GGN 88169	Y	0.50		4.19	612,007	6,221,793	3.69
GGN 88170	Y	0.52		6.82	611,984	6,221,717	6.30
GGN 88171	N	0.33		Destroyed	611,796	6,219,995	Destroyed
GGN 88172	N	0.68		Destroyed	611,599	6,219,595	Destroyed

Current listing of piezometers by area:

O:DO Files\002 Piezometers\Piezometer Readings\Piezometer Readings 2022-23\[2022-23 Piezometer Readings.xlsx]Buronga Annual

Western Murray Irrigation Limited

				Coomea	lla		
Site ID	Use Y/N	Top of Pipe above NS (M)	NS (AHD)	Depth below top of pipe (M)	GDA94 Easting	GDA94 Northing	Condition
CMA 11	Y	0.15	47 15	7.68	592895	6229556	7 53
CMA 12	N	0.12	45.92	Drv	593013	6228000	Dry
CMA 13	N	0.34	38.61	Drv	592993	6226744	Dry
CMA 14	N	0.09	41.81	Drv	594651	6230158	Dry
CMA 15	N	0.03	35.28	Destroved	594820	6228585	Destroved
CMA 17	N	0.1	47.08	Destroyed	597386	6228912	Destroyed
CMA 19	N	0.4	46.56	Destroyed	597432	6224905	Destroyed
CMA 22	Y	0.07	38.34	6.9	599623	6223207	6.83
CMA 23	Y	0.12	51.22	19.35	603060	6227045	19.23
CMA 24	N	0.28	35.98	Destroyed	592996	6225377	Destroyed
CMA 25	Y	0.08	35.83	5.57	596284	6224322	5.49
CMA 26	Y	0.04	54.09	22.31	602274	6225545	22.27
CMA 52	N	0.15	39.25	Dry	596000	6230939	Dry
CMA 53	N	0.07	53.2	Dry	597127	6226003	Dry
CMA 56	N	0.075	57.75	Destroyed	605572	6228666	Destroyed
CMA 58	N	0.18	35.58	Dry	603036	6230266	Dry
CMA 60	N	0.15	48.57	Dry	600072	6231442	Dry
CMA 63	N	0.07	47.3	Dry	599862	6230475	Dry
CMA 67	Y	0.11	48.94	18.33	599207	6232534	18.22
CMA 77	N	0.22	51.07	Destroyed	601701	6229588	Destroyed
CMA 78	N	0.16	44.25	Dry	603989	6231888	Dry
CMA 79	N	0.14	40.56	Dry	604114	6230296	Dry
CMA 82	N	0.12	35.59	Dry	592955	6231606	Dry
CMA1019	N	0.2	36.1	Destroyed	601534	6232271	Destroyed
CMA1022	Y	0.36	32.09	2.13	596696	6232849	1.77
CMA1027	Y	0.33	40.67	10.42	594334	6230812	10.09
CMA1061	Y	0.36	42.36	12.2	593236	6228785	11.84
CMA1062	N	0.34		Dry	597172	6224021	Dry
CMA1091	Y	0.3		3.23	603114	6229076	2.93
CMA1092	N	0.25		Dry	602755	6229261	Dry
CMA1094	N	0.4		Dry	602949	6229107	Dry
CMA1110	N			Destroyed	598871	6226877	Destroyed
CMA1200	Y	0.26	34.09	4.02	596119	6231971	3.76
CMA1201	Y	0.28		20.13	599508	6227667	19.85
CMA1202	Y	0.32		4.61	603224	6228415	4.29
CMA1203	Y	0.4		6.13	599973	6229284	5.73
CMA1204	N	0.34		Dry	594827	6227191	Dry
CMA1205	Y	0.4		10.19	601310	6227913	9.79
CMA1206	Y	0.2		18.75	602475	6227646	18.55
CMA1207	Y	0.34	37.67	6.74	596892	6232801	6.4

O:\DO Files\002 Piezometers\Piezometer Readings\Piezometer Readings 2022-23\[2022-23 Piezometer Readings.xlsx]Coomealla Annual

				Cur	lwaa		
		Top of Pipe above NS		Depth below top of pipe			
Site ID	Use Y/N	(M)	NS (AHD)	(M)	GDA94 Easting	GDA94 Northing	Condition
CWA 1/A	Y	0.2	35.89	5.66	590306	6225161	5.66
CWA 5	N	0.08	33.07	Dry	589226	6225851	Dry
CWA 6	N	0.21	35.14	Dry	589094	6226121	Dry
CWA 11/A	N	0.2	33.1	Destroyed	587811	6226897	Dry
CWA 12	Y NI	0.22	30.4	4.27 Destroyed	590323	6225100	4.27 Destroyed
CWA 13	N	0.03	34.89	Destroyed	592989	6226747	Destroyed
CWA 15	N	0.3	35.24	Destroyed	588489	6225784	
CWA16S	Y NI	0.46	34.30	0.07 Destroyed	589315	6226363	5.57
CWA 19	N N	0.26	34.30	Destroyed	590710	6228171	Destroyed
CWA 21/A	N N	0.23	22.21	2 estibyeu	507571	6226176	
CWA 23	N	0.23	22 10	0.00 Destroyed	590067	62220170	5.65 Destroyed
CWA 25	N	0.4	24.26	Destroyed	580457	6226649	Destroyed
CWA 28	V	0.10	34.30	5 26	580765	6227007	5 26
CWA 31	N	0.10	34.30	Destroyed	580703	6227007	Destroyed
CWA 31	N	0.1	36.42	Destroyed	501013	6225787	Destroyed
CWA 48	Y	0.13	35.82	6 14	589661	6225588	6 14
CWA 50	V I	0.14	35.52	5 20	50001	6225624	5 20
CWA 51	V I	0.17	35.02	5.20	590311	6225663	5.20
CWA 50	۱ ۷	0.08	25 52	6.00	590224	6226003	6.00
C/MA 60	I V	0.00	30.02	5.00	590447	6220179	5.81
CW/A 90	N	0.20	30.02	Destroyed	597604	6220202	Destroyed
CWA 91	N	0.07	30.12		50/004	6226380	Dry
CW/A 82	N	0.00	2/ 20	Dry	500372	6224821	Dry
CWA 84	V	0.22	33.88	3 3/	580010	6224660	3 34
CWA 85	N	0.06	33.00 22.00	Destroyed	588407	6223730	Destroyed
CWA 86	V	0.03	34.83	3 81	580101	6223867	3 81
CWA 87	N	0.12	34.39	Unknown	580213	6222557	Unknown
CWA 87	N V	0.1	35.42	4.03	589/07	6224552	4 03
CWA 89	V I	0.03	35.5	4.00	580853	6225000	4.83
CWA 09	V I	0.02	33.8	4.02	588580	6225010	4.02
CW/A 91/I	Y	0.15	33.5	4.20	589078	6225510	4.20
CWA 91/L	N	0.15	34 30	A.20	586853	622/310	4.20 Destroyed
CWA 93	N	0.10	34.44	Destroyed	588580	6228587	Destroyed
CWA 98	N Y	-0.03	35.96	4 88	592017	6224404	4 88
CWA 99	Y	0.00	36.52	6 33	592312	6224737	6 33
CWA 100	N	0.2	35.36	0.00 Drv	591373	6225168	Drv
CWA 100	N	0.7	36.24	Dry	592033	6225525	Dry
CWA 102	Y	0.10	35.83	6.07	592345	6225958	6.07
CWA 103	N	0.18	37 78	Destroyed	592128	6226328	Destroyed
CWA 104	Y	0.00	35.15	5 99	590361	6229014	5 99
CWA 105	N	0.13	34.34	Drv	587455	6226976	Dry
CWA 111	N	0.06	33.89	Destroyed	586901	6224984	Destroyed
CWA 113	N	0.12	33.71	Destroyed	588791	6223432	Destroyed
CWA 115	N	0.15	33.92	Destroyed	588861	6223837	Destroyed
CWA 119	N	0.15	34.61	Destroyed	589291	6224667	Destroyed
CWA 142	N	0.15	35.84	Destroved	590636	6225742	Destroved
CWA 150	N	0.21	32.39	Destroyed	587251	6225532	Destroyed
CWA 162	N	0.1	34.6	Destroyed	591481	6225988	Destroyed
CWA 165	N	0.15	36.3	Destroyed	590741	6226502	Destroyed
CWA 167	N	0.01	35.01	Destroyed	589894	6226586	Destroyed
CWA 173	N	0.15	34.26	Destroyed	588496	6226782	Destroyed
CWA 174	N	0.1	34.69	Destroyed	589215	6227059	Destroyed
CWA 177	N	0.02	35.69	Destroyed	590424	6227000	Destroyed
CWA 178	N	0.005	34.26	Destroyed	591759	6226954	Destroyed
CWA 179	N	0.13	34.81	Dry	591121	6226813	Dry
CWA 180	N	0.12	35.58	Dry	591190	6227287	Dry
CWA 185	N	0.02	34.21	Destroyed	589241	6227478	Destroyed
CWA 187	N	0.005	35.5	Destroyed	588496	6227620	Destroyed
CWA 189	N	0.07	35.27	Dry	589318	6227957	Dry
CWA 195	N	0.09	35.18	Destroyed	589706	6227962	Destroyed
CWA 196	N	0.15	35.22	Destroyed	589725	6228312	Destroyed
CWA 198	N	0.09	35.43	Destroyed	589392	6228745	Destroyed
CWA 199	N	0.09	35.18	Destroyed	589863	6228716	Destroyed
CWA1039	N	0.22	34.72	Dry	591054	6225536	Dry
CWA1041	Y	1.2	34.35	5.00	588734	6226034	5.00
CWA1044	Y	0.32	34.06	3.74	588057	6223637	3.74
CWA1045	Y	0.31	35.19	5.14	588173	6224402	5.14
CWA1060	Y	0.24	34.66	5.36	591471	6228536	5.36
CWA1083	Y	0.3	34.63	4.48	589366	6224994	4.48
CWA1084	N	0.2	34.93	Destroyed	588970	6224197	Destroyed
CWA1085	Y	0.18	32.36	5.20	589201	6225858	5.20
CWA1086	Y	0.32	34.88	5.24	591372	6225561	5.24
CWA1087	Y	0.08	35.88	6.17	590627	6225856	6.17
CWA1088	N	0.16	35.85	Destroyed	590489	6227394	Destroyed
CWA1131	Y	0.17	33.69	6.84	587444	6229017	6.84
D:\DO Files\002 F	Piezometers\Pie	ezometer Reading	gs\Piezometer R	eadings 2022-23	[2022-23 Piezomete	er Readings.xlsx]Cur	lwaa Annual

Attachment 2, p.2 - Condition 1

Map of groundwater depth below natural surface @ 2M contour intervals and including first 1M. Dry/destroyed piezometers are not used for constructing contour lines.

Location of Active Buronga Piezometers:









Buronga groundwater heights below natural surface (M), combined image:



Location of Active Coomealla piezometers:



Coomealla groundwater height below natural surface (M):



Flatchers (Lake MA1022 CMA1207 CMA-67 A 1200 600A78 0000.000 CMA.60 Hollands Lake 6330,62 CHA70 അന ana (3 Flatchars Creak 602300 CMA1988 - 6000000 303 (E) Tuckens Greek MATERIA A1200 CURIERA mana 00313 CMA.68 6000428 Coomealla Active Piezometers Legend MA1082 O Ple zome ters тач 100.00 0.5

Coomealla groundwater heights below natural surface (M), combined image:

Location of Curlwaa active piezometers:



6.8 6.2 5.6 5 4.4 3.8

3.2 2.6 2



Curlwaa groundwater height below natural surface (M):

Curlwaa groundwater heights below natural surface (M), combined image:



Attachment 2, p.2 - Condition 2.

No consultation with the minister required, where levels have risen above the historical reference.

Contour maps have been provided at condition 1; groundwater levels were initially low for 2022/23; October 2022 - June 2023 groundwater levels are expected to have increased in line with the flooding event. All piezometers are read in August/September of each year.

Attachment 2, p.2 - Condition 3.

Table of the area (ha) of shallow (<2M), moderate (2-4M) and >4M groundwater depth.

Approxima	te areas at	different	depths of ${\it g}$	groundwater (Ha)											
	<2M 2-4M >4M Total mapped area														
Buronga	180	2430	5760	8370											
Coomealla	0	400	10000	10400											
Curlwaa	0	330	1890	2220											

• Evaporation basins form a large part of our area of operations, the figures indicate this as being a large area of high groundwater, whereas it is a low laying drainage/evaporation basin.

Attachment 2, p.2 – Condition 4.

Table of the change in the three depth class areas (ha) within the area of operations, relative to the previous and historical reference years:

					Approximate areas	at different he	eights of grou	ındwater (ha	1)			
					_				_			
	2	022/23				2022/23 - 20	21/22 differe	nce (ha)		2022/23 - 20	10/11 differe	nce (ha)
	<2M	2-4M	>4M	Total op. area		<2M	2-4M	>4M		<2M	2-4M	>4M
Buronga	0	45	612	657	Buronga	0	-15	15	Buronga	-3.2	31.25	-28.05
Coomealla	0	125	4,056	4,181	Coomealla	0	50	-50	Coomealla	-473.55	-79.28	552.83
Curlwaa	0	150	1,491	1,641	Curlwaa	0	150	-150	Curlwaa	0	95.09	-95.09
	2	021/22				2021/22 - 20	20/21 differe	nce (ha)		2021/22 - 20	10/11 differe	nce (ha)
	<2M	2-4M	>4M	Total op. area		<2M	2-4M	>4M		<2M	2-4M	>4M
Buronga	0	60	597	657	Buronga	0	30	-30	Buronga	-3.2	46.25	-43.05
Coomealla	0	75	4,106	4,181	Coomealla	0	75	-75	Coomealla	-473.55	-129.28	602.83
Curlwaa	0	0	1,641	1,641	Curlwaa	0	-5	5	Curlwaa	0	-54.91	54.91
	2	020/21										
	<2M	2-4M	>4M	Total op. area								
Buronga	0	30	627	657								
Coomealla	0	0	4,181	4,181								
Curlwaa	0	5	1,636	1,641								
	2	010/11										
	<2M	2-4M	>4M	Total op. area								
Buronga	3.2	13.75	640.34	657								
Coomealla	473.55	204.28	3502.91	4,181								
Curlwaa	0	54.91	1586.09	1,641								

O:\DO Files\002 Piezometers\Piezometer Readings\Piezometer Readings 2022-23\[2022-23 Piezometer Readings.xlsx]Area of groundw ater and EC

River has remained at normal level up to the point of piezometer measurement, rainfall may have charged the water table slightly. Water table appears to have risen slightly in Coomealla and Curlwaa, with the 2-4M range increasing and the >4M range decreasing. 2010/11 has been used as a significant historical year; up until August 2010 the prior year was close to average rainfall (277mm), followed by the wettest year on record. Groundwater monitoring and SIS review made an observation that significant rainfall changes the groundwater temporarily; below are monthly rainfall figures covering this monitoring period.

Monthly rainfall BOM – Mildura Airport:

Season	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total	Total 2 years	Total 3 years
2009/10	11.8	8.2	30.4	10.8	65.6	13.2	8.4	19.8	35.8	18.8	51.2	14.6	288.6	517.6	668.4
2010/11	26.4	29.2	56.6	92.2	110.2	146.8	127.0	183.2	119.8	11.8	13.2	10.2	926.6	1,215.2	1,444.2
2011/12	15.4	20.8	7.2	27.6	43.4	61.8	12.6	36.6	64.2	4.0	2.6	8.0	304.2	1,230.8	1,519.4
2012/13	41.4	17.0	13.6	7.0	4.6	4.4	1.2	14.6	10.8	6.2	29.2	35.8	185.8	490.0	1,416.6
2013/14	14.8	10.4	18.8	14.4	2.4	57.8	0.6	67.2	29.2	58.4	22.8	6.4	303.2	489.0	793.2
2014/15	13.0	18.2	18.6	0.6	13.4	9.6	57.0	0.6	0.0	93.0	10.2	30.6	264.8	568.0	753.8
2015/16	11.6	12.0	13.0	3.8	6.0	1.6	68.2	0.2	0.4	3.0	43.4	18.2	181.4	446.2	749.4
2016/17	19.2	30.8	93.6	24.8	51.2	5.6	29.4	5.2	4.2	44.0	19.6	1.8	329.4	510.8	775.6
2017/18	4.0	34.0	4.0	23.0	55.4	45.0	3.4	0.2	2.2	1.8	17.4	19.2	209.6	539.0	720.4
2018/19	3.4	10.6	0.8	12.2	19.2	44.6	2.6	2.8	3.0	1.8	48.0	13.4	162.4	372.0	701.4
2019/20	10.4	5.4	12.0	0.0	13.8	2.6	2.8	11.0	27.6	48.6	48.1	8.4	190.7	353.1	562.7
2020/21	10.4	41.6	25.0	59.0	5.2	8.6	45.0	0.2	4.8	0.0	8.0	30.6	238.4	429.1	591.5
2021/22	32.2	11.8	14.8	15.2	56.6	1.6	86.2	6.0	14.8	49.0	52.8	17.0	358.0	596.4	787.1
2022/23	4.6	38.8	53.4	109.6	66.2	11.0	24.8	1.4	5.4	23.0	12.4	80.2	430.8	788.8	1,027.2

Attachment 2, p.2 – Condition 5

Groundwater salinity @ 0-2000, -5000, -10,000, -20,000, -30,000, -40,000 micro-Siemens/cm contours:

Buronga Salinity Contours (µ/Siemens):



Buronga Salt Contours – Combined Image:



Coomealla Salinity Contours:



Coomealla Salt Contours – Combined Image:





Curlwaa Salinity Contours:

Curlwaa Salt Contours – Combined Image:



Tabulated approximate salinity (microSiemens/cm) interval areas, within areas of operations boundary, relative to the previous and historical reference year:

Approximate areas at different EC of groundwater (ha)

		_		2022/23				
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area	
Buronga	0	190	270	197	0	0	657	B
Coomealla	0	300	3481	400	0	0	4,181	C
Curlwaa	60	1101	480	0	0	0	1,641	C
			;	2021/22				
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area	
Buronga	0	90	190	377	0	0	657	B
Coomealla	0	600	2881	750	0	0	4,181	C
Curlwaa	0	1100	401	140	0	0	1,641	Cu
				2020/21				
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area	
Buronga	0	90	210	357	0	0	657	
Coomealla	0	1200	2231	750	0	0	4,181	Bu
Curlwaa	0	525	1046	70	0	0	1,641	Co
				2010/11				Cu
	0-2000	-5000	-10000	-20,000	-30,000	-40,000	Total op. area	
Buronga	7	20	154	141	148	188	657	
	123	615	984	1312	943	205	4,181	
Coomealla	120							

		2022/23 - 2	2021/22 differ	ence (ha)		
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	0	100	80	-180	0	C
Coomealla	0	-300	600	-350	0	C
Curlwaa	60	1	79	-140	0	C
		2021/22 - 2	2020/21 differ	ence (ha)		
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	0	0	-20	20	0	C
Coomealla	0	-600	650	0	0	C
Curlwaa	0	575	-645	70	0	C
		2020/21 - 2	2010/11 differ	ence (ha)		
	0-2000	-5000	-10000	-20,000	-30,000	-40,000
Buronga	-7	170	116	56	-148	-188
Coomealla	-123	-315	2497	-912	-943	-205
Curlwaa	17	345	286	-432	-130	-86

Attachment 2, p.2 – Condition 6. It is unknown whether there are alternative presentation formats approved by the minister, therefore presentation is as close as possible to requested.

Attachment 2, p.3 Groundwater Control bores (Tubewells) Details

All tubewells have been active due to high river levels from October2022 to 20Mar23:

District	Curlwaa										Locati	on Deta	ils	Туре		Weir - 90)° V No	otch
Work/Site Identifier	CW1									Mildu	a 7329-	N 1:50,	000 map	Dimensi	ons	600mm	Pipe	
Name	Tubewell P	ump St	ation							5890	87E	622	25688N			X- Section	on = 1.1	13m2
Representing discharge	resenting discharge Discharge to Fletchers Creek													Capacity	,	8 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	e Visits
Volume (ML)	0.0	0.0	0.0	0.00	0.0	0.0	0.00	0.0	0.000	0.0	0.0	0.0	0.0 ML	0.0	0.0	0.0	Flow	
Salt Load (T)	0	0	0	0	0	0	0	0	0	0	0	0	0.0 T	0.0	0.0	0.0	Flow No F	
Average EC	NA NA NA NA NA NA NA NA NA									NA	NA	NA		0	0	NA	0	52
O:\DO Files\001 Drainage\000	Drainage Fig	ures\D	rainage	2022-23	3\[WMIL	Draina	ae 2022	-23.xls]	CW1 Tub	pewell S	tation							52

District		Curlwaa									Location	n Details		Туре		Submers	ible Pum	р
Work/Site Ide	ntifier	CW 2									GDA9	4-Z54		Dimensio	ons	100mm		
Name		Tubewell	Pump No	o.1 - Knipe	es					5897	780E	6227	019N			X- Sectio	n = 0.01r	n²
Representing	discharge	Discharg	es to Tub	ewell Sta	tion									Capacity		0.5 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.00	0.00	0.00	0.00	0.00	1.07	2.49	2.22	1.27	0.00	0.00	0.00	7.0 ML	2.5	0.0	0.6	Flow	
Salt Load (T)	0.00	0.00	0.00	0.00	0.00	1.30	3.02	2.60	2.05	0.00	0.00	0.00	8.97 T	3.0	0.0	0.7	1 1000	
Average EC						1,900	1,900	1,827	2,532					2,532	1,827	1,991	15	37
O:\DO Files\0	01 Drainag	e\000 Drai	inage Figi	ures\Drair	nage 2022	2-23\[WMI	L Drainag	e 2022-2	3.xls]CW2	2 Tubewe	ll No1-Kni	pes					5	52

District		Curlwaa									Location	n Details		Туре		Submers	ible Pum	р
Work/Site Identif	ier	CW 3									GDAS	94-Z54		Dimensio	ons	100mm		
Name		Tubewell	Pump No	o.2 - Acac	ia Road					588	579E	6226	214N			X- Sectio	n = 0.01r	n ²
Representing dis	scharge	Discharg	es to Tub	ewell Sta	tion									Capacity		0.5 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.00	0.00	0.00	0.00	0.00	0.20	0.73	5.47	3.98	0.00	0.00	0.00	10.4 ML	5.5	0.0	0.9	Flow	
Salt Load (T)	0.00	0.00	0.00	0.00	0.00	0.64	0.99	10.99	9.35	0.00	0.00	0.00	21.96 T	11.0	0.0	1.8	11000	
Average EC						5,100	2,100	3,137	3,667					5,100	2,100	3,304	11	41
O:\DO Files\001 Drainage\000 Drainage Figures\Drainage 2022-23\[WMIL Drainage 2022-23.xls]C											II No2-Aca	acia Road	ł				Ę	52

District		Curlwaa									Location	n Details		Туре		Submers	ible Pum	р		
Work/Site Ide	ntifier	CW 4									GDAS	4-Z54		Dimensio	ons	100mm				
Name		Tubewell	Pump No	o.3 - Olive	Lane					5897	732E	6225	474N			X- Sectio	n = 0.01r	n ²		
Representing	discharge	Discharg	es to Tub	ewell Sta	tion									Capacity		0.5 ML/D				
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits		
Volume (ML)	0.00	0.00	0.00	0.00	0.74	0.56	0.84	9.54	7.58	0.00	0.00	0.00	19.3 ML	9.5	0.0	1.6	Flow			
Salt Load (T)	0.00	0.00	0.00	0.00	2.11	1.51	1.66	22.15	17.61	0.00	0.00	0.00	45.03 T	22.1	0.0	3.8	3.8 Flow No			
Average EC					4,476	4,177	3,100	3,625	3,629					4,476	3,100	3,652	15	37		
O:\DO Files\0	01 Drainag	e\000 Drai	inage Fig	ures\Drair	nage 2022	2-23\[WM	L Drainag	e 2022-23	3.xls]CW4	1 Tubewe	II No3-Oliv	ve					5	52		

District		Curlwaa									Location	n Details		Туре		Submers	ible Pum	р
Work/Site Ide	ntifier	CW 5									GDAS	4-Z54		Dimensio	ons	100mm		
Name		Tubewell	Pump No	o.4 - Rice						5904	420E	6226	103N			X- Sectio	n = 0.01r	n ²
Representing	discharge	Discharg	es to Tub	ewell Sta	tion									Capacity		0.5 ML/D		
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Totals	Max	Min	Av.	Site	Visits
Volume (ML)	0.00	0.00	0.00	0.16	0.21	0.38	0.63	6.73	5.85	0.00	0.00	0.00	14.0 ML	6.7	0.0	1.2	Flow	
Salt Load (T)	0.00	0.00	0.00	0.45	0.62	1.09	0.93	16.48	15.79	0.00	0.00	0.00	35.37 T	16.5	0.0	2.9	Flow No Fi	
Average EC		4,500 4,600 4,451 2,300 3,826 4,220 4,600 2,300 3,										3,958	14	38				
	01 Drainad	o\000 Drai	inage Fig		ade 2022	2-23/[/////		a 2022-2	3 yle1CW/	Tubowo	II No/-Ric	0					F	2

Quality Assurance for Monitoring & Reporting

Condition 3.

All monitoring and reporting are carried out in accordance with the DPI NSW publication "Salinity Training Manual" (2014).

Presentation of Data

Condition 4. There has been no written request from the minister for presentation of any primary monitoring data or other material.

Environment Protection and Management Requirements

Discharge of Noxious Aquatic weeds

Condition 5.

WMI did not discharge any noxious aquatic weeds.

Discharge of Blue-Green Algae

Condition 6.

WMI pumps directly from the River Murray and has a fully pipelined system. Blue green algae monitoring on the river is performed by external parties and reported to stakeholders, including WMI. There is no discharge of Blue-Green Algae from WMI systems.

Basin Salinity Management Strategy

Condition 7.

There were no practices undertaken to increase the salinity debit, however it is evident that WMI has improved salinity management over the long term.
