To 30 June 2024

Buckland Dry Creek PEPR Compliance Report

For
Holding Pattern and Residual Operations

Buckland Dry Creek Pty Ltd
GPO Box 234
Port Adelaide
South Australia 5015
(ACN 114 007 153; ABN 82 114 007 153)

Document Control

Document Reference	Version	Date of Issue	Authors	Approved for Issue	Issued To
Buckland Dry Creek PEPR Compliance Report 241030	**Rev 0**	**30 Oct 2024**	**N J Withers**		**Buckland Dry Creek Pty Ltd**

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Executive Summary

This document has been prepared to fulfil the requirement under Regulation 77 for the tenements listed herein

This report provides and references information concerning the compliance of PEPR / MoP operations at the Dry Creek Salt Field in the period from 1 July 2023 to 30 June 2024.

The information in and referenced by this report demonstrates the extent to which the Holding Pattern and Residual Operations at the Dry Creek Salt Field have complied with the environmental outcomes and measurement criteria in the DEM approved PEPR / MoP.

The information presented in the text of this report, in the Appendices to this report and that is accessible via the links referenced in this report is designed to be read as a whole for the purposes of assessing this compliance.

Acronyms and Abbreviations

AMLR	Adelaide and Mount Lofty Ranges
ACM	Asbestos Containing Material
AHD	Australian Height Datum
Anaerobic	Relating to or requiring an absence of free oxygen
ASS	Acid Sulfate Soils
Biodiversity	The variety of plant and animal life in the world or in a particular habitat.
Bitterns	A solution of bromides, magnesium and calcium salts remaining after sodium chloride is crystallised out of seawater
BOD	Biological Oxygen Demand
Brine	Water saturated with or containing large amounts of salt, especially sodium chloride
Calsilt	Calsilt was a by-product from the Penrice manufacturing plant, and is mostly calcium
Camelles	Salt stacks formed from a series of overlapping cones of salt
CE Steering	Chief Executives Steering Group
CoP	Change of process
CoS	City of Salisbury
Cst	Coastal Zone under the current Development Plan
DEWNR	Department of Environment, Water and Natural Resources
DO	Dissolved oxygen
DoE	Department of the Environment (Cth)
DPTI	Department of Planning, Transport, and Infrastructure
DEM	Department of State Development (including the former Department for Manufacturing, Innovation, Trade, Resources and Energy prior to 1 July 2014)
DSTO	Defence Science and Technology Organisation
EIn	Extractive Industry zone under the current Development Plan
Entrainment	The upward movement of eroded particles into the water column by net turbulent
EoI	Expressions of Interest
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Freehold	Permanent and absolute tenure of land or property with freedom to dispose of it at

Maiden brine	Saturated brine ready for the crystallisation of salt
MBO	Mono-sulphidic black ooze
MFP	Multifunction Polis zone
ML	Mining Lease
MOP	Mine Operations Plan
MOSS	Metropolitan Open Space System
NABCWMB	Northern Adelaide and Barossa Catchment Water Management Board
NaCl	Chemical grade solar salt
NEPM	National Environment Protection Measure
NGO	Non-Government Organisation
NRM	Natural Resource Management
OTH	Over-the-horizon radar
PASS	Potential acid sulfate soils
PEPR	Program for Environment Protection and Rehabilitation
ppt	Parts per thousand
PIRSA	Department of Primary Industries and Regions SA
Ramsar	The Convention on Wetlands (Ramsar, Iran, 1971)
SA	South Australian (Government)
Salinas	A set of interconnected lagoons
Samphire	Sparse to medium density dwarf shrubland of semi-woody plants
SAR	Sodium absorption ratio
SEB	Significant environmental benefit
SME	Special Mining Enterprise Agreement
SOP	Standard Operating Procedure
STAG	Strategy and Technical Advisory Group
TDS	Total dissolved solids
TJpa	Terajoule per annum
tpa	Tonne per annum

1. Introduction

Table 1 PEPR Number & Approval; Mining Leases

<table>
<tr><td>Mine Name</td><td colspan="2">Dry Creek Salt Fields</td><td>PEPR #</td><td>MPEPR 2020/039
Revision 4 v.1
September 2020</td></tr>
<tr><td></td><td colspan="2"></td><td>Date Approved</td><td>December 2020</td></tr>
<tr><td>Lease Holder</td><td colspan="4">Buckland Dry Creek Pty Ltd (from 1 June 2016)</td></tr>
<tr><td>Operator</td><td colspan="4">Buckland Dry Creek Pty Ltd (from 1 June 2016)</td></tr>
<tr><td>Mining Lease Approval Date</td><td colspan="4">
<table>
<tr><th>Mining Lease</th><th>Registration Grant Date</th><th>Next renewal date</th></tr>
<tr><td>234</td><td>1/4/1928</td><td>31/3/2040</td></tr>
<tr><td>235</td><td>1/4/1928</td><td>31/3/2040</td></tr>
<tr><td>237</td><td>1/4/1928</td><td>31/3/2040</td></tr>
<tr><td>357</td><td>1/7/1976</td><td>30/6/2040</td></tr>
<tr><td>358</td><td>1/7/1976</td><td>30/6/2040</td></tr>
<tr><td>359</td><td>1/7/1976</td><td>30/6/2040</td></tr>
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<tr><td>361</td><td>1/7/1976</td><td>30/6/2040</td></tr>
<tr><td>389</td><td>1/7/1978</td><td>31/3/2040</td></tr>
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<tr><td>6514</td><td>23/7/2020</td><td>31/3/2040</td></tr>
<tr><td>392</td><td>1/7/1978</td><td>31/3/2040</td></tr>
<tr><td>404</td><td>1/10/1956</td><td>31/3/2040</td></tr>
<tr><td>405</td><td>1/10/1956</td><td>31/3/2040</td></tr>
<tr><td>406</td><td>1/10/1956</td><td>31/3/2040</td></tr>
<tr><td>416</td><td>1/1/1978</td><td>30/6/2040</td></tr>
<tr><td>417</td><td>1/1/1978</td><td>31/3/2040</td></tr>
<tr><td>418</td><td>1/1/1978</td><td>31/3/2040</td></tr>
<tr><td>421</td><td>1/1/1979</td><td>31/3/2040</td></tr>
<tr><td>429</td><td>1/4/1980</td><td>30/6/2040</td></tr>
<tr><td>439</td><td>1/4/1980</td><td>31/3/2040</td></tr>
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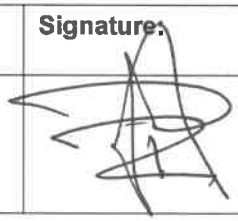
	587 1/7/1975 31/3/2040 600 1/4/1977 31/3/2040 605 1/4/1956 31/3/2040 606 1/4/1956 31/3/2040 607 1/4/1956 31/3/2040 608 1/4/1956 31/3/2040 617 1/4/1978 31/3/2040 618 1/4/1978 31/3/2040 702 1/4/1973 31/3/2040 5205 16/03/1984 30/6/2040 5206 16/03/1984 30/6/2040 5207 16/03/1984 30/6/2040 5208 16/03/1984 30/6/2040 5209 16/03/1984 30/6/2040 5210 16/03/1984 30/6/2040 5908 25/10/1994 30/6/2040 Private Mine # Registration Grant Date 248 22/8/1974 199 25/10/1973
Associated Tenements	**MLs 234, 235, 237, 357, 358, 359, 360, 361, 389, 390, 391, 392, 404, 405, 406, 416, 417, 418, 421, 429, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 587, 600, 605, 606, 607, 608, 617, 618, 702, 5205, 5206, 5207, 5208, 5209, 5210, 5908 and PMs 248 and 199** And ML 6514
Approval Document	**MO6628.055, dated 12 April 2017**
Ministerial Determination	**MD09**
Site Contact	**Shaun Walker**
Email	**Buckland@epicbuilding.com.au**
Phone Number	**0403 370 005**
Registered Mine Manager	**Not Applicable**

Site Location Details	**The site office can be accessed from the Salisbury Highway, entering via Magazine Road, Dry Creek. The site extends from Dry Creek to Middle Beach – an approximate distance of 28 km**			
Reporting Period	**From**	**1 July 2023**	**To**	**30 June 2024**
Date of Compliance Report Preparation	**30 October 2024**			

2. Executive Declaration

Table 2: Executive Declaration

Person responsible for preparation of the compliance report This document has been prepared to fulfil the requirement under Regulation 77 for the tenements listed herein. The information contained in this report is to the best of my knowledge a true and accurate record of the mining activities and compliance status for the reporting period.			
Name:	**Position or Agent:**	**Signature:**	**Date:**
Peter Jurkovic	Managing Director, Buckland Dry Creek Pty Ltd		30 Oct 2024
Agency Agreement			

3. Tenements

A table and map showing the Mine leases and Private Mines

Table 3: Tenements

Tenement	Tenement number	Next Renewal Date	Forward work plan
ML	234	31/3/2040	
ML	235	31/3/2040	
ML	237	31/3/2040	
ML	357	30/6/2040	
ML	358	30/6/2040	
ML	359	30/6/2040	
ML	360	30/6/2040	
ML	361	30/6/2040	
ML	389	31/3/2040	
ML	390	31/3/2040	
ML	391	31/3/2040	
ML	6514	31/3/2040	
ML	392	31/3/2040	
ML	404	31/3/2040	
ML	405	31/3/2040	
ML	406	31/3/2040	
ML	416	30/6/2040	
ML	417	31/3/2040	
ML	418	31/3/2040	
ML	421	31/3/2040	
ML	429	30/6/2040	
ML	439	31/3/2040	
ML	440	31/3/2040	
ML	441	31/3/2040	
ML	442	31/3/2040	
ML	443	31/3/2040	
ML	444	31/3/2040	
ML	445	31/3/2040	
ML	446	31/3/2040	
ML	447	31/3/2040	
ML	448	31/3/2040	
ML	587	31/3/2040	
ML	600	31/3/2040	
ML	605	31/3/2040	
ML	606	31/3/2040	
ML	607	31/3/2040	
ML	608	31/3/2040	
ML	617	31/3/2040	
ML	618	31/3/2040	
ML	702	31/3/2040	
ML	5205	30/6/2040	
ML	5206	30/6/2040	
ML	5207	30/6/2040	
ML	5208	30/6/2040	
ML	5209	30/6/2040	
ML	5210	30/6/2040	
ML	5908	30/6/2040	
PM	199	Granted 25/10/1973	
PM	248	Granted 22/08/1974	

Figure 1: SARIG Map of Tenements in Salt Field – 1

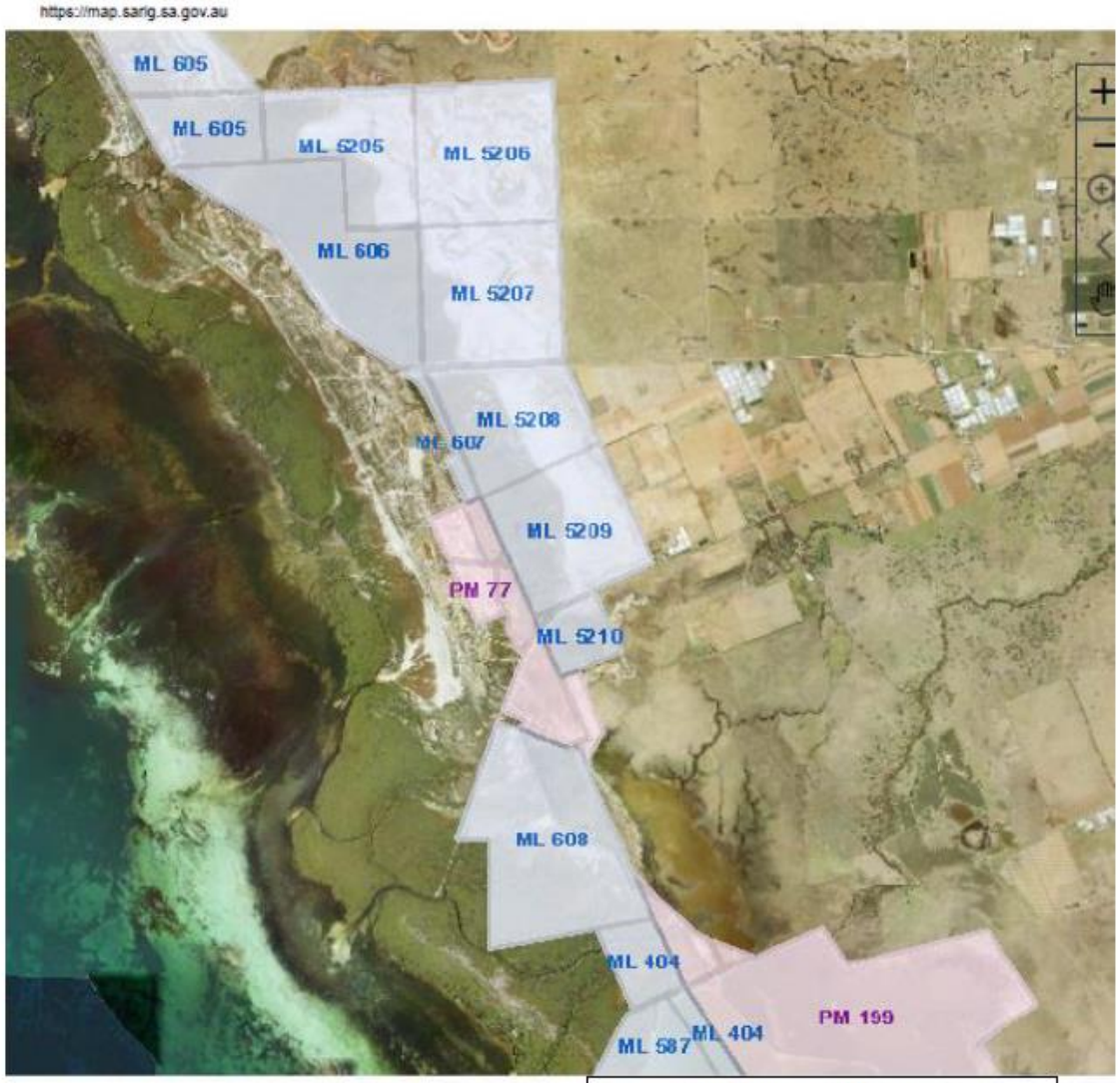


Figure 2: SARIG Map of Tenements in Salt Field – 2

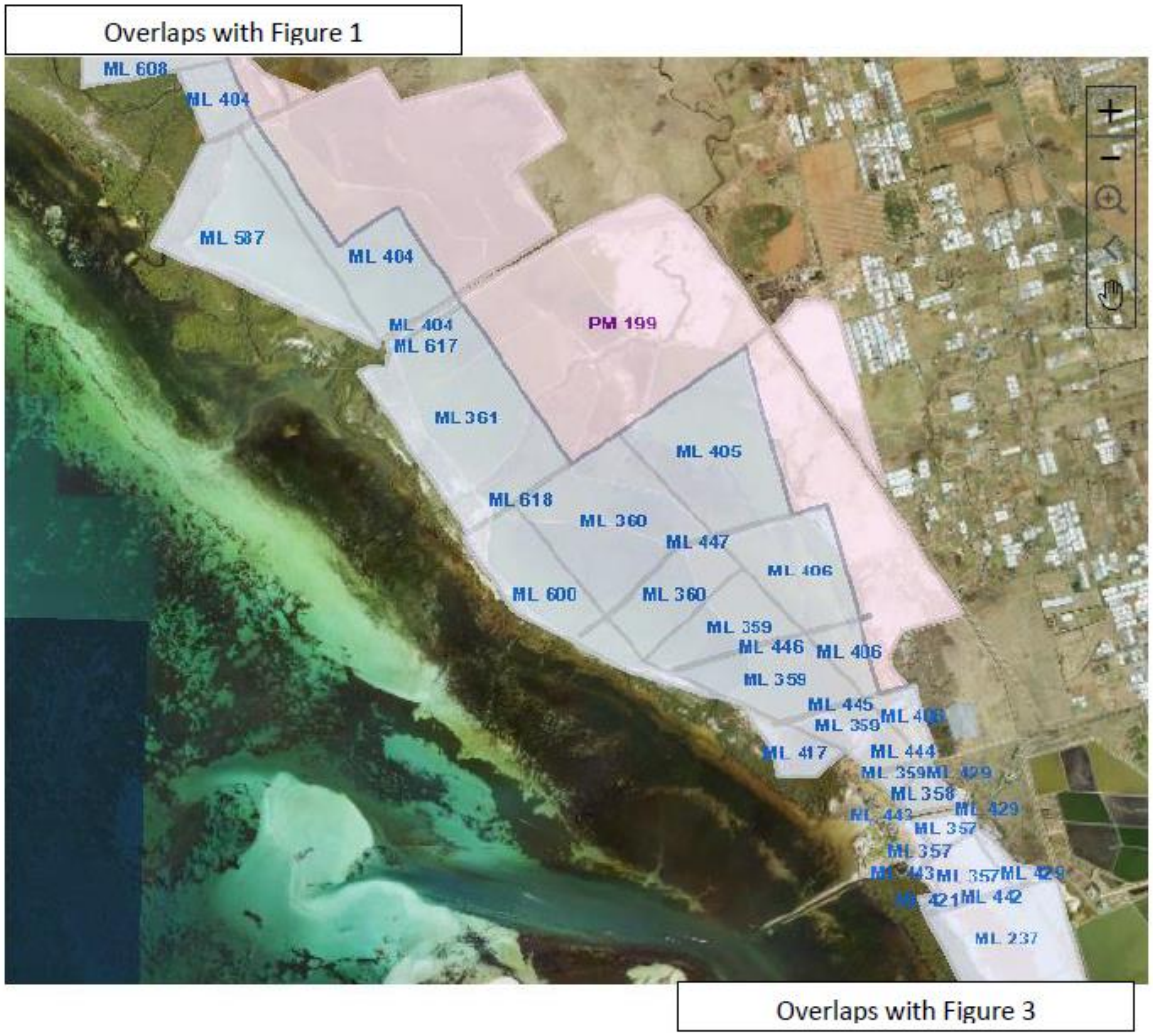


Figure 3: SARIG Map of Tenements in Salt Field –3

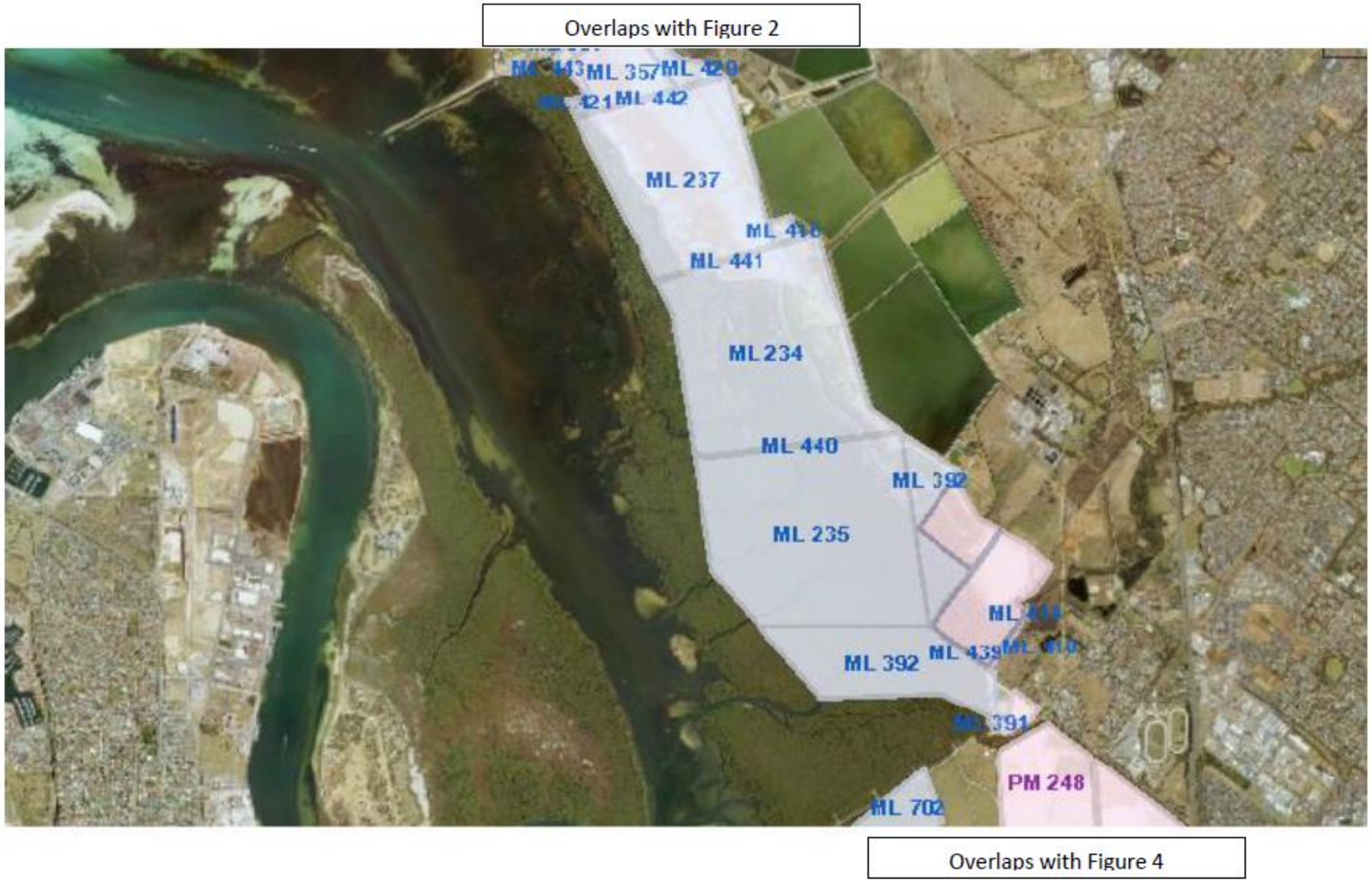


Figure 4 SARIG Map of Tenements in Salt Field –4

4. Other Licences and Permits

Table 4: Other Licences and Permits

Licence, Permit or Agreement	**Regulatory Authority or Other**	**Supporting Document**	**Associated ML, MPL, EML lease condition or Outcome Measurement Criteria**
EPA Licence	40942 Commencement Date: 01 Apr 2021 Expiry Date: 31 Mar 2026		
Fisheries Management Act Permit	MP0159 ME9903160		
AMLNRM Permit and Agreement with City of Playford	AMLNRM Permit A14010 Agreement dated 12 December 2014 between Ridley Dry Creek Pty Ltd (Ridley) and the City of Playford - Stormwater Harvesting		
Water Extraction Licences	211790, 211788		

5. Mining Operations and Closure

Table 5: Mine Operations & Closure

Mining Operations	**Information**
Ore Reserves and Mine Life	The Mine is in a Holding Pattern, Pending closure. No new salt is being produced
Overburden Ore and Concentrate	
Overburden	NA
Ore Stockpiled	As 30 June 2024, approximately 150,000 tonnes of salt remains in the floors of crystallisers and the final areas in Section 1.
Ore Mined and Processed	NA
Concentrate	NA
Holding Pattern and Residual Operations	
Tabular summary – consistent with information in PEPR	**The residual operations in Section 1:** • pumping bore water from the T1 aquifer and sea water to dissolve or wash salt in stockpiles or in crystallisers • excavation of salt from crystallisers and loading this into trucks for transport to stockpile or to an on-site salt washing plant • washing salt to stockpile • loading salt from stockpile into trucks for transport offsite • pumping “MagBrine” into a tanker for use on site or for transport offsite • workshop operations for the maintenance and repair of equipment • when permitted, the pumping of diluted waste brine from salt washing into sea water • storage of waste brine from salt washing or brine from dissolved salt • recrystallisation of brine in crystallisers • pumping and storage of stormwater • maintenance of existing roads and bunds • environmental management as per the existing management plans and procedures • the operations of the site office. **Holding Pattern Activities** • Continuation of the historic operational seawater entrainment at Middle Beach into Section 4 • Entrainment at Chapman Creek into Section 3. This used to be the operational entrainment location until superseded by Middle Beach. *(None in this reporting period)* • Entraining and discharging sufficient volumes of water and managing flows of water between ponds to manage water levels and quality within the inundated ponds. Information is provided below about target ranges for water levels. The water quality parameters include Dissolved Oxygen, Temperature, Specific Gravity, and pH. The aim with these is to stay

	broadly consistent with values that pertained during normal operations, except to the extent this objective is unavoidably constrained by the point of discharge being moved from PA12 to PA5. • A trial of discharges to the Gawler River from Pond XE6 *(None in this reporting period)* • Planning for the construction of infrastructure to enable movement of brine from PA5 to PA12 and from PA12 to ML 6514 – the which pumping of brine is to replace the capacity to discharge brine from PA5 into the SA Water Bolivar Outfall – the which capacity is not available in adequate volume, although this is permitted under the PEPR and EPA Licence • Preparation of Section 1 to enable commercial salt production **Investigations and Studies** • Topography and Bathymetry *(None in this reporting period)* • Land Management Investigations / Trials *(None in this reporting period)* • Acid Sulfate Soils / Mono-sulfidic Black Ooze *(None in this reporting period)* • Odours / dust prevention / mitigation trials *(None in this reporting period)* • Migratory birds monitoring and investigations *(None in this reporting period)* • Surface water management • Infrastructure management • Vegetation surveys *(None in this reporting period)* • DEWNR Trials for controlled tidal inundation of Pond XB8A *(These trials finished in 2018-2019 reporting period; tidal inundation continued in 2023-2024)* • Trials for discharges of brine to the Port River or to North Arm Creek or to Dry Creek *(None in this reporting period)* • SA Water Trials of Nitrogen removal from treated sewage effluent using selected Ponds in Section 2 *(These trials finished in 2018-2019 reporting period)* • Trial of placement of salt residues in F and G Row Pits *(None in this reporting period)*
Closure	• Certain Closure Works in PM248 of Section 1 are permitted by the PEPR. o the construction, in G and H Rows, of layered fill profile intended for use in closure works for land in Section 1 (See Appendix J) • Other Closure Works to be regulated by future approved revisions to the PEPR

6. Voluntary Information

Table 6: Voluntary Information

Activity	Description
Voluntary Reporting	This takes the following forms: 1. Progressive reporting to DEM and including graphs of monitoring data for pond water quality, and levels, & for discharge water quality compliance with EPA Licence Conditions 2. Reporting of dust conditions for XC2E to DEM 3. Progress and Compliance Reporting to DEM for filling of G and H Row crystallisers
Charter for Coordinated DoE and DEWNR / DEM assessment of Impacts on Matters of National Environmental Significance	Ridley sought and facilitated the creation of an agreed Charter for the coordinated DoE and DEWNR / DEM assessment of Impacts on Matters of National Environmental Significance. A draft Charter was created and is filed with Buckland Dry Creek Pty Ltd. This is needed as the Mining Act and the EPBC Act both apply (in different ways to the) management and protection of birds and vegetation at the site, and it is important therefore that there is a coordinated approach (as between State and Commonwealth Agencies) to impact assessment and compliance, particularly in respect of migratory shorebirds and certain vegetation
Preparation of Revision 5 of the PEPR / MOP	There were further discussions between BDC and DEM about the draft of Revision 5 of the PEPR / MOP, leading to revision of the draft. This Revision 5 will, if approved, provide for the resumption of commercial salt crystallisation, harvesting and refining in Section 1 of the salt field

7. Summary of Project Variations

Table 7: Project Variations

Description of Project Variation	**Date Project Variation submitted to DEM**	**Document Control Number**	**Date regulatory authority endorsement received**	**Forward Work Plan** *i.e., Included in annual PEPR update?*
Initial PEPR	17 December 2014	Dry Creek Salt Field PEPR December 2014.pdf	18 December 2014	
SA Water Trial in PA9	5 December 2014	Minor Change Application 141205.docx	8 December 2014	
Drain XF1	16 January 2015	Change of Process Application 140930	22 January 2015	
Extension of SA water trial to more of PA9 and to PA10	24 July 2015	Minor Change Application 150724.docx	28 August 2015	
Revision 2 – for changed compliance point for discharges via SA Water outfall and for extension of trial discharges to Gawler River	9 October 2015	Dry Creek Salt Field PEPR October 2015.pdf	23 October 2015	
Initial trial of Brine Discharges to Port River	23 November 2015 – submitted to DEM and EPA	Email of 23 November 2015, with attached documents: • Brine Main Pressure Test Procedure 151112 • Results of lab tests on brine Main Water Sample • AWQC report 140411_P-7	EPA email of 25 November 2015	Not included in the Forward Work Plan. Due to leaks from the Brine Main uncovered by preliminary testing, this trial has been deferred pending outcomes from salt removal from Section 1 If the trial is conducted and if it proved successful, then apply for a) EPA Licence Variation to allow

Description of Project Variation	**Date Project Variation submitted to DEM**	**Document Control Number**	**Date regulatory authority endorsement received**	**Forward Work Plan** *i.e., Included in annual PEPR update?*
				discharge into the Port River; and b) a Minor Change under the PEPR to allow resumption of pumping brine into the Brine Main (once a normal part of site operations)
Revision 3 – for inclusion of a) soil filling works in PM248 (in Section1) and b) additional trials and investigations to inform selection of closure strategies	March 2017	Dry Creek Salt Field Integrated Program f or Environment Protection and Rehabilitation and Mine Operations Plan Revision 3 v.3 March 2017	13 April 2017	Change under the PEPR to fill PM248, and to conduct other approved trials and investigations The DEWNR Trial in XB8A The continuation / extension of the SA Water Trial in Section 2
PEPR Revision 4	September 2020	Dry Creek Salt Field Integrated Program f or Environment Protection and Rehabilitation and Mine Operations Plan Revision 4 v.1 September 2020		Change to PEPR to accommodate: • Issue of ML6514 • Construction / Rehabilitation and Operation of Infrastructure to pump and flow brine from PA5 through to ML6514 • The continuation of filling in G and H Rows as per the Bulk Earthworks Plan, • The works to rehabilitate and construct infrastructure in Section 1 to ready this for resumption of commercial salt

				production (should this become permitted by approval of a revised PEPR (Revision 5) • Cessation of the SA Water and DEWNR Trials
Supplementary / replacement discharge for brine from PA5	Plan for this variation was agreed with DEM and then implementation started in the reporting period 1 July 2019 to 30 June 2020, under DEM oversight			The ongoing and projected reductions in SA Water Bolivar flows and uncertain availability of the Outfall for discharge make a supplementary / replacement discharge essential for maintaining stability of the Holding Pattern and compliance with the PEPR's environmental outcomes. The agreed plan entails • Renewal of all Mining Leases • Application for and granting of ML6514 • Construction / and Operation of Infrastructure to pump brine from PA5 through to ML6514 • Creating and gaining DEM approval of Revision 4 of the PEPR to allow a) for the operations to pump and flow brine from PA5 through to ML6514 and b) for some restoration / renovation in Section 1 of previously used salt production systems and infrastructure, as well as the construction of some new infrastructure and facilities – this to manage the received brine and to make preparations for the resumption of commercial salt production

Resumption of salt production in all but F, G, H Row crystallisers in Section 1, using Brine from condensers in Sections 3 and 4 of the Saltfield, and a pipeline to bypass Section 2	Plan for this variation is in preparation			Planning is underway and will be documented in a PEPR Revision 5 The types of salt production operations would be the similar to those when the salt field was in use up to 2013.

8. Complaints

Table 8: Complaints

Complaint Reference Notes: Date, type (resident, general public etc.)	**Complaint Type** *Notes: e.g., noise, dust, or traffic complaint*	**Was the complaint as a result of a PEPR non-compliance?**	**Resolution Date**	**Forward Work Plan** *Notes: e.g., additional screening installed, or "NIL" if no evidence found to support complaint*
From 1 June 2016, Buckland Dry Creek Pty Ltd became the operator of the Salt Field.				
8th March 2017	Dust from XC2	No	No dust from XC2 was visible on structures at the complainant's property. BDC has communicated this with DEM and EPA.	Work thus far has involved: 1. Constructing wind barrier to induce turbulence and reduce dust carried offsite 2. Trial Use of Mag Brine to form a dust emission resistant crust 3. Exploration of feasibility of pumping shallow groundwater to moisten soil surface ahead of adverse weather conditions for dust 4. Exploration of possibility to import mulch to place as soil cover over dust prone areas
2nd August 2017	Dust from XC2	No	No dust from XC2 was visible on structures at the complainant's property. BDC has communicated this with DEM and EPA.	
12th and 14th March 2018	Dust from XC2 and XC2E	No	No dust from the saltfield was visible around or at the complainant's property. The saltfield operator in their daily report have indicated no issues with dust in and around the Brooks road area. BDC has communicated this with DEM and EPA.	

Complaint Reference Notes: Date, type (resident, general public etc.)	**Complaint Type** *Notes: e.g., noise, dust, or traffic complaint .*	**Was the complaint as a result of a PEPR non-compliance?**	**Resolution Date**	**Forward Work Plan** *Notes: e.g., additional screening installed, or "NIL" if no evidence found to support complaint*
11/09/18	Dust from XC2E	No	11/9/18 No dust from the saltfield was visible around or at the complainant's property. The saltfield operator in their daily report have indicated no issues with dust in and around the Brooks road area. BDC has communicated this with DEM and EPA.	
8/10/18	Dust from XC2E	No	8/10/18 The saltfield operator in their daily report have indicated no issues with dust in and around the Brooks road area. BDC has communicated this with DEM and EPA.	
12/10/18	Noise from Middle Beach pump	Yes	16/10/18	
29/10/18	Noise from H Row	No	1/11/18 There is very little discernible noise from machinery that is 400-500 meters from the resident in question BDC has communicated this with DEM	
1/11/18	Dust from XC2E	No	1/11/18 The saltfield operator in their daily report have indicated no issues with dust in and around the Brooks road area.	

Complaint Reference Notes: Date, type (resident, general public etc.)	**Complaint Type** *Notes: e.g. noise, dust or traffic complaint.*	**Was the complaint as a result of a PEPR non-compliance?**	**Resolution Date**	**Forward Work Plan** *Notes: e.g. additional screening installed, or "NIL" if no evidence found to support complaint*
			BDC has communicated this with DEM	
9/1/19	Dust from XC2E	No	10/1/19 The brine operator inspected the site at 2.30 pm and noted that there was some evidence of dust however it was blowing southerly away from the complainant BDC has communicated this with DEM	
17/1/19	Dust from Section 1	Possibly	21/1/19 Onsite inspection carried out. Increase use of water carts mainly due to the extreme heat conditions Further steps be taken to control daytime and night-time dust. BDC has communicated this with DEM.	
6 /5/19	Debris on site	Possibly	13/6/2019	Further picking of plastic along roadside verge in first two weeks of June 2019.
19/5/19	Dust	Possibly	22/5/2020	Maintain water cart wetting of haul roads until winter rains arrive
October 2020	Vegetation	No	The matter remains unresolved. In December 2020 DEM provided: a) approval of the Program for Environment Protection and Rehabilitation / Mine Operations Plan (MPEPR 2020/039) for the Dry Creek Saltfields which, amongst other minor	Ongoing compliance with the Environmental Direction until this is closed out, or approval of a revise PEPR/ MoP, which if approved would allow BDC to flow brine through a

Complaint Reference Notes: Date, type (resident, general public etc.)	**Complaint Type** *Notes: e.g. noise, dust or traffic complaint.*	**Was the complaint as a result of a PEPR non-compliance?**	**Resolution Date**	**Forward Work Plan** *Notes: e.g. additional screening installed, or "NIL" if no evidence found to support complaint*
			updates, allows BDC to reconnect Section 2 and Section 1 of the Saltfields through the recently granted ML 6514. b) an Environmental Direction which closed out the Direction issued on 19 November 2020 has been closed out. and that constrains the operations that are approved in MPEPR 2020/039 and outlines immediate actions to minimise any further impacts to the mangrove and vegetation dieback in Section 2 of the Saltfields. The Environmental Direction has been and is being complied with.	pipe to Section 1 of the Saltfields
18 February 2022	Mosquitoes	No	18 February 2022	Nil
For FY 2022 to 2023 – BDC advise no complaints received	For FY 2022 to 2023 – BDC advise no complaints received	For FY 2022 to 2023 – BDC advise no complaints received	For FY 2022 to 2023 – BDC advise no complaints received	For FY 2022 to 2023 – BDC advise no complaints received
For FY 2023 to 2024 – BDC advise no complaints received	For FY 2023 to 2024 – BDC advise no complaints received	For FY 2023 to 2024 – BDC advise no complaints received	For FY 2023 to 2024 – BDC advise no complaints received	For FY 2023 to 2024 – BDC advise no complaints received

9. Compliance Summary Table

Table 9: Compliance Summary

Outcome	**Outcome Measurement Criteria (OMC)**	**OMC Compliance Status** Compliant (C) / Non-Compliant (NC) * *Notes: Compliant, Non-Compliant, Unable to Determine or No longer relevant to risk profile of project*	**Leading Indicator*** *Notes: Is there an associated Leading indicator?*	**Leading Indicator Status*** *Notes: Triggered/Not Triggered*	**Leading Indicator Actions Summary*** *Notes: If triggered describe what actions were taken as a result of triggering the leading indicator. Have the actions been implemented or remain outstanding?*	**Evidence*** *Notes: For each criterion, state what measurements have been taken to monitor compliance and provide an interpretation of the results (i.e., compliant, or noncompliant Provide a summary of the key measurements (use a graph to summarise data where possible) and refer to a summary of the detailed/raw data (if necessary) in an appendix but only to the extent necessary to verify the compliance conclusion reached. Where graphs are used to illustrate compliance, the relevant compliance limits must be clearly included on the graph. Evidence where applicable should include document control number of report or technical memo*	**Forward Work Plan*** *Notes: If non-compliant summarise actions being undertaken to rectify. If unable to demonstrate compliance state reasons relevance of the outcome measurement criteria to the current risk profile of the project or current stage of the project. Are outcome measurement criteria or lease condition amendments required? Quantify the risks associated with the non-compliance if applicable? Was the Leading indicator adequate to pick up the non-compliance or does it need to be amended?*
No adverse public health and or significant nuisance impacts due to air emissions, dust, pest insect species, odour, or noise (A significant nuisance impact is considered to be one that generates a complaint that is confirmed as attributable to the salt field and cannot be addressed within the timeframes specified in the measurement criteria.)	**Dust:** • Register demonstrates that in respect of complaints relating to impacts from dust outside site boundary: ○ complaint initially responded to within 48 hours; ○ issues underlying complaint investigated and causes identified within 2 weeks or other time frame agreed by DEM; ○ complaint closed out within 4 weeks or other time frame agreed by DEM **Pest Insects:** • Register demonstrates that in respect of complaints relating to impacts outside site boundary from pests: ○ complaint initially responded to within 48 hours; ○ issues underlying complaint investigated and causes identified within 2 weeks or other time frame agreed by DEM; ○ complaint closed out within 4 weeks or other time frame agreed by DEM **Odour:** • Register demonstrates that in respect of any complaints relating to impacts outside site boundary from pests: ○ Complaint initially responded to within 48 hours; ○ Issues underlying complaint investigated and causes identified within 2 weeks or other time frame agreed by DEM; ○ Complaint closed out within 4 weeks, or such other time frame agreed by DEM **Noise** • Register demonstrates that in respect of any complaints relating to impacts from noise outside the site boundary: ○ complaint initially responded to within 48 hours; ○ issues underlying complaint investigated and causes identified within 2 weeks or other time frame agreed by DEM;	**Dust** **C** **Pest Insects** **C** **Odour** **C** **Noise** **C**	**Dust** None **Pest Insects** None **Odour** None **Noise** None	**Dust** Not Applicable **Pest Insects** Not Applicable **Odour** Not Applicable **Noise** Not Applicable	**Dust** Not Applicable **Pest Insects** Not Applicable **Odour** Not Applicable **Noise** Not Applicable	**Dust** No complaints received. BDC advise that operational records indicate no or transient, short term dust from the saltfield and that DEM and EPA kept informed. **Pest Insects** No Complaints Received **Odour** No complaints received **Noise** No Complaints Received.	Continue implementation of PEPR, and in particular in respect of dusts: 1. Explore feasibility to cover calsilt on XC2E mulch or other suitable materials 2. Monitor and report on trial coating of parts of Xc2with magnesium brine 3. Continue trial of dust forecasting to see if a reliable tool for forewarning neighbours can be developed.

Outcome	**Outcome Measurement Criteria (OMC)**	**OMC Compliance Status** Compliant (C) / Non-Compliant (NC) * *Notes: Compliant, Non-Compliant, Unable to Determine or No longer relevant to risk profile of project*	**Leading Indicator*** *Notes: Is there an associated Leading indicator?*	**Leading Indicator Status*** *Notes: Triggered/Not Triggered*	**Leading Indicator Actions Summary*** *Notes: If triggered describe what actions were taken as a result of triggering the leading indicator. Have the actions been implemented or remain outstanding?*	**Evidence*** *Notes: For each criterion, state what measurements have been taken to monitor compliance and provide an interpretation of the results (i.e., compliant, or noncompliant Provide a summary of the key measurements (use a graph to summarise data where possible) and refer to a summary of the detailed/raw data (if necessary) in an appendix but only to the extent necessary to verify the compliance conclusion reached. Where graphs are used to illustrate compliance, the relevant compliance limits must be clearly included on the graph. Evidence where applicable should include document control number of report or technical memo*	**Forward Work Plan*** *Notes: If non-compliant summarise actions being undertaken to rectify. If unable to demonstrate compliance state reasons relevance of the outcome measurement criteria to the current risk profile of the project or current stage of the project. Are outcome measurement criteria or lease condition amendments required? Quantify the risks associated with the non-compliance if applicable? Was the Leading indicator adequate to pick up the non-compliance or does it need to be amended?*
No adverse impacts to adjacent land use	**Inundated ponds[1]** Records from weekly monitoring of pond water levels demonstrate pumped entrainment and discharge have maintained water levels in ponds within target range set out in Table 31, or other levels agreed with EPA in writing. **Other ponds[2]** Records demonstrate: • ASS / MBO investigations undertaken, and results provided to EPA/DEM • risk monitoring and management plan prepared as agreed with DEM/EPA • actions in risk monitoring and management plan implemented in accordance with timeframes specified in plan • outcome measurement criteria specified in plan met **Bund banks** Records demonstrate that: • inspections every six months of bunds banks for inundated ponds demonstrate are stable and maintained at a height that will ensure no unplanned overflow from ponds; or • if any maintenance / repairs issues are identified from six monthly inspections, they are closed off within 1 calendar month unless otherwise agreed with DEM and EPA **Seepage Drains** Records demonstrate that: • quarterly inspections of seepage drains demonstrate they are stable; or if any maintenance / repairs issues identified from quarterly inspections of seepage drains are closed off within 1 calendar month unless otherwise agreed with DEM and EPA	**Inundated Ponds** **C** **Other Ponds** **C** **Bund banks** **C** **Seepage Drains** **C**	**Inundated Ponds** None **Other Ponds** The results of investigations in previous reporting periods for ponds in Sections 2 and 4. **Bund banks** None **Seepage Drains** None	**Inundated Ponds** Not Applicable **Other Ponds** Not triggered by the results of these investigations **Bund banks** Not applicable **Seepage Drains** Not Applicable	**Inundated Ponds** Not Applicable **Other Ponds** Not Applicable **Bund banks** Not applicable **Seepage Drains** Not Applicable	**Inundated Ponds** See Appendix C **Other Ponds** All reports of investigations in previous reporting periods were provided to EPA / DEM. **Bund banks** See Appendix D Bunds for these ponds are inspected routinely as part of the regular (daily, weekly) movement of staff through the site to monitor and control flows and water quality in these ponds. As maintenance issues are identified they are addressed. No maintenance issues occurred in this reporting period **Seepage Drains** The key seepage drains outside those ponds that are still inundated are inspected routinely as part of the regular (daily, weekly) movement of staff through the site to monitor and control flows and water quality in these ponds. If maintenance issues are identified they are addressed. No maintenance issues have yet been identified.	**Inundated Ponds:** **Entrainment** Continue with entrainment at Middle Beach and management of flows through the salt field as documented in PEPR Rev 4 **PA5 Discharges** These will continue until no longer permitted by SA Water (Agreement DEM- SA Water) or by EPA Licence (expires March 2022) If permitted by DEM, replace the PA5 discharges with flow of brine through to Section1 **Trial of Discharges to Gawler River** As needed to manage salinity in XE6 for the benefit of the salinity in Ponds in Section 3, **c**ontinue with the trial of the documented water management regime as discussed with STAG (when in operation), DEM, and EPA **Other Ponds** Continue with management of drainage to keep drained ponds as free draining as possible, noting that where there is seepage from an adjacent inundated pond, pooling of water in low areas will be inevitable **Bund banks** Continue with this inspection and maintenance regime **Seepage Drains** Continue with this inspection and maintenance regime

<table>
<tr><th>Outcome</th><th>Outcome Measurement Criteria (OMC)</th><th>OMC Compliance Status Compliant (C) / Non-Compliant (NC) *
Notes: Compliant, Non-Compliant, Unable to Determine or No longer relevant to risk profile of project</th><th>Leading Indicator*
Notes: Is there an associated Leading indicator?</th><th>Leading Indicator Status*
Notes:
Triggered/Not Triggered</th><th>Leading Indicator Actions Summary*
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<tr>
<td>No adverse impacts on other groundwater users</td>
<td>Water bores
Records of meter readings demonstrate the volume of water extracted per annum does not exceed the following allocations:
<table>
<tr><td>6628_19184</td><td>T1</td><td rowspan="4">1,177,255 kL</td></tr>
<tr><td>6628_10427</td><td>T1</td></tr>
<tr><td>6628_04356</td><td>T1</td></tr>
<tr><td>6628_13020</td><td>T1</td></tr>
<tr><td>6628_13170</td><td>T1</td><td rowspan="2">850,255 kL</td></tr>
<tr><td>6628_18042</td><td>T1</td></tr>
<tr><td>6528_2005</td><td>T3</td><td>1,200,000 kL</td></tr>
</table>
</td>
<td>Water Bores

C

Drained Ponds

C</td>
<td>Water Bores

No leading Indicator for Water Bores.

Drained Ponds

Leading Indicator is visual indication of soil acidification from water discharging via pond drains into external seepage drains</td>
<td>Water Bores

Not Applicable

Drained Ponds

Not Triggered</td>
<td>Water Bores

Not Applicable

Drained Ponds

Not Applicable</td>
<td>Water Bores

See Appendix G
• The aggregate licence allocation for the six T1 bores has not been exceeded by the metered usage

Drained Ponds
Configuration and condition of drained ponds and their drainage channels connecting to external seepage drains has not changed since the previous compliance report.

Inspections with EPA have not yielded reports of visual signs of soil acidification in external drains specifically resulting from discharge water</td>
<td>Water Bores

Continue to Track Meter Readings and to report consumption as per PEPR

Drained Ponds

Visual inspections of drainage</td>
</tr>
</table>

Outcome	**Outcome Measurement Criteria (OMC)**	**OMC Compliance Status** Compliant (C) / Non-Compliant (NC) * *Notes: Compliant, Non-Compliant, Unable to Determine or No longer relevant to risk profile of project*	**Leading Indicator*** *Notes: Is there an associated Leading indicator?*	**Leading Indicator Status*** *Notes: Triggered/Not Triggered*	**Leading Indicator Actions Summary*** *Notes: If triggered describe what actions were taken as a result of triggering the leading indicator. Have the actions been implemented or remain outstanding?*	**Evidence*** *Notes: For each criterion, state what measurements have been taken to monitor compliance and provide an interpretation of the results (i.e., compliant, or noncompliant Provide a summary of the key measurements (use a graph to summarise data where possible) and refer to a summary of the detailed/raw data (if necessary) in an appendix but only to the extent necessary to verify the compliance conclusion reached. Where graphs are used to illustrate compliance, the relevant compliance limits must be clearly included on the graph. Evidence where applicable should include document control number of report or technical memo*	**Forward Work Plan*** *Notes: If non-compliant summarise actions being undertaken to rectify. If unable to demonstrate compliance state reasons relevance of the outcome measurement criteria to the current risk profile of the project or current stage of the project. Are outcome measurement criteria or lease condition amendments required? Quantify the risks associated with the non-compliance if applicable? Was the Leading indicator adequate to pick up the non-compliance or does it need to be amended?*
No loss of abundance or diversity of native vegetation on or off Sections 2 to 4 of salt field through clearance arising from Holding Pattern, unless prior approval under relevant legislation is obtained	Records demonstrate that all clearance of native vegetation has been undertaken with appropriate permissions. It is noted that clearance can also include loss from • physical works, • dust/contaminant deposition, • fire, or • other damage.	**Approvals** **C** **Clearance** **C**	**Approvals** None. **Clearance** **None**	**Approvals** Not applicable. **Clearance** Not applicable.	**Approvals** Not applicable. **Clearance** Not applicable.	**Approvals** No approvals have been sought or granted for loss of abundance or diversity of native vegetation arising from Holding Pattern or other activities in Sections 2 to 4, and due to clearance. **Clearance** There has been no physical clearance of native vegetation arising from Holding Pattern or other activities in Sections 2 to 4. The evidence for this is: 1. The Nearmap aerial photos in Appendix E indicate that regeneration of native vegetation is occurring in parts of the drained ponds in Sections 2 to 4 2. The Nearmap aerial photos in Appendix E that show no clearance of vegetation outside the ponds in Sections 2 to 4 in the reporting period 3. There have been no physical works outside the ponds in Sections 2 to 4 except for a) for the EPA licensed discharges of Brine from PA5 into the SA water outfall and b) the discharges to sea associated with the DEWNR Trial in XB8A	**Approvals** Should physical clearance need to occur, prior approval under the relevant legislation will be obtained. **Clearance** No physical clearance works are proposed BDC is revising the PEPR , which if approved by DEM would enable brine to be transferred to Section 1. This PEPR revision will propose works to prevent any perceived risk that such brine may pose to the external mangroves. This revised PEPR will also clarify the preventive bund maintenance program deployed by BDC –to sustain confidence that in Sections 2 to 4 , the risk from brine seepage to vegetation outside the bunds remains as negligible as it has been for decades.

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No adverse impacts on the environmental values of marine waters due to water discharge	Records demonstrate that salinity from: • PA5 discharges, measured at the "SA Water Outfall compliance point" taken no less frequently than each 10 minutes is within the 45ppt TDS threshold for the 6-hour rolling average. • XE6 discharges, measured at the "Gawler River Discharge compliance point" taken no less frequently than each 5 minutes is within criterion for this compliance point -being the greater of: ○ The maximum diurnal TDS measured in the past 30 days at the compliance point in the absence of discharge from XE6; or ○ The measured contemporaneous maximum diurnal TDS in Chapman Creek (at the pumping station). In the event of an exceedance at a discharge compliance point, records will demonstrate that: • there has been notification to DEM, PIRSA and EPA within 24 hrs exceedance was followed by a period of nil discharge from PA5 or XE6, as appropriate, unless and until further discharge is approved by EPA Exceedance reports were provided within 3 days with root cause assessment and proposed or taken corrective action.	**PA5 Discharges** **C** **Trial of Discharges to Gawler River** **C** **DEWNR Trial of Tidal Inflows and Outflows at XB8A** **No longer relevant to risk profile of project**	**PA5 Discharges** • Salinity in Outfall at the Bridge over the Outfall • Estimates of salinity at Weir 2 from salinity in PA5, Outfall flow rate and salinity. **Trial of Discharges to Gawler River** • Salinity in XE6 **DEWNR Trial of Tidal Inflows and Outflows at XB8A** • None	**PA5 Discharges** The leading indicators provide a reliable predictor of the potential for exceedance of the compliance criterion. **Trial of Discharges to Gawler River** The leading indicator provides a reasonable estimate of the salinity in the Gawler River at the compliance point when there is continuous discharge **DEWNR Trial of Tidal Inflows and Outflows at XB8A** • Not Applicable	**PA5 Discharges** The leading indicators continue to be tracked and used to manage the discharge **Trial of Discharges to Gawler River** The leading indicator continues to be tracked and used to manage the discharge **DEWNR Trial of Tidal Inflows and Outflows at XB8A** Not Applicable	**PA5 Discharges (see Appendix F)** 1. See graphs in Appendix F **Trial of Discharges to Gawler River (see Appendix F)** 1. There were no discharges to the Gawler River in the reporting period **DEWNR Trial of Tidal Inflows and Outflows at XB8A** 1. This trial was completed in the 2018=2019 reporting period. No trial completion report has been received from DEWNR	**Entrainment** Continue with entrainment at Middle Beach and management of flows through the salt field as documented in PEPR Rev 4 **PA5 Discharges** These will continue until no longer permitted by SA Water (Agreement DEM- SA Water) or by EPA Licence (expires March 2022) If permitted by DEM, replace the PA5 discharges to the Bolivar Outfall with flow of brine through to Section1 Continue implementing the water management and monitoring regime as agreed with DEM and EPA **Trial of Discharges to Gawler River** As needed to manage salinity in XE6 for the benefit of the salinity in Ponds in Section 3, **c**ontinue with the trial of the documented water management regime as discussed with STAG (when in operation), DEM, and EPA **DEWNR Trial of Tidal Inflows and Outflows at XB8A** DEWNR has completed the trial. All its monitoring has ceased By agreement between DEWNR, DEM and BDC, the tidal gates constructed at XXB8A remain open and allow tidal exchange into XB8A, with no monitoring required

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No adverse impacts to avifauna using the site beyond internationally recognised impact thresholds, or outside historic ranges of variability in species and bird numbers	Records demonstrate that impacts on listed migratory birds from activities in this PEPR / MOP are below significant impact threshold as determined by EPBC Act significant impact guidelines for Matters of National Environmental Significance. **Inundated ponds** • Records from weekly monitoring of pond water levels demonstrate pumped entrainment and discharge have maintained water levels in ponds within target range set out in Table 31, or other levels agreed with EPA in writing	**C**	Water depths of Inundated ponds remaining within the limits specified in the PEPR.; and salinities in Inundated ponds remaining within the acceptable ranges that sustain the attractiveness of the saltfield habitats for the migratory birds	Water levels in ponds stayed within limits. In the migratory bird season, the salinities in the central and southern ponds in Section 3 rose to levels higher than in 2017-2018 and 2016-2017, due to constraints on discharge to the SA Water Outfall that restricted the rate of movement of water through these ponds. That allowed more evaporative loss per unit volume of water moving through the ponds leading to increased salinity However, the higher salinity levels in these ponds were not outside the range experienced since the start of the holding pattern;	The issues with salinity have led to adaptation and refinement of the water management regime by agreement with DEM and EPA. With sufficient flow from Bolivar down the SA Water outfall, this has proved effective, with control over salinity in summer improving each year of the holding pattern to 2017-2018 However, reductions in Bolivar flows, due to diversions to the NAIS does limit the effectiveness of this mode of salinity control for the ponds	• No bird monitoring has been conducted by BDC in the 2023/2024 migratory bird season. However, bird monitoring has been conducted by Birds SA and BDC has provided copies of this monitoring information to DEM. • The record of water levels and salinity in Holding Pattern Inundated ponds indicates, in the aggregate, broad comparability with ranges observed in 2013 to 2018 and for which bird monitoring demonstrated compliance with the required outcome. See Appendix D • This comparability indicate that the habitat provided by the inundated ponds for migratory birds has been sustained and therefore that compliance with the required outcome has been achieved • There has been adequate discharge from PA5 to the Bolivar outfall for control of pond salinities. • As has been evidenced by data in EPBC self-assessment reports copied to DEM, the size of the salt field and its patterns of salinity have meant that there has been sufficient redundancy in available bird habitat to enable birds to move from ponds where salinity has become too high to ponds with acceptable salinity. • The longer it takes to establish an operational replacement discharge arrangement, the greater the risk of instability in salinities leading to more risk that the numbers and areas of ponds with salinities too high for some migratory birds will increase to the point where this impacts the numbers of migratory birds the salt field can accommodate. This risk must be managed. Prior to 2018 / 2019 migratory bird season: • Bird Monitoring has been conducted in 2013 / 2014 and 2014 / 2015, 2015 / 2016, 2016/ 2017 and 2017/2018 migratory bird seasons. • This monitoring indicates the maintenance of water levels and salinity in Holding Pattern Inundated ponds resulted in compliance with the required outcome for 2013/ 2014, 2014 / 2015, 2015 / 2016, 2016 / 2017, and 2017/ 2018 season	

Outcome	**Outcome Measurement Criteria (OMC)**	**OMC Compliance Status** Compliant (C) / Non-Compliant (NC) * *Notes: Compliant, Non-Compliant, Unable to Determine or No longer relevant to risk profile of project*	**Leading Indicator*** *Notes: Is there an associated Leading indicator?*	**Leading Indicator Status*** *Notes: Triggered/Not Triggered*	**Leading Indicator Actions Summary*** *Notes: If triggered describe what actions were taken as a result of triggering the leading indicator. Have the actions been implemented or remain outstanding?*	**Evidence*** *Notes: For each criterion, state what measurements have been taken to monitor compliance and provide an interpretation of the results (i.e., compliant, or noncompliant Provide a summary of the key measurements (use a graph to summarise data where possible) and refer to a summary of the detailed/raw data (if necessary) in an appendix but only to the extent necessary to verify the compliance conclusion reached. Where graphs are used to illustrate compliance, the relevant compliance limits must be clearly included on the graph. Evidence where applicable should include document control number of report or technical memo*	**Forward Work Plan*** *Notes: If non-compliant summarise actions being undertaken to rectify. If unable to demonstrate compliance state reasons relevance of the outcome measurement criteria to the current risk profile of the project or current stage of the project. Are outcome measurement criteria or lease condition amendments required? Quantify the risks associated with the non-compliance if applicable? Was the Leading indicator adequate to pick up the non-compliance or does it need to be amended?*
No compromise to potential future land use	Compliance with measurement criteria (as above) for the following outcomes: • No adverse impacts to adjacent land use • No adverse impacts to avifauna using the site beyond internationally recognised impact thresholds, or outside historic ranges of variability in species and bird numbers	**C**	**See above**	**See above**	**See above**	**See above**	**See above**

[1] Inundated ponds are defined as: Ponds XE1-3, XE5, XE6, XE7, XD1, XC3, XB3, XB4-5, XB6, XB8, XA1, XA2, XA3, XA4, XA7, PA3, PA4, PA5

[2] Other ponds are defined as XF1, XF2, XE4, XC1, XC2, XC2S, PA6, PA7, PA7A, PA8, PA9, PA10, PA11, PA12

10. Rectification of Non-Compliance (not subjects of complaint)

The following table lists the non-compliance matters (not subjects of complaints – See Section 8) and that have been rectified. There was no non-compliance matter in the period 1 July 2021 to 30 June 2022.

Table 10: Rectification of Non-Compliance

Date of Incident	**Detected by Operator or DEM**	**Date DEM Advised**	**Non-Compliance** *Notes: Refer to outcome or lease condition breached*	**Status***	**Further Work Plan**	
					Actions	**Implemented**
8 June 2014	Operator	Email from Ridley (NJW) 9 and 10 June 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Adjusted pumping regime and its monitoring and controls	Yes
10 June 2014	Operator	Email from Ridley (NJW) 10 and 11 June 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes
22 June 2014	Operator	Email from Ridley (NJW) 23 June 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes
28 September 2014	Operator	Email from Ridley (NJW) 29 and 30 September 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes
6 October 2014	Operator	Email from Ridley (NJW) 7 October 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes
13 November 2014	Operator	Email from Ridley (NJW) 14 November 2014	Exceed 45 ppt at Weir 2	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes

4 December 2015	Operator	Email from Ridley (NJW) 4 and 5 December 2015	Exceed 45 ppt at Site 1a / site 3	Resolved / Closed out	Further adjusted pumping regime and its monitoring and controls	Yes
July to Oct 2016 and May 2017 (See Figure 10)	Operator	DEM not advised	Water Level in XA 3 temporarily below minimum required	Resolved / Closed out	Cause was reduced inflow from XB6 – Solved by reducing outflow to XA4, & increasing inflow from XB6	Yes. Water level restored above minimum required by Nov 2016 and June 2017 respectively. No adverse impacts to migratory birds because of redundancy in bird carrying capacity in the salt field and b) the low water levels occurred outside on during "shoulders" of the bird season. Through the majority of the bird season, when bird numbers are high, water levels were within the compliance range

11. Disturbance and Rehabilitation Activities

Table 11: Disturbance and Rehabilitation

Activity	Tenement	Tenement size (Ha)	Maximum amount approved in PEPR to be cleared (Ha)	Previously reported cleared area (Ha)	Estimated clearance for next reporting period (Ha)	SEB offset	Forward work plan
NA	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
***NA* = Not applicable because there has been no new land disturbance and the Salt Field has been in a Holding Pattern under this PEPR, except for the filling underway in G & H Rows (part of PM248) for the purposes of the rehabilitation of G & H Rows.**							

12. Environmental Protection and Biodiversity Conservation Act Reporting

Table 12: Reports provided under the EPBC Act (EPBC Ref 2015/418)

Date	Report	Reference
19 May 2014	Self-Assessment	Brett Lane & Associates: 13061 (2.0) Self-Assessment 140516.pdf
8 January 2015	EPBC Act Referral – Dry Creek Salt Field Closure, South Australia	EPBC Act Referral (Dry Ck Closure) 150108 - Referral Form.pdf Plus, Attachments 1 to 7
15 February 2015	Referral Decision	DOE 2015/7418
6 October 2015	Technical Report from Monitoring in 2013/2014 and 2014/2015 Migratory Bird Seasons	Brett Lane & Associates: 13061 (1.10) Dry Creek Technical Report 150917.pdf
6 October 2015	Update to Self-Assessment	Brett Lane & Associates: 13061 (2 5) EPBC Act 2015 Self-Assessment for Dry Creek Salt Field.pdf
8 June 2017	Update to Technical Report and Self-Assessment (adding the 2015/2016 bird monitoring data)	Report 13061 (1.13) Final 170302.pdf Report 13061 (2 7) EPBC Act 2016 Self-Assessment for Dry Creek Salt Field 170203.pdf
24 October 2018	Update to Technical Report and Self-Assessment (adding the 2016/ 2017 and 2017/2018 bird monitoring data)	Report 13061 (2.9) EPBC Act 2018 Self-Assessment for Dry Creek Salt Field 181024

13. Audits and Reviews

A tabular summary of Audits or Reviews (if any) conducted for the purposes of Buckland Dry Creek's Management Systems or for PEPR compliance

Note:

To date, no Audits or Reviews have been conducted for the purposes of PEPR Compliance because:

- DEM and EPA have made regular inspections of the site and checks of compliance with the PEPR conducted
- Reports on the Bird Monitoring have been submitted to both DEWNR and to DAWE for review and comment
- Investigations and Monitoring of ASS conditions have been conducted by ASSC, jointly funded by the Government and Ridley. The reports from this work are available to both parties
- Ground level surveys have been conducted by CSIRO and ARA jointly funded by the Government and Ridley. The reports from this work are available to both parties
- EPA has conducted its own independent monitoring (chemical and biological) of the waters of the Gawler River, Chapman Creek and in the Gulf in the vicinity of the discharges from the SA Water Outfall
- EPA has conducted its own independent monitoring of the groundwater under and adjacent to PA6
- EPA / DEM has conducted its own independent monitoring of the salinity and levels of water in PA6 and has implemented its own operations to pump water from PA6 into PA5

14. Uncertainties

A tabular summary of any key uncertainties affecting or potentially affecting compliance, and what actions (if any) are being taken or planned to reduce these

Table 13: Uncertainties

Description of Uncertainty	Estimated Date to Resolve	Progress in Reporting Period	Confirmed?	Forward Work Plan
NA	*NA*	*NA*	*NA*	*NA*

NA= Not Applicable because the uncertainties that exist are as described and accounted for in the risk assessment and management plan in the current approved PEPR / MoP.

15. Technical Reports

Buckland Dry Creek has provided DEM and EPA with access to

- Technical Data and Reports in the following OneHub Folders. These are accessible to those Government Agency staff who have been invited:
    - PEPR Documents (Lodged at DEM Request following DEM Review): https://ws.onehub.com/folders/curom545
    - PEPR Documents (Approved): https://ws.onehub.com/folders/tznhcbn7
    - Documents provided to STAG (WHEN IN OPERATION), relating to progress and issues arising during the conduct of the Holding Pattern: https://ws.onehub.com/folders/xcjx6e4f
    - Ground Level Survey Information: https://ws.onehub.com/folders/xx6wob19
    - Acid Sulphate Soil Investigations: https://ws.onehub.com/folders/ykf4b3q7
- Appendices to this Compliance Report contain the following information

Table 14: Technical Reports

Appendix	Document Name	Document Date	Author	Subject
B	• Complaints Register 240630. pdf	• October 2024	• Buckland Dry Creek	• The Register of Complaints and actions arising

Appendix	Document Name	Document Date	Author	Subject
C	• Holding Pattern Pond Water Level Graphs April 2013 to 240701 • Holding Pattern Pond Water Level Graphs 1 Jan 2023 to 240701 • Pond Salinity 2012 to this Year 240701 • Pond Salinity 1 Jan 2023 to this Year 240701 • Pond SG Graphs 2012 to this Year 240701 • Stats for Holding Pattern Pond Water Levels Sept 2023 to Mar 2024 • Water Levels vs Compliance Criteria In PEPR Sept 2023 to March 2024 Note Updated Pond Water Level and Salinity Graphs are provided in the monthly reports to DEM	• July 2024 • July 2024 • July 2024 • July 2024 • July 2024 • Aug 2024 • Aug 2024	WithERS Environmental Risk Strategies (for Buckland Dry Creek) using data provided by Buckland Dry Creek	• Comparison of Pond Water Levels with Measurement Criteria • Comparison of Pond Salinity with Measurement Criteria • Time series of salinity data for inundated holding pattern ponds • Changes year to year of average pond water salinity classifications based on ranges of salinity data for these months • Changes year to year of average pond water salinity classifications based on ranges of salinity data for these months • Comparison of Pond Water Levels with Measurement Criteria • Comparison of Pond Water Levels with Measurement Criteria

Appendix	Document Name	Document Date	Author	Subject
D	• Section 3 in BDC Report - 30 June 2024 compliance 12 mth	• 18 October 2024	• Buckland Dry Creek	• Asset maintenance
E	• Nearmap Photos - Vegetation In Drained Ponds 2023 - 2024 • Nearmap Photos - Vegetation To West of Sea Bund 2023 - 2024	• August 2024 • August 2024	WithERS Environmental Risk Strategies (for Buckland Dry Creek)	• Development of Revegetation • Variation of vegetation
F	• Combined Monthly Reports to DEM 2023-2024 • Entrainment and Discharge Diagrams dated 240708 Note Updated Entrainment and Discharge Diagrams are provided in the monthly reports to DEM	• Originals as dated;	WithERS Environmental Risk Strategies (for Buckland Dry Creek) using data provided by Buckland Dry Creek	• The graphs of salinity for the Bridge vs compliance criteria for PA5 discharge • The quantities or entrainment and discharge or Sections 3 and 4, with graphs of Bridge Salinity
G	• Bore Water Consumption 2023-2024	• October 2024	WithERS Environmental Risk Strategies (for Buckland Dry Creek) using data provided by Buckland Dry Creek	• Reconciliation of Bore water uses with Licence Allocation

Appendix	Document Name	Document Date	Author	Subject
H	• Section 2 in BDC Report - 30 June 2024 compliance 12 mth • BDC PEPR filling update F-G-H Rows 24.09.13 • AH PEPR Endorsement F G Row Sep 2023 to June 2024	• 18 October 2024 • 13 September 2024 • 14 October 2024	• Buckland Dry Creek • Buckland Dry Creek • Esher Environmental Services	• Information re filling in G and H Rows

14. Forward Works Plan

The following table summarises the actions raised throughout this compliance report. These actions will form the basis of some of the forward works plan for the 2019 / 2020 year.

It is also noted that during 2019 / 2020 BDC will be initiating certain investigations and trials to help design closure and completion works for the different parts of the site, or to assist the planning, design, and implementation of work to resume salt production. If these require a Minor Change Notification or Revision to the PEPR, they will be discussed with DEM and other relevant agencies and stakeholders as need arises. For now, they lie outside the scope of this present compliance report (reporting on compliance to 30 June 2019).

Table 15: Forward Works Plan

Action No.	Action Description	Responsibility of:	Proposed Completion Date	Compliance Report Reference
1	Continue Implementation of the Approved PEPR	Buckland Dry Creek Pty Ltd	Ongoing	Section 9 Compliance Summary and Section 7 Project Variations
2	Exploration potentially feasible new land uses for XC2 and XC2E that would provide ways to limit risks of dust emissions from and to resolve complaints re this	Buckland Dry Creek Pty Ltd	Ongoing	Section 8 Complaints
3	Conduct further filling in H Row and G Row in PM248	Buckland Dry Creek Pty Ltd	Ongoing	Section 7 Project Variations
4	Continue with Tidal Flushing of XB8A	Buckland Dry Creek Pty Ltd)	Ongoing	Section 7 Project Variations
5	Develop Plans to resume commercial salt production in A, B, C Row Crystallisers, using brine from the condensers in Sections 2, 3 and 4 of the salt field Create and gain DEM approval for PEPR Revision 5 permitting commercial salt production	Buckland Dry Creek Pty Ltd	Ongoing	Section 7 Project Variations

6	Supplementary / Replacement discharge from PA5	Buckland Dry Creek Pty Ltd	Ongoing	Section 7 Project Variations

15. Ministerial Determination Checklist

Table 16: Checklist

Section	Included? Or N/A
Executive summary	YES
1. Introduction	YES
Tenement number(s)	YES
Name of the mine operation	YES
General location details	YES
Name(s) of the mine owner and mine operator(s)	YES
Site Contact	YES
Registered Mine Manager, *Mines Works Inspection Act, 1920*	YES
Reference and approved date of relevant PEPR being reported against	YES
Person accepting responsibility for the report	YES
Dates of the reporting period for the report	YES
Date of preparation of the report.	YES
2. Executive Declaration	YES
3. Tenements	
Summary table of all tenements including ML, MPL, EML etc.	YES
4. Other Licences, Permits, Waivers, Native Title and Agreements	
Summary table of all licences, permits, waivers, native title, and other agreements relevant to the PEPR.	YES
Where applicable, provide a statement that all waivers for exempt land required for the current operation are in place in accordance with the Mining Act	
5. Mining operations and Closure	
Ore reserves and mine life	
new delineation or exploration drilling activities on or off the lease (if required)	NA
review of reserves (if required)	NA
Other potential sources of ore (e.g., from nearby mines) (if required)	NA
Overburden, Ore and Concentrate	
Overburden	NA
Ore	NA
Concentrate	NA
Holding Pattern and Residual Operations	YES
Closure	NA
6. Voluntary Information (not mandatory, but strongly recommended)	YES

7. Project Variation Summary	
Summary table of any changes/project variations submitted to DEM	YES
8. Complaints	
Summary table of complaints made by members of the public during the reporting period	YES
Indicate how concerns or complaints by third parties were addressed.	YES
9. Compliance Summary Table	
For **each** outcome in PEPR state if "complied", "not complied", or "unable to demonstrate compliance"	YES
For **each** outcome in the PEPR provide summary criteria data that supports the conclusion above	YES
For **each** lease or licence condition (other than environmental outcomes) state if "complied", "not complied", or "unable to demonstrate compliance"	YES
For each leading indicator criterion state if any were triggered in the reporting period	YES
If triggered, **(if required)**	YES
• What actions were taken	YES
• An assessment of the effectiveness of the current control strategies or criteria	YES
10. Rectification of Non-Compliances	
If a "not complied" is recorded, the following must be included: ***(if required)***	YES
• date of the incident	YES
• state if the incident was a Reportable Incident under Regulation 79. If so, the report must also state the date the incident was initially reported to the Minister and the date the written report was provided to the Minister.	YES
• what environmental outcome or lease condition was breached	YES
• if and how the noncompliance was, or is planned to be, rectified	YES
• what measures, if any, will be taken to prevent recurrence.	YES
Progress update on previous non-compliances not fully rectified at time of last report	YES
11. Disturbance and Rehabilitation Activities	
Information on areas disturbed and current rehabilitation status	YES
The amount of land disturbed	YES
Vegetation cleared	N/A
New measures implemented to avoid or control environmental impact	N/A
Revegetation or rehabilitation earthworks conducted.	N/A
Evidence (by using closure and rehabilitation criteria in the current approved PEPR) of the effectiveness of rehabilitation being progressively undertaken.	N/A
Any problems or potential improvements learned from previous rehabilitation	N/A
An assessment of risks that rehabilitation may or may not be achieved as planned	N/A

New strategies to be undertaken to achieve rehabilitation outcomes (if required)	N/A
12. Environment Protection and Biodiversity Conservation Act reporting	
Demonstration of compliance with EPBC conditions (if required)	YES
13. Audits and Reviews	
If an audit or review of any part of the operation management system was conducted during the reporting period, the following information on the audit or review must be included: (if required)	N/A
• when the audit or review was undertaken	N/A
• who undertook the audit or review	N/A
• what aspect(s) of the management system was/were audited/reviewed	N/A
• what issues, or recommendations for improvement, were noted	N/A
• an assessment of the potential for any issues identified in the audit/ review to lead to a noncompliance with approved environmental outcomes	N/A
• what corrective action that has or will be taken to address any issues.	YES
14. Verification of Uncertainties	
Changes or failures of mining operations	N/A
Increases to areas disturbed	N/A
New baseline environmental data	N/A
Reported to DEM?	N/A
Uncertainties table	N/A
15. Technical Reports	
Summary of technical data studies and reports generated in reporting period	YES
16. Forward Work Plan	
Action description	YES
Responsibility	YES
Proposed Completion Date	YES
17. Ministerial Determination Checklist	
This checklist	YES

Appendices A to H of Supporting Information

- Appendix A – Progress and Incident Reporting to Agencies
- Appendix B - Dust, Pest Insect, Odour, Noise
- Appendix C – Pond Water level and Salinity Monitoring
- Appendix D - Bunds and Seepage Drains
- Appendix E – Vegetation
- Appendix F – Licensed Water Discharges
- Appendix G – Water Bores
- Appendix H –Filling in G & H Rows

See also:

- Technical Data and Reports in the following OneHub Folders. These are accessible to those Government Agency staff who have been invited:
  - PEPR Revision 4 Documents (Approved): https://ws.onehub.com/folders/curom545
  - PEPR Revision 3 Documents (Approved): https://ws.onehub.com/folders/tznhcbn7
  - Documents provided to STAG (WHEN IN OPERATION), relating to progress and issues arising during the conduct of the Holding Pattern: https://ws.onehub.com/folders/xcjx6e4f
  - Ground Level Survey Information: https://ws.onehub.com/folders/xx6wob19
  - Acid Sulphate Soil Investigations: https://ws.onehub.com/folders/ykf4b3q7

Appendix A –Progress and Incident Reporting to Agencies

Incident Reports **1. Initial Report within 48 hrs of incident or complaint; subsequent reports per incident or complaint as agreed with DEM / EPA** **2. Reports to be referenced in the relevant register**	**Progress Reports** **1. Reports provided as per PEPR requirements or on request**
Dust, Pest Insect, Odour, Noise • Complaints • Results of investigations and actions to close out complaints *Pond Water Levels* • Any non-compliances with pond levels specified in the outcome measurement criteria reported to DEM • Progress reporting on remedial action taken as directed by DEM. *Vegetation* • Any unauthorized vegetation clearance reported to DEM • Progress reporting on remedial action taken as directed by DEM. *Licensed Water Discharges* • Any -exceedances of the outcome measurement criteria notified to DEM, EPA and PIRSA within 24 hours • Progress reporting on remedial action taken as directed by DEM, EPA or PIRSA.	• *For Inundated Ponds, graphs, and data for* o Water levels o Pumped entrainment rates o Pumped discharge rates o Water specific gravity and salinity • *For Licenced discharges, graphs, and data for salinity at:* o PA5 o The Bridge for the compliance locations for PA5 discharges to the SA Water Outfall o The Gawler River – the compliance location for XE6 discharges • *For filling for Rehabilitation and progress towards Closure in PM248* o Progress and compliance reports as agreed with DEM

Appendix B - Dust, Pest Insect, Odour, Noise

Following is the complaints register held by Buckland Dry Creek Pty Ltd

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
Odour from XC2S following high rainfall on 13 and February	1	20 Feb 2014	1. Bill Drew via EPA Tim Gubbin on 20 Feb 2014 2. 2 members of the community via a community meeting conducted by Jefferies, advised to Ridley by Tim Gubbin on 25 February 2014	21 Feb 2014	Nick Withers left phone messages with Bill	1. Email on 21 Feb to Bill Drew 2. Email on 22 Feb to Bill Drew 3. Meeting on 6 March with Bill Drew (1st available time) 4. 7 May 2014 - Meeting held with Bill Drew to: a) Brief him on actions to address the odours from pond XC2S and more generally; b) Also to get further feedback on what the odour situation has been like since the March meeting	1. Email to Tim Gubbin on 21 Feb re initial contact with Bill Drew 2. Investigation of causes initiated in week of 24 Feb, and comprises a) Sampling for chemical and biological testing to help assess opportunities to suppress odours b) Trial lowering of water level in the natural creek line and western trench to investigate ability to drain depressions in the ground surface outside these water filled bodies c) Qualitative observation and monitoring of odours and water levels / appearance d) Trial introduction of water from XC3 when this is possible to improve water quality in the natural creek line and western trench 3. Email on 24 Feb to EPA and DMITRE re date of planned meeting with Bill Drew 4. Report on status of investigations to STAG meeting on 6 March 5. Email on 13 March to EPA and DMITRE re notes of meeting with Bill Drew on 6 March 6. Report on status of investigations and communications with Complainant to STAG meeting on 20 March 7. Further updates provided to subsequent STAG Meetings Email to EPA and DSD on 10 June, with attachments, reported the investigations and the cause of the odours. It also reported the works to prevent recurrence, and also the engagement with the complainant, Bill Drew	10 June 2014	Email to EPA and DSD on 10 June, with attachments, reported the investigations and the cause of the odours. It also reported the works to prevent recurrence, and also the engagement with the complainant, Bill Drew. It is noted: • Bill expressed himself satisfied with our efforts. • No further odour complaints have been received in relation to the XC2 S incident. STAG was advised of the above at its next meeting subsequent to 10 June
Odour	2	10 October 2014	Bill Drew complained of a “acid” odour coming from XC2 on 04/10/14	10 October 2014	Telecon between Allan Mathieson and Bill Drew	1. Review wind directions for 4 October 2014 2. Review odour observations with site personnel who were in the area of XC2 on 4 October 2014. 3. AirQP commissioned to investigate: a. Get more specific information from Bill Drew b. Get BoM wind data for 4 October	1. Email to EPA on 14 October 2014. Email to EPA / DSD on 25 November 2014 with Air QP report	25 November 2014	No further complaints since this date STAG was advised of the actions to deal with the complaint above EPA acknowledged receipt of email of 25 November

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
						c. Review existing dust / odour diary data			
Odour	3	20 October 2014	Mark McCauley reports strong smell of (dynamic lifter	20 October 2014	Mark investigated this odour. The odour was strong in the St Kilda area between 5-10 pm. There was a light wind at the time. On further investigation the odour was found to emanate from SA Water Bio Solids area.	Wind conditions could be suitable for odour transmission in th early hours of Thursday and Sunday morning. The following investigations are planned to provided evidence as to the source: 1. Ridley will review the diarists records 2. Ridley will monitor and log the air quality at locations around the north end of PA6, between the suspected odour source in SA Water Bolivar and St Kilda. The monitoring will be early and late in the working day, 3. Ridley will obtain a record of the hourly wind direction and strengths at BoM Edinburgh 4. Ridley will set up the Odalog on east side of PA6, in a line between the suspected odour source in SA Water Bolivar and St Kilda. Ridley will collect and evaluate all the data from the above, and report on what it means	1. Email to EPA on 22 October Email to EPA / DSD on 25 November 2014 with Air QP report	25 November 2014	Odour likely from SA Water Bolivar not from XC2
		21 October 2014	Bill Drew and Lindsay Virgo, both odour dust registered residents have complained of a strong odour. Both describe is as the same odour as last night. Lindsay's email to Alan states " *Hi Allen, tonight at 6.00pm I experienced a bad smell similar to sewage/sulphur.* *The strength of the smell was strong, there was no wind evident.* *I have logged this on my report for Tracy, and also at Tracy's suggestion from her visit today, advised EPA.* *Had a phone call from Robyn Cook, who operates the Kiosk*	21 October 2014	Tracy Freeman, of AirQP met with the Odour / dust diarists during the day on 21 Oct to review the diary process. All St Kilda diarists – Lindsay, Kevin, Marylin reported the odour. Tracy suggested Lindsay report the odour to EPA. Allan Mathieson contacted Bill and Lindsay. in the evening of 21 October. At this stage it appears to be SA water bio solids.The smell is the bio solids mass heating up			25 November 2014	Odour likely from SA Water Bolivar not from XC2

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
			approx. 8.00pm to say that there was a terrible "sulphur like" smell reaching the kiosk. *Can you tell me whether water is supposed to be in the lagoon area to the left of St. Kilda road, as the sight of the dry beds is certainly not appealing, could this also be the origin of the smell in this warmer weather?* *Can you please contact me regarding this issue, either by return email, or mobile 0408829586.* *At the time of writing this email, the smell is still quite evident."*						
Dust	4	23 Feb 2015	Mr Robinson, Lot 2 Brookes Road. He complained to Council on about 3 February 2015. This complaint made its way through to EPA who alerted Ridley on 23 February	23 Feb 2015	Tracy Freeman (Air QP) contac ted Mr Robinson to clarify complaint	Allan Mathieson contacted Mr Robinson on **26 February 2015**: Actions so far are thus 1. Tracy has spoken with Mr Robinson to clarify his complaint 2. Allan has spoken with Mr Robinson 3. Tracy is investigating weather for the day(s) complained about and will be reporting to me on this 4. I have added this complaint to the register 5. I have sent Mr Robinson the link to the Ridley web page and document library Planned actions are: 1. When we have the report from Tracy, Allan and / or I will meet with Mr Robinson to explain the implications 2. Allan will in any case arrange to meet with Mr Robinson to show him the work we are doing to reduce quantities of wind blown dust exiting our site in his direction	1. Emails NJW and Allan Mathieson to EPA on 27 February 2015		

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
						3. We will by these means attempt to close out the complaint and record this **4 March 2015:** Allan Mathieson has spoken to Steve Robinson and informed him we intend to use dust suppression on the access road on Ridley site that are adjacent to his property. He also enquired about the local council (Playford) using the same dust suppressant on Brooks road which runs alongside his property. Steve told him he will send him the contact details for the council. Allan will suggest to council that they use the suppressant on Brooks road to alleviated the dust for nearby residents. Obtaining quotation for construction of windblown dust / soil trap (5m wide, 0.5m deep trench with spoil mounded on west side) along eastern bund of XC2. Works to be done over next 2 weeks approx. **17 March 2015** Draft report received from Tracy Freeman (Air QP). This being reviewed and will be transmitted to DSD / EPA Dust / Soil collection traps are being constructed along the eastern boundary of XC2, in particular opposite Steve Robinson's house. Further meeting will be held with Steve to show him these			
Dust	5	16 and 17 March 2015	Complaint received via media (Northern Messenger, ABC, Channel 7, Channel 9) news stories. Complain is about dust impacts on properties and horticultural crops on land east of XC2 and XC2E	16 and 17 March 2015	18 March Action Plan being implemented: • Investigation and Risk assessment started: ○ Meeting separately with a number of the complainants (regarded as being those living to east of XC2 and Xc2E) scheduled for 25 March to discsover their actual issues ○ Data on calsilt (from previous work by Penrice and others) sought from EPA ○ Golder instructed to provide initial letter of advice on	There has been periodic reporting to STAG, and provision of copies of reports of monitoring of XC2E (photos and observations of soil conditions) Ridley has investigated the technical feasibility of dust prevention measures. The outcomes are: 1. A plan is in preparation for a trial (under the PEPR) of turning XC2E into a depot for the production of a Calsilt /Recycled Timber Product	Email from NJW to DSD / EPA on 18 March 2015, advising the initial programme of work to implement the protocol set out in the PEPR to a. Contact and engage with the complainants b. Investigate the issues c. Identify an evidence based way to address the complaint d. Consult and engage with DSD and EPA, as well as the complainants to obtain support for the proposed way to address the complaint e. Address the complaint		

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
					potential risks from dusts by 28 March ○ Further Investigation and Risk assessment to be designed (in consultation with DSD and EPA) when we have assembled and reviewed the above and determine clear objectives. Observational Monitoring along E boundary of XC2E devised. Implementation commenced 20/3/15). Initial frequency is daily Communications • Initial meeting with complainants (see above). This will lead to further meetings • PR and Media consultant retained and briefed. Meeting next week to decide initial actions • We are accelerating the preparation of a planned document. a 1- 2 page factual information sheet on what we have learnt about dusts and odours from the Salt Fields over the summer – using facts from our monitoring programme and from our diary programme, as well as other information. Our intended audience for this document includes: The approximately 1000 letterboxes and post office boxes previously dropped when seeking volunteers for the diary programme 1. The diarists – we want them to see how their information has helped 2. The people who access the Ridley saltfield web page and its document library 3. STAG and government agencies, and through these Ministers and other politicians Dust Limitation and Prevention: • Dust interception mound / trench constructed in XC2, along E edge (see complaint 4) • Protocol devised for using results of observational monitoring and & day BoM weather forecast to further actions to further limit dusts.	Blend for reuse elsewhere in non-sensitive areas of the Salt Field. 2. Implementation of that plan would see XC2E occupied and with active dust prevention via water carts 3. A successful trail would see the slow removal of all calsilt from XC2E – thereby removing this dust source In respect of XC2, the ultimate solution is to find and implement a new use for this land . In the mean time it would appear that targeted watering is the most technically feasible method. A proposition is before the Ridley Board for approval.	f. Report on outcomes to the complainants and to DSD & EPA g. Close the complaint		

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
					• Work to identify and scope those further actions will start next week. Initial further actions involves triggered deployment of a water cart to dampen soil in dust prone areas of XC2E				
Dust	6	6 October 2015	Jayne Plummer / Bryant via EPA	5 and 6 October 2015	1. Telephone discussions and email / sms communications between Air QP (Ridley's Air Quality Advisor) and Jayne Plummer / Bryant; andf Steve Robinson on 5 and 6 October. Ridley Inspections and photos of XC2 and XC2E on 5 and 6 October. Those on 6 October in presence of Tim Gubbin of EPA	1. On 7 October 2015, Allan Mathieson met both Steve Robinson and Jayne Plummer / Bryant. A water cart with water cannon has been hired to water soils in XC2 from its eastern and western perimeter road	Telephone discussion between Ridley and DSD and Ridley and EPA on 7 October 2015 to discuss Ridley's response Email to DSD / EPA on 7 October 2015 with copy of this Register Based on investigations and also on discussions with EPA: 1. The source of the dust is dry fine grained sand and silt surface soils in XC2 and possibly also in XC1 2. The cause of the dust is high temperatures which caused further drying and strong N, NW, SW winds that entrained the soils in the air. 3. Dust that was entrained from Xc2E appears not to be calsilt but resuspension of dusts deposited from XC2 or XC1 4. Under the strong wind conditions the dust gets transported offsite and deposited on / in neighboring downwind properties.		
Dust	7	25 November 2015	Bill Drew / Jayne Bryant	25 November 2015	Tracy Freeman of Air QP organized to be on site this day to make own observations Bill Drew called NJW – to advise that he had contacted EPA and was filming the dust, which he described as bad. NJW committed to meeting with Bill in December.	Investigations / Monitoring on 25 November 2015 to be included in a future report: • Photos taken by Ridley • Air QP observations	1. NJW rang DSD (Ben Zammit) and EPA (Tim Gubbin). Tim was on his way to site to check conditions		
Dust	8	8th March 2017	Jayne Bryant	8th March 2017	Allan Mathieson rang Jane and discussed the issues with her. Allan offered to go and inspect the complainant's property. This offer was rejected by Jane Plummer/Bryant.	1. On the 8th march the property was inspected from the boundary of the property. 2. Photos were taken of the outer fencing. No dust was visible	There was no evidence of dust around or near the property. The complainant does not wish to communicate with BDC. And will not allow any BDC employees access to inspect the property. At this time there are no dust issues in or around the property. BDC has communicated this with DSD and EPA. Jayne now refuses to speak to any personnel from BDC.		

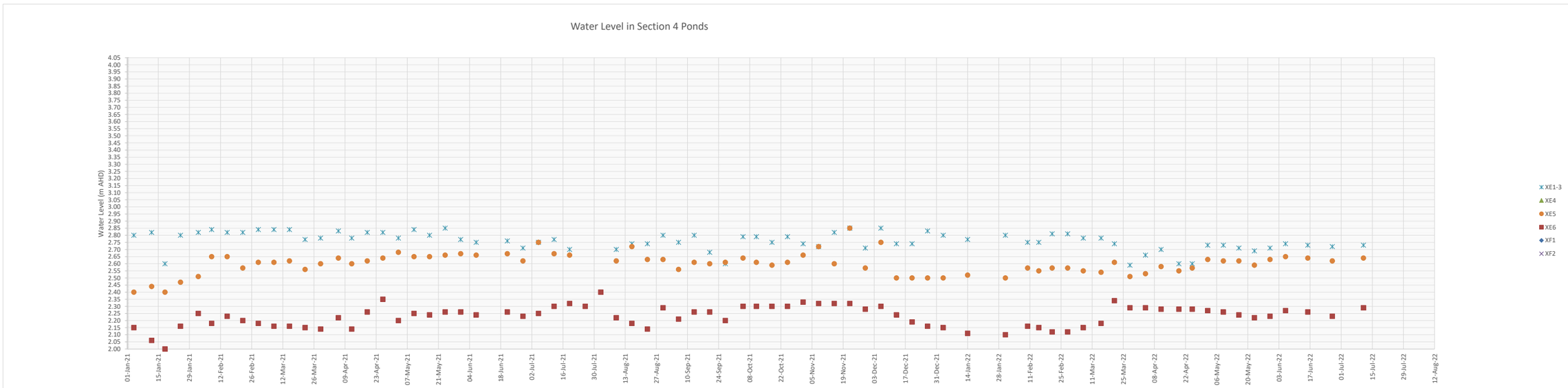
Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
Dust	9	2nd August 2017	Jayne Bryant/Plummer	3rd August 2017	1 Inspect the property and surrounding area for any evidence of dust or previous dust excursions from BDC property. 2 disseminate email chain surrounding Jayne's complaints. That were received on the 2nd August 2017 from Ross Stevens of DSD . The operator that was working in that area on Saturday the 29th August has a signed report that no dust was evidenced in or around the Brooks road area. There is an operator in the field 7 days a week that reports any issues with a very high priority placed on reporting conditions in and around the Brooks road area of the Salt filed	3rd August 2017. Visit the property and inspect the surrounding area. Take photos of conditions in and around XCC2E Brooks road Ryan's road. Correspond via email to the complainant and offer to communicate on any level regarding any issues they may have.	Due to the very wet nature of the past week the likely hood of dust from any part of BDC property is extremely remote. Wind conditions at the time of the complaint 10.00 am 29th august 2017 were high however there was .2 mm of rain on 27th July and 2.4 mm of rain on the 28th July 2017. The very damp conditions would prevent dust from any of the condenser areas as evidenced by the photos taken.		
Dust	10	14th March 2018	Jayne Bryant /Ross Stevens	14th March 2018	BDC received a n email from ross Stevens of a dust complaint. There was no date to the complaint BDC found it difficult to determine the cause of the dust due to the lack of a date.	1. On the 14th march the property was inspected from the boundary of the property. 2. Photos were taken of the outer fencing. No dust was visible	There was no evidence of dust around or near the property. The complainant does not wish to communicate with BDC. And will not allow any BDC employees access to inspect the property. At this time there are no dust issues in or around the property. The weather site is inspected daily and there was no reports of dust from the salt fields at or around the time of this email. BDC has communicated this with DSD and EPA. Jayne now refuses to speak to any personnel from BDC.		
							The weather conditions on that during that time were investigated as a possible cause of dust plumes no conclusive evidence of dust from emanating form the salt field was noted o Not knowing what time of day or other factors surrounding this complaint I have on receipt of the dust complaint investigated the area surrounding Brooks road. The only dust that was visible was created by passing motor vehicles. The reporting system for dust has not been triggered this year. The weather patterns for the area around Brooks road. The mean averages for weather conditions 1st January 2018 to 14th March 2018 demonstrate typical weather conditions. The mean averages for wind in January February and March to date show, no abnormal wind conditions.		

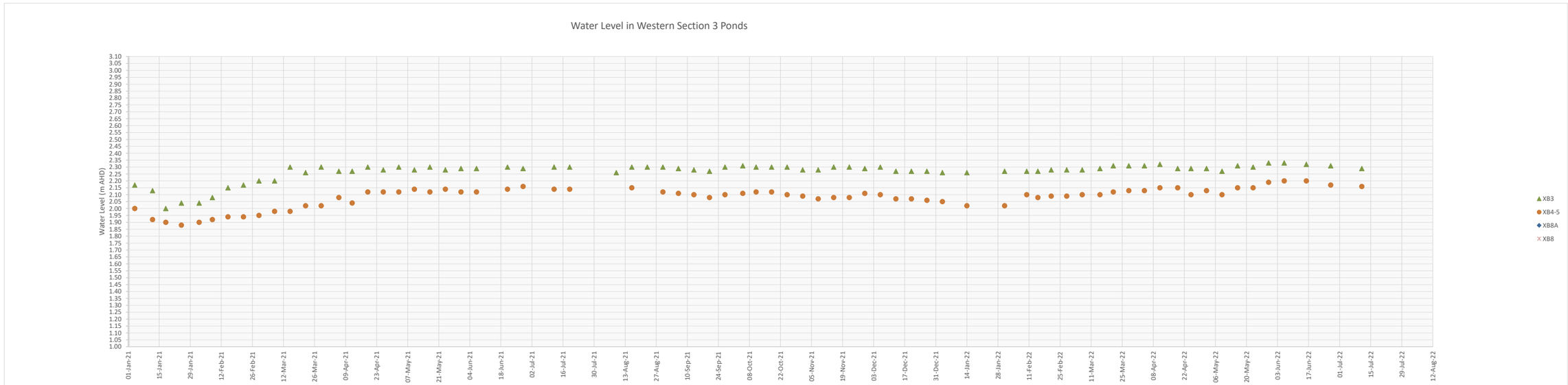
Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
							The Operator in their daily report have indicated no issues with dust in and around the Brooks road area. That report on weather conditions in and around Brooks road is conducted every day of the year. I have enclosed 8 pictures taken at 10 am 14/03/18 • Picture 1 demonstrates there is no dust • Picture 2 shows a white type of soil used on the road surface • Picture 3 Shows the dust created by a passing truck • Picture 4 shows the dust created by a passing truck • Picture 5, 6, 7 and 8 shows tyre marks from vehicles doing burnouts and skidding around that section of road in picture 2 (white type sop soil) this is directly opposite Janes home. Photos available on request		
Dust	12	11/09/18	Jayne Plummer	11/09/18	Inspect site for dust from Calsilt stockpile at 12.05 pm took photos at the intersection of Ryan's road and Brooks road There was no evidence of dust from the Calsilt. This was also confirmed by an operator that was working on the Northern irrigation Scheme development that there was no evidence of dust from the Calsilt, despite the very strong winds was also evidenced by silt stockpiles one hour prior to the complaint being received	Sent Ross Stevens (DEM) images and details of wind speed and dust in the area at 12.15 pm There were large plumes of dust being blown across Adelaide from the Northern plains. At times making the Adelaide hills invisible.	Sent images and details via text and telephone message to Ross Stevens. The wind was gusting at the 12.05 up to 64 km/h, that there was no evidence of dust from the Calsilt. Received return text message from Ross Stevens indicating would catch up on Thursday at a prearranged meeting to discuss the complaint.	This complaint appears to be inaccurate. Rain fell in the area from 2.20 pm	
Dust	13	8/10/18	Jayne Plummer	8/10/18	The brine operator was on site in XE2E no dust he arrived at the middle beach pumps and the wind had strengthened. He also noted large plumes of dust from surrounding paddocks. He then went back to Ryans road brooks road intersection and inspected the Calsilt sock piles for dust and noted that there was no sign of dust at 11.30 am.	I communicated this to Ross Stevens of DEM It was also noted that large volumes of rain fell on Saturday night at St Kilda and with that amount of moisture on the Calsilt it is not possible for the Calsilt to cause a dust issue.	I communicated this to Ross Stevens of DEM	This complaint appears not to be accurate .	
Noise /Environmental impacts of the pump operations	14	12/10/18	Sharon Bais	12/10/18	There was a noisy pump at Middle Beach. This pump had already been targeted to be removed from service. The complaint re: Middle beach pumps reducing water level in and around the Middle beach boat ramp are not valid.	I informed Ross that the pump will be out of service from the 16/10/18 and it was removed from service on that date	I communicated this to Ross there is another pump now servicing the condensers XE1-3	The noise was greatly reduced to a level that is no longer a nuisance to local residences	Pump removed from service
Noise	15	29/10/18	Phil Church	29/10/18	The noise from reversing heavy vehicles alarms. Noise from pile driving from the remediation of H row	There is no pile driving works at H row Lend lease maybe doing that type of activity during the night. this is unclear at this time. The	I have sent this information to Ross Stevens 01/11/18	The noise will abate over time.	Working the area of Pt wakefield and Globe Derby drive corner has reduced and moved

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
						reversing beeper cannot be heard above the high traffic on Port Wakefield road during the day. They are however a legal requirement for heavy earthmoving equipment on a building site, and there fore they must be in place. As the development /trial moves' further south the noise level will decrease. There is very little discernable noise from machinery that is 400-500 meters from the resident in question			further south by several hundred meters
Dust	16	1/11/18	Jayne Plummer	01/11/18	Dust complaint from the 31st October received on the 01/11/18 Calsilt area the complainant stated yet another day of winds and dust. Not sure why this is being referred to BDC as the email seem unspecific. I believe the department has become very reactive to this complainant	Winds and the brine operators' evidence do not indicate any dust issuing from the Calsilt area	I have sent this information to Ross Stevens 01/11/18	Unreliable evidence of dust emanating from BDC	
Dust	17	09/01/19	Bill Drew	09/01/19	On receiving the complaint, I investigated wind speed and direction and discussed with the brine operator who inspected the site at 2.30 pm and noted that there was some evidence of dust however to was blowing southerly away from the direction of Bill drew and other houses in the direction of Jefferies	Onsite inspection being carried out	Reported to Ross Steven the findings of the investigation and provided photo graphic evidence.	10/01/19	
Dust	18	17/01/19	Mr Van, 112 Sanctuary Drive, Mawson Lakes	16/01/19	Complaint made by phone on 16 January and Mr Van was told that after investigating truck and machinery movements, he would receive a call back the next day. Wind speed and direction was reviewed and discussed with the civil operator. Rang the complainant on 17 January and left message with findings of investigation.	Onsite inspection being carried out. Increase use of water carts mainly due to the extreme heat conditions. On Thursday I spoke to the civil supervisor on site and asked that further steps be taken to control daytime and night-time dust. He made arrangements for the night-time truck turn-around area to be better wetted down and the ground surface to be better compacted to prevent break-up and dust generation. He reported to me today that last night's tipping work had reduced significantly dust from the truck turn-around movements. He also said that the water carts will spend more time wetting down trafficable areas in both the ballast laying area and the filling area. The net effect is a great reduction in dust generation.	Reported to Ross Steven the findings of the investigation. Also advised Salisbury Council on 19 February 2019 about dust complaint and steps taken to control dust.	21/01/19	Extra water carts in extreme heat conditions he complainant has stated that there is no longer an issue with dust from BDC and he declined a visit from our civil engineer 06/02/19

Complaint type (Dust , Odour, Noise, Pest Insects, Other)	Complaint No	Date complaint received	Complainant & Complaint	Date of Initial Response	Initial Response	Further Response / Communications (with dates)	Reporting to DEM / EPA • Investigation of Causes • Communications with complainant	Complaint closure date	Mode of Complaint Closure
Debris on site	19	6 May 2019	Mr Peter Virgin	16/05/19	Complaint handled by EPA initially and then forwarded to BDC on 8 May 2019. Inspected area for debris on 9 May 2019 and commenced two days of hand picking along Port Wakefield Road frontage amongst trees and vegetation.	Further picking of plastic along roadside verge in first two weeks of June 2019.	Formal response provided to Ross Stevens on 13 June 2019 for his forwarding to complainant.	13 June 2019	All debris that was wind born removed
Dust	20	19 May 2019	Resident of Hindmarsh Cct, Mawson Lakes	19 May 2019	Inspect operations for dust potential.	Maintain water cart wetting of haul roads until winter rains arrive	Email to Ross Stevens 22 May 2019	22 May 2019	Ross Stevens arranged a site inspection for the subsequent week. He was happy with site management practices including relating to dust control.
Dust and debris on road	21	April 2021	Lisa, Trotter Dr, Globe Derby Park	8 April 2021	Met with landowner to discuss issue and options for controlling dust	Concrete works were undertaken in late April on swept area of truck exit from site to Globe Derby Drive. BDC made follow-up discussion with landowner in early May, who expressed her satisfaction that the matter was resolved.	Email to Ross Stevens 4 May 2021	4 May 2021	Ross acknowledged the outcome on 4 May 2021
Mosquitos	22	February 2022	Via DEM – complainant not specified	18 Feb 2022	Inspected low-lying areas along Port Wakefield Rd	Provided written response to DEM outlining site status and distances to nearest residences	Email to Ross Stevens 18 Feb 2022	18 Feb 2022	Ross satisfied with response and would pass on to complainant and inspect area in forthcoming week or two
Bund condition	23	30 June 2022	Adelaide University / DEM	7 July 2022	Inspected the bund between XB8 and XB8A and formulated options to improve its condition	Regular inspections and reports to DEM indicating bund condition following adverse weather events	Reports	28 July 2022	June 2024 close-out report sets out bund improvement works undertaken
Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023	Nil Complaints for FY 2022-2023
Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024	Nil Complaints for FY 2023-2024

Appendix C – Pond Water Level & Salinity Monitoring


Water Level in Section 4 Ponds
Water Level (m AHD)
4.05
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
01-Jan-21
15-Jan-21
29-Jan-21
12-Feb-21
26-Feb-21
12-Mar-21
26-Mar-21
09-Apr-21
23-Apr-21
07-May-21
21-May-21
04-Jun-21
18-Jun-21
02-Jul-21
16-Jul-21
30-Jul-21
13-Aug-21
27-Aug-21
10-Sep-21
24-Sep-21
08-Oct-21
22-Oct-21
05-Nov-21
19-Nov-21
03-Dec-21
17-Dec-21
31-Dec-21
14-Jan-22
28-Jan-22
11-Feb-22
25-Feb-22
11-Mar-22
25-Mar-22
08-Apr-22
22-Apr-22
06-May-22
20-May-22
03-Jun-22
17-Jun-22
01-Jul-22
15-Jul-22
29-Jul-22
12-Aug-22
XE1-3
XE4
XE5
XE6
XF1
XF2


Water Level in Western Section 3 Ponds
Water Level (m AHD)
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
01-Jan-21
15-Jan-21
29-Jan-21
12-Feb-21
26-Feb-21
12-Mar-21
26-Mar-21
09-Apr-21
23-Apr-21
07-May-21
21-May-21
04-Jun-21
18-Jun-21
02-Jul-21
16-Jul-21
30-Jul-21
13-Aug-21
27-Aug-21
10-Sep-21
24-Sep-21
08-Oct-21
22-Oct-21
05-Nov-21
19-Nov-21
03-Dec-21
17-Dec-21
31-Dec-21
14-Jan-22
28-Jan-22
11-Feb-22
25-Feb-22
11-Mar-22
25-Mar-22
08-Apr-22
22-Apr-22
06-May-22
20-May-22
03-Jun-22
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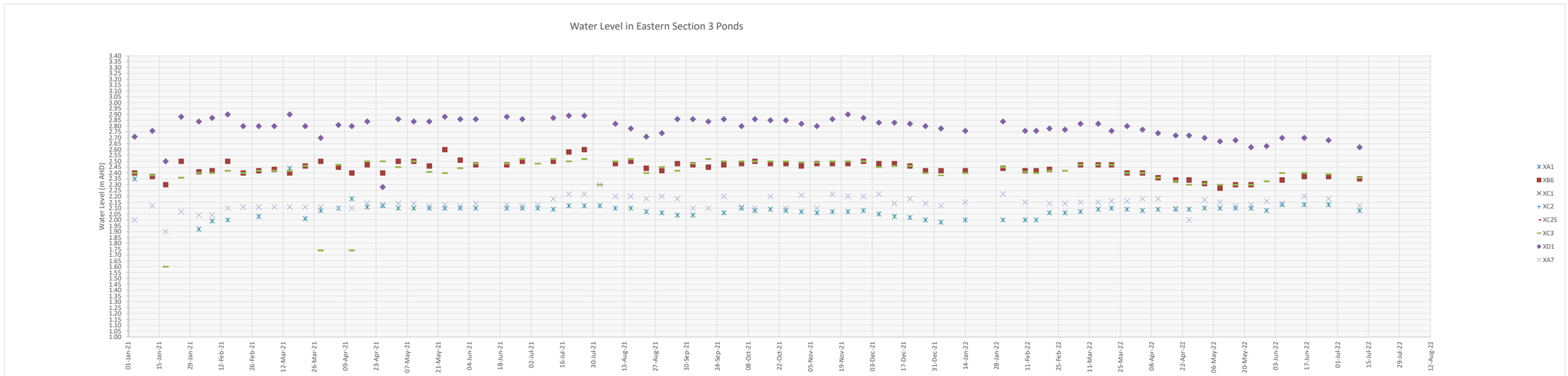
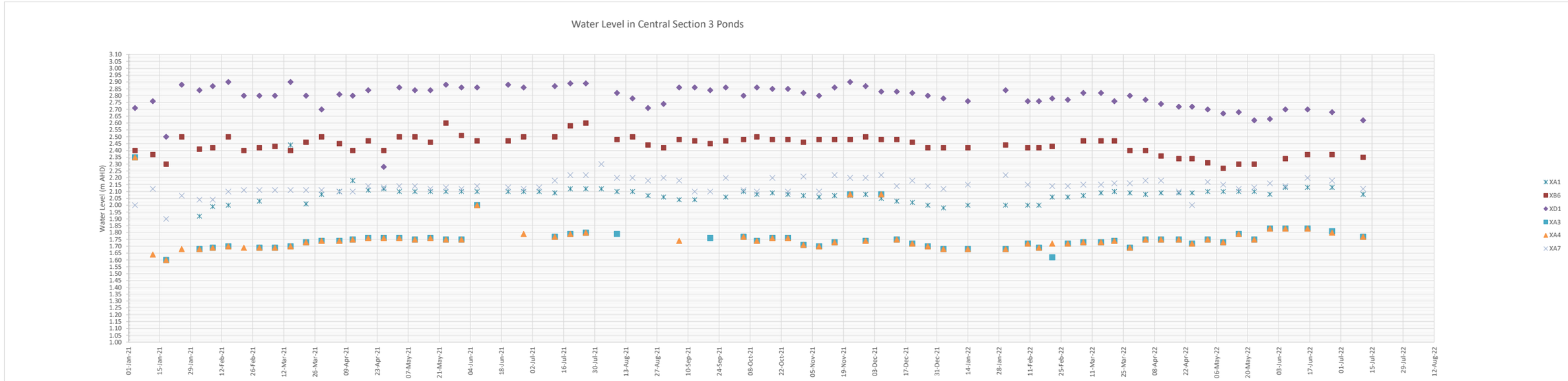
XB3
XB4-5
XB8A
XB8


Water Level in Eastern Section 3 Ponds
Water Level (m AHD)
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
01-Jan-21
15-Jan-21
29-Jan-21
12-Feb-21
26-Feb-21
12-Mar-21
26-Mar-21
09-Apr-21
23-Apr-21
07-May-21
21-May-21
04-Jun-21
18-Jun-21
02-Jul-21
16-Jul-21
30-Jul-21
13-Aug-21
27-Aug-21
10-Sep-21
24-Sep-21
08-Oct-21
22-Oct-21
05-Nov-21
19-Nov-21
03-Dec-21
17-Dec-21
31-Dec-21
14-Jan-22
28-Jan-22
11-Feb-22
25-Feb-22
11-Mar-22
25-Mar-22
08-Apr-22
22-Apr-22
06-May-22
20-May-22
03-Jun-22
17-Jun-22
01-Jul-22
15-Jul-22
29-Jul-22
12-Aug-22
XA1
XB6
XC1
XC2
XC25
XC3
XD1
XA7


Water Level in Central Section 3 Ponds
Water Level (m AHD)
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
01-Jan-21
15-Jan-21
29-Jan-21
12-Feb-21
26-Feb-21
12-Mar-21
26-Mar-21
09-Apr-21
23-Apr-21
07-May-21
21-May-21
04-Jun-21
18-Jun-21
02-Jul-21
16-Jul-21
30-Jul-21
13-Aug-21
27-Aug-21
10-Sep-21
24-Sep-21
08-Oct-21
22-Oct-21
05-Nov-21
19-Nov-21
03-Dec-21
17-Dec-21
31-Dec-21
14-Jan-22
28-Jan-22
11-Feb-22
25-Feb-22
11-Mar-22
25-Mar-22
08-Apr-22
22-Apr-22
06-May-22
20-May-22
03-Jun-22
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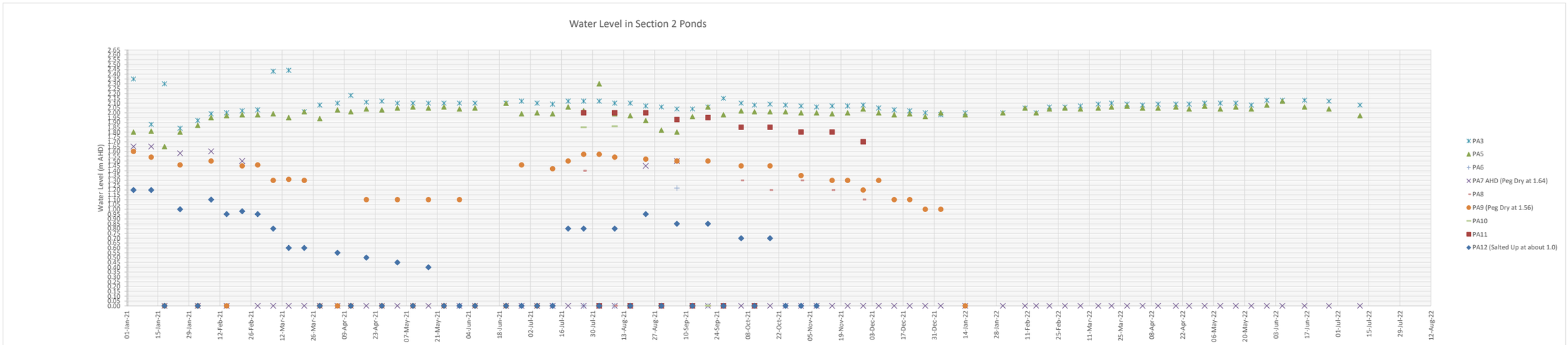
12-Aug-22
XA1
XB6
XD1
XA3
XA4
XA7


Water Level in Section 2 Ponds
Water Level (m AHD)
PA3
PA5
PA6
PA7 AHD (Peg Dry at 1.64)
PA8
PA9 (Peg Dry at 1.56)
PA10
PA11
PA12 (Salted Up at about 1.0)
01-Jan-21
15-Jan-21
29-Jan-21
12-Feb-21
26-Feb-21
12-Mar-21
26-Mar-21
09-Apr-21
23-Apr-21
07-May-21
21-May-21
04-Jun-21
18-Jun-21
02-Jul-21
16-Jul-21
30-Jul-21
13-Aug-21
27-Aug-21
10-Sep-21
24-Sep-21
08-Oct-21
22-Oct-21
05-Nov-21
19-Nov-21
03-Dec-21
17-Dec-21
31-Dec-21
14-Jan-22
28-Jan-22
11-Feb-22
25-Feb-22
11-Mar-22
25-Mar-22
08-Apr-22
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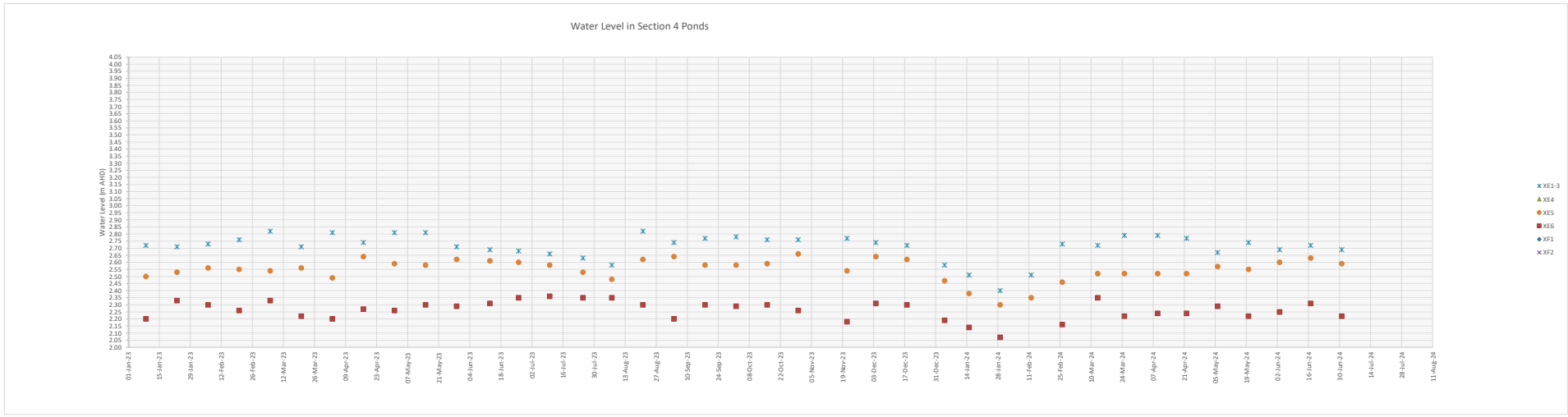
29-Jul-22
12-Aug-22


Water Level in Section 4 Ponds
Water Level (m AHD)
4.05
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
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3.45
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2.15
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01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
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26-Mar-23
09-Apr-23
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03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
28-Jan-24
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
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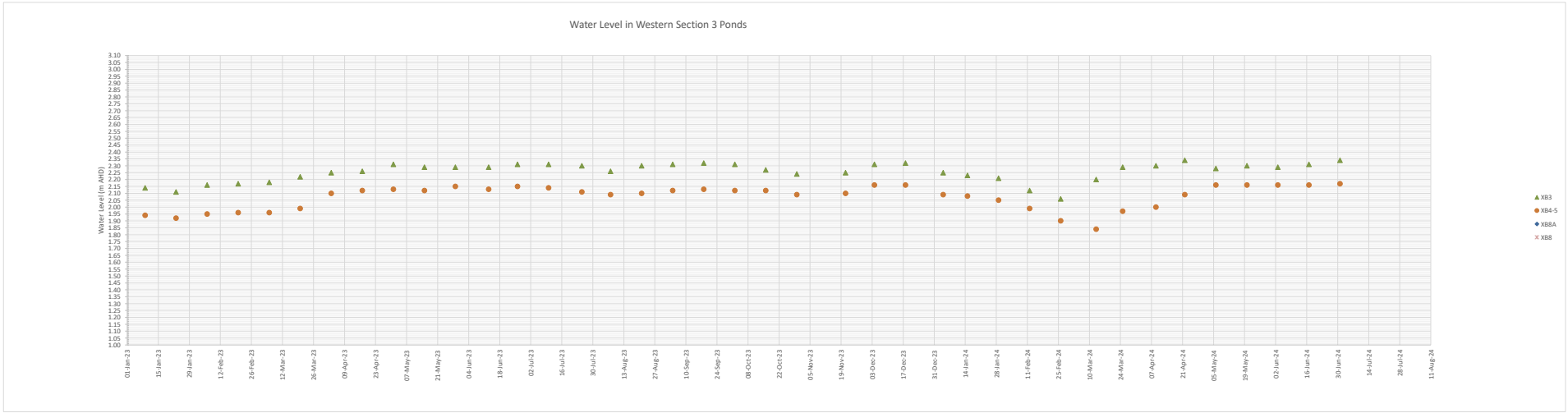
XE6
XF1
XF2


Water Level in Western Section 3 Ponds
Water Level (m AHD)
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
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2.25
2.20
2.15
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2.05
2.00
1.95
1.90
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1.75
1.70
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1.50
1.45
1.40
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1.30
1.25
1.20
1.15
1.10
1.05
1.00
01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
12-Mar-23
26-Mar-23
09-Apr-23
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07-May-23
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04-Jun-23
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05-Nov-23
19-Nov-23
03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
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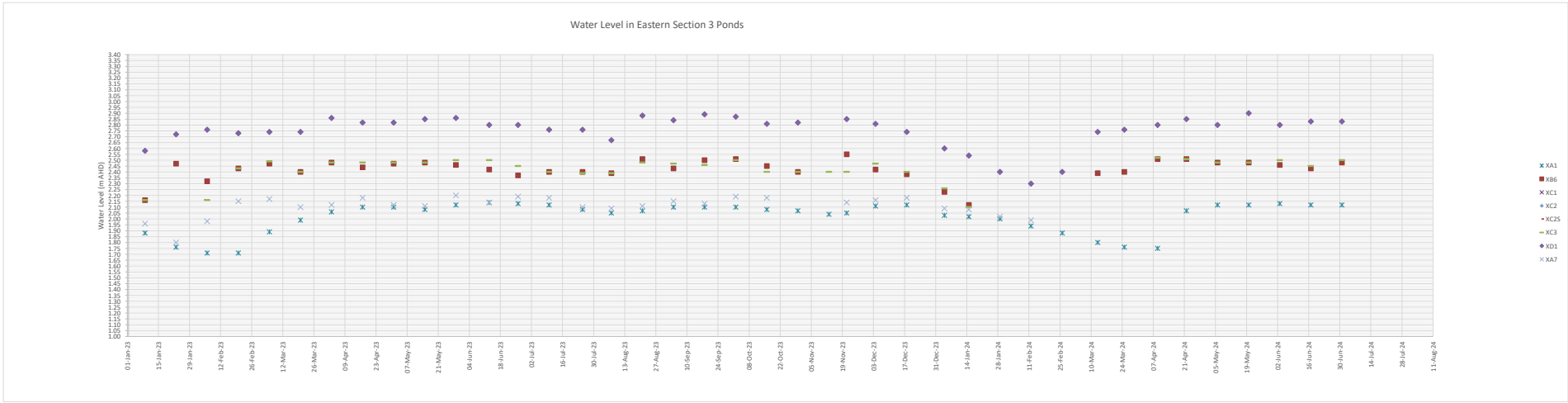
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
03-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
XB3
XB4-5
XB8A
XB8


Water Level in Eastern Section 3 Ponds
Water Level (m AHD)
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
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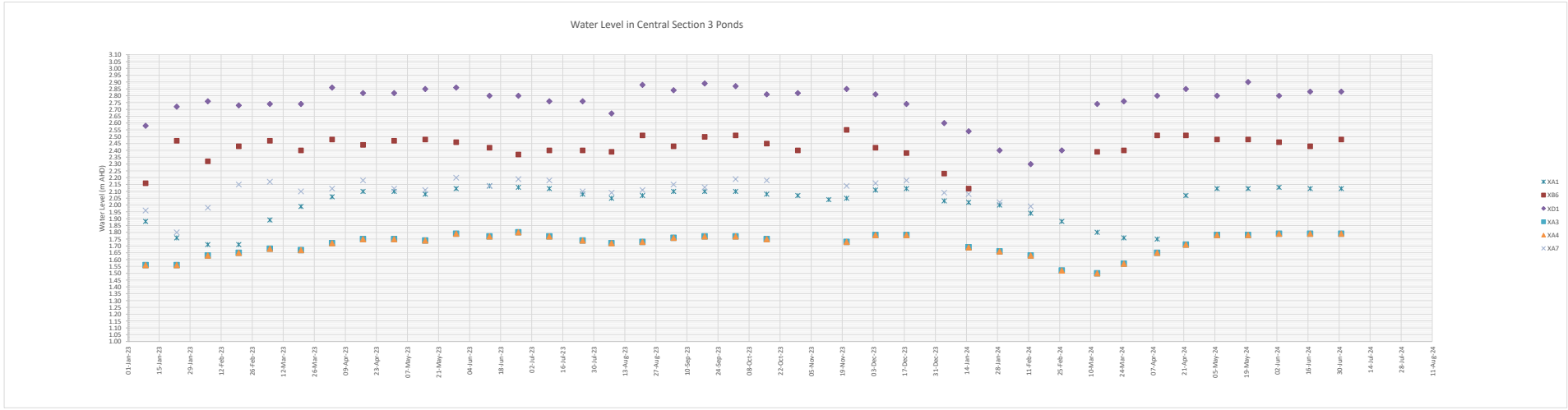
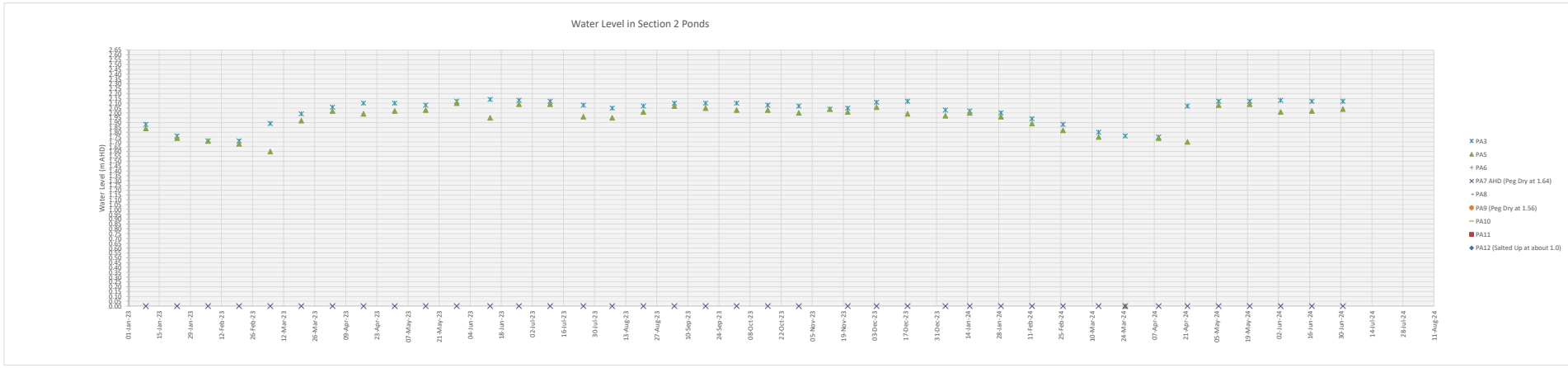
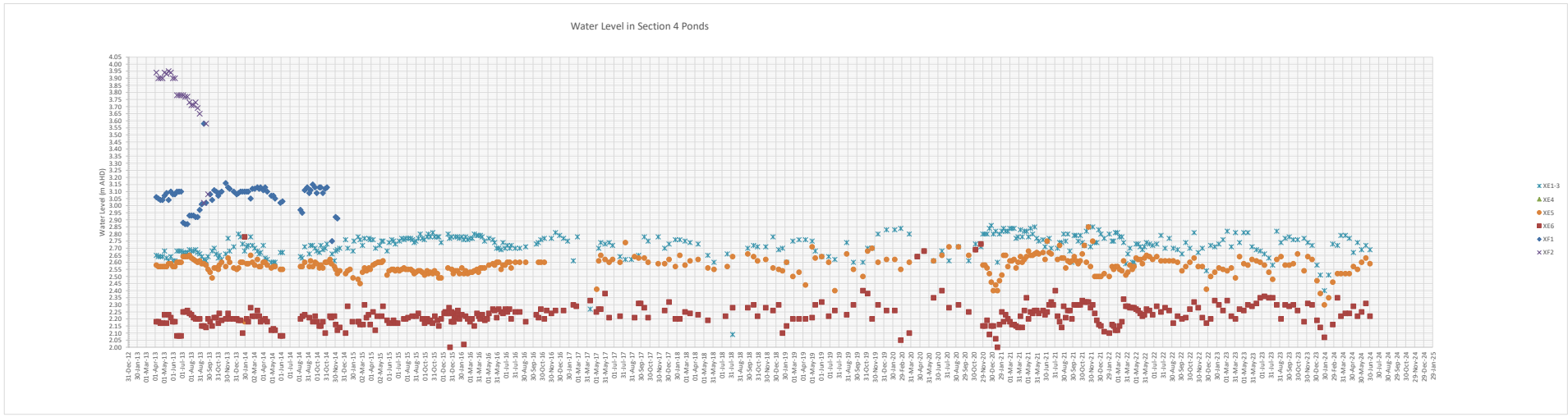
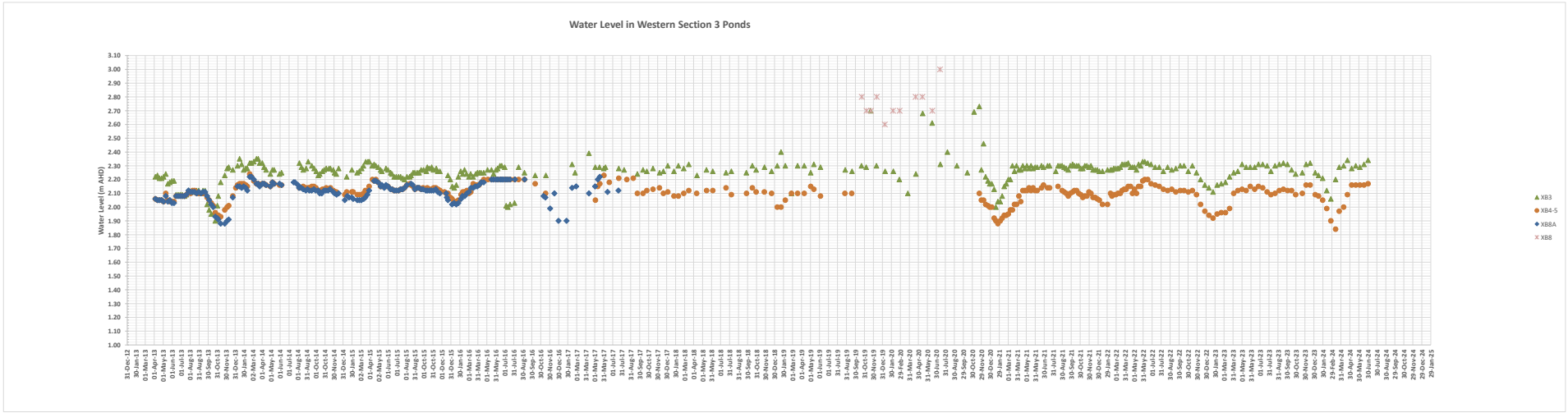
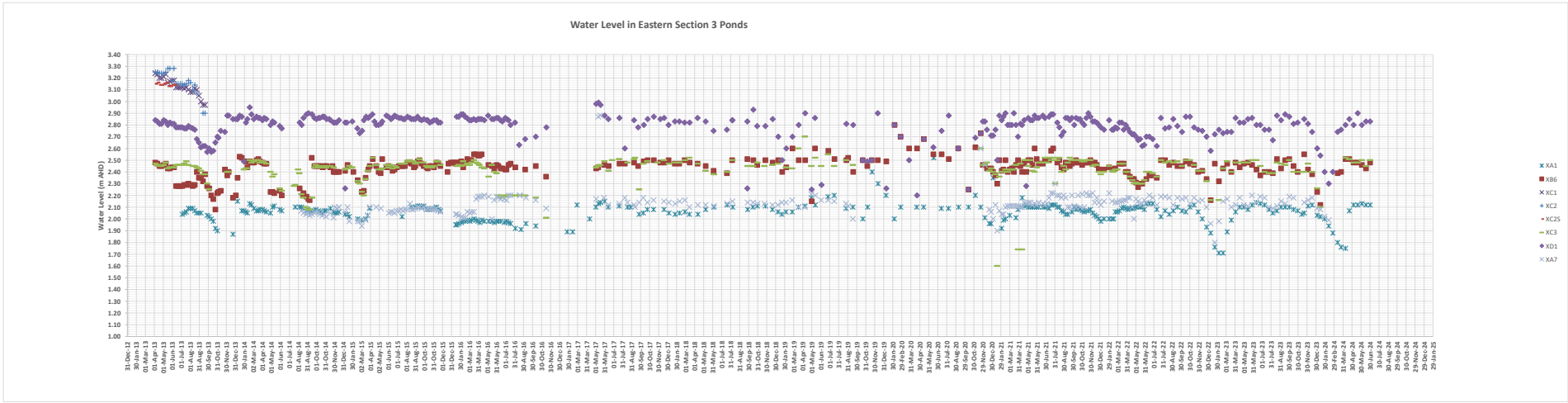
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
XA1
XB6
XC1
XC2
XC2S
XC3
XD1
XA7

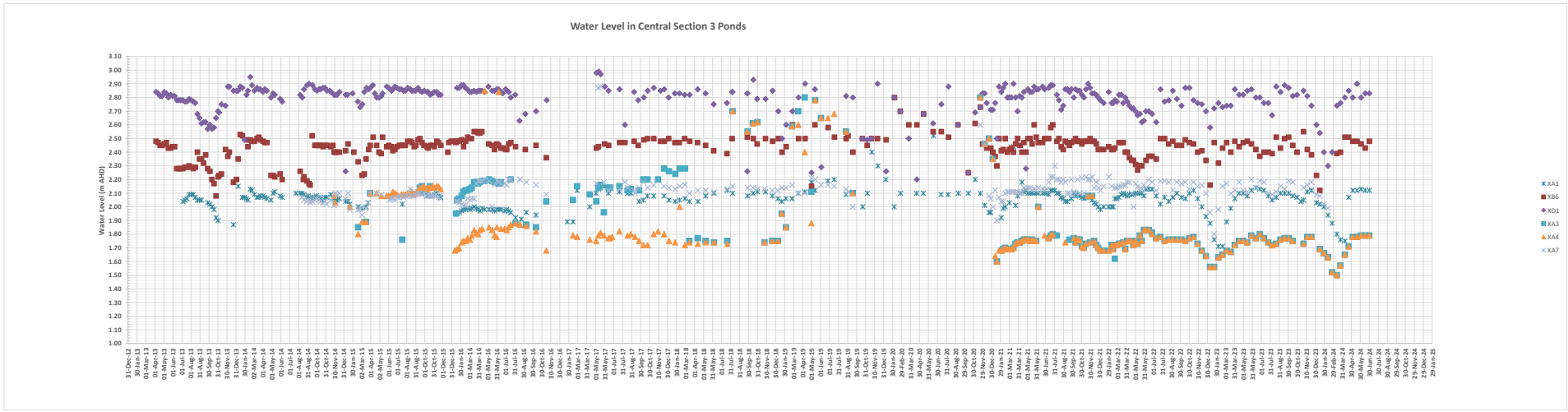

Water Level in Central Section 3 Ponds
Water Level (m AHD)
3.10
3.05
3.00
2.95
2.90
2.85
2.80
2.75
2.70
2.65
2.60
2.55
2.50
2.45
2.40
2.35
2.30
2.25
2.20
2.15
2.10
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
1.35
1.30
1.25
1.20
1.15
1.10
1.05
1.00
01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
12-Mar-23
26-Mar-23
09-Apr-23
23-Apr-23
07-May-23
21-May-23
04-Jun-23
18-Jun-23
02-Jul-23
16-Jul-23
30-Jul-23
13-Aug-23
27-Aug-23
10-Sep-23
24-Sep-23
08-Oct-23
22-Oct-23
05-Nov-23
19-Nov-23
03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
28-Jan-24
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
XA1
XB6
XD1
XA3
XA4
XA7

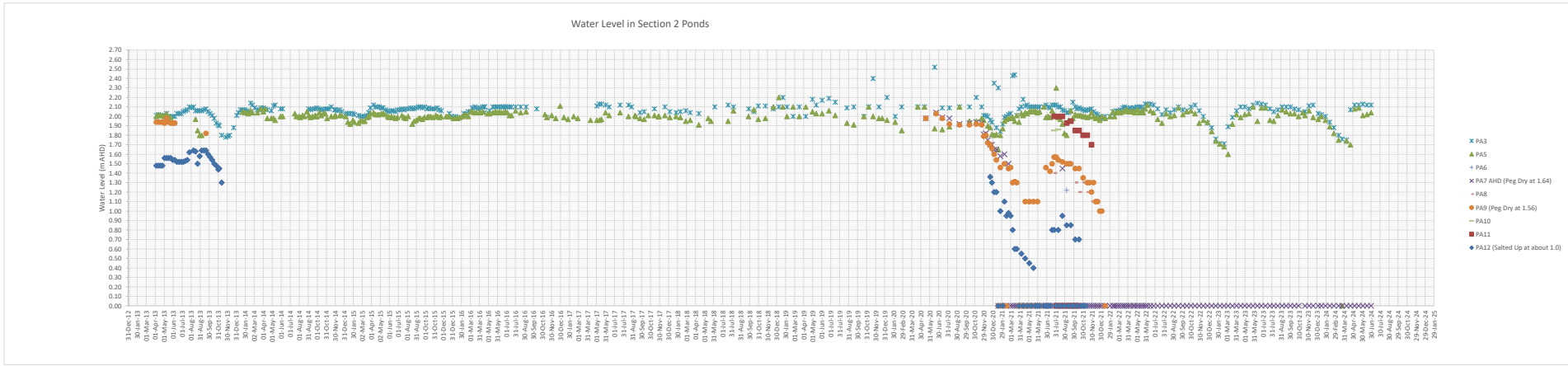

Water Level in Section 2 Ponds
Water Level (m AHD)
01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
12-Mar-23
26-Mar-23
09-Apr-23
23-Apr-23
07-May-23
21-May-23
04-Jun-23
18-Jun-23
02-Jul-23
16-Jul-23
30-Jul-23
13-Aug-23
27-Aug-23
10-Sep-23
24-Sep-23
08-Oct-23
22-Oct-23
05-Nov-23
19-Nov-23
03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
28-Jan-24
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
PA3
PA5
PA6
PA7 AHD (Peg Dry at 1.64)
PA8
PA9 (Peg Dry at 1.56)
PA10
PA11
PA12 (Salted Up at about 1.0)

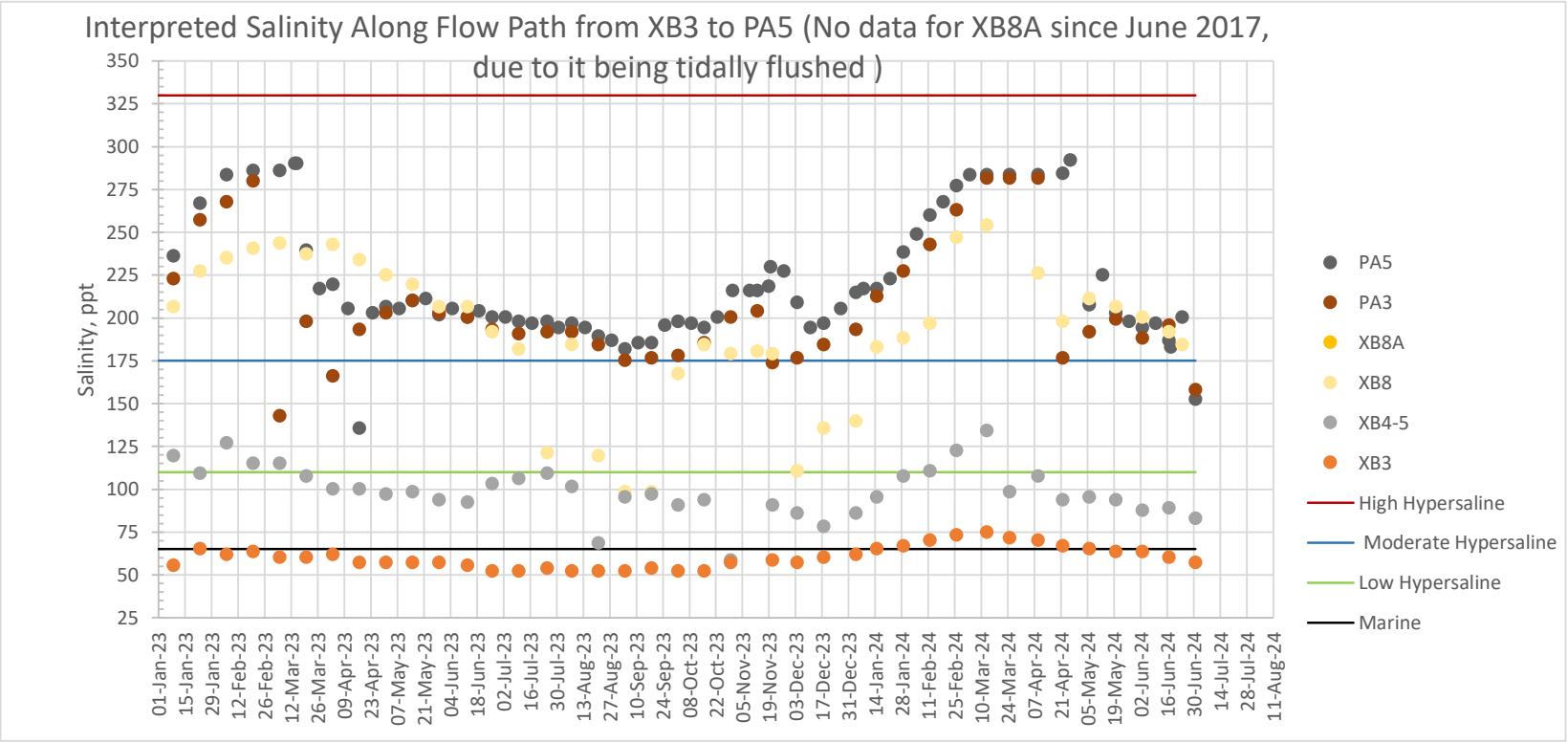

Water Level in Section 4 Ponds
Water Level (m AHD)
XE1-3
XE4
XE5
XE6
XF1
XF2


Water Level in Western Section 3 Ponds
Water Level (m AHD)
XB3
XB4-5
XB8A
XB8

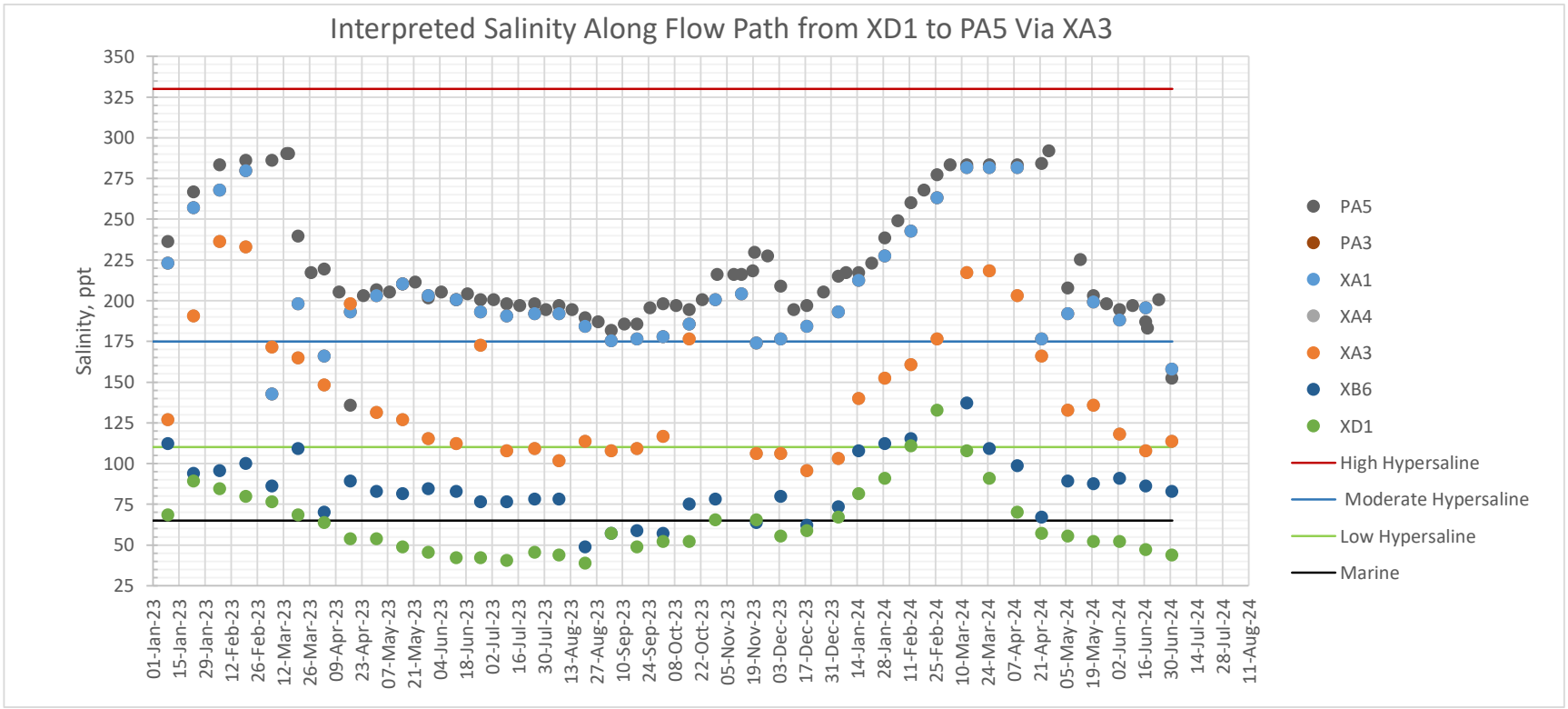

Water Level in Eastern Section 3 Ponds
Water Level (m AHD)
XA1
XB6
XC1
XC2
XC2S
XC3
XD1
XA7


Water Level in Central Section 3 Ponds
Water Level (m AHD)
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
XA1
XB6
XD1
XA3
XA4
XA7

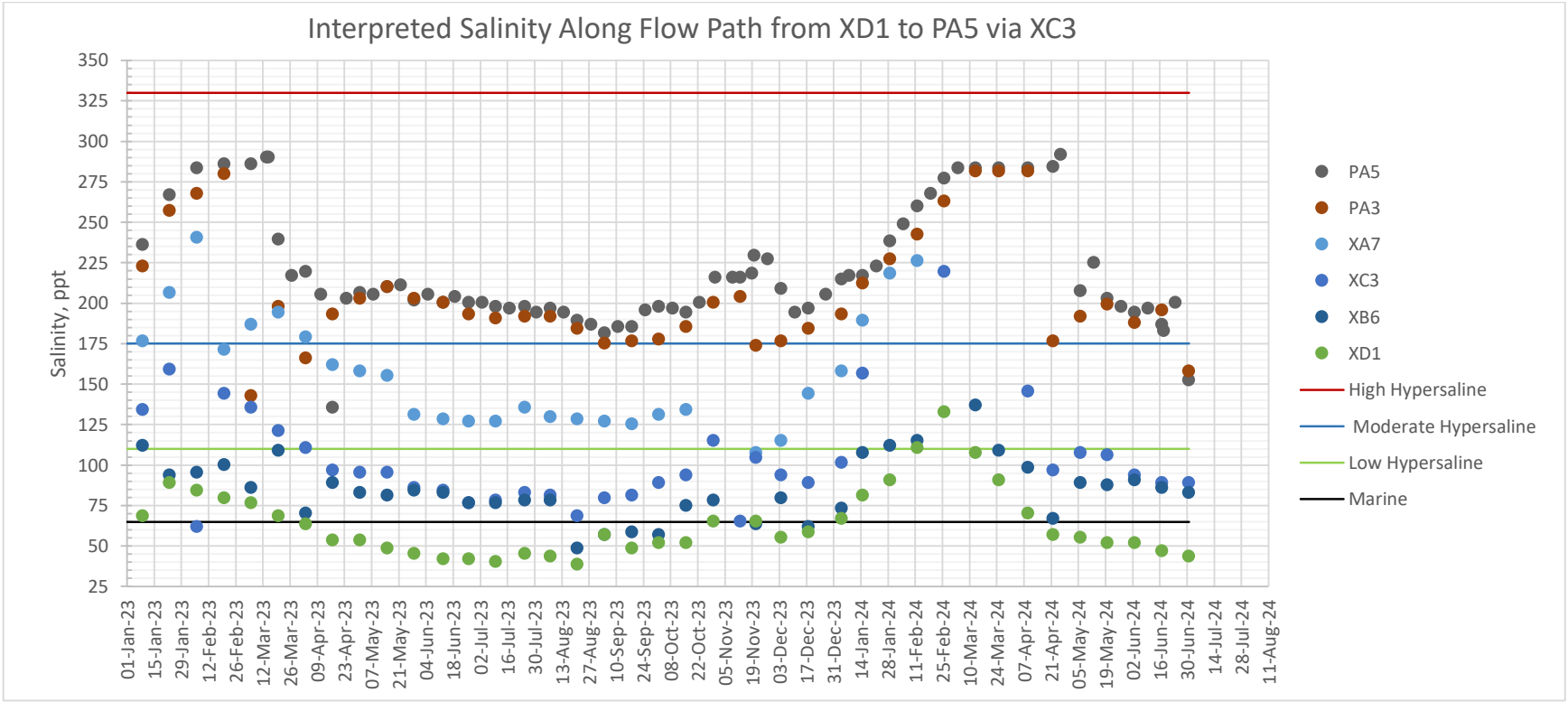

Water Level in Section 2 Ponds
Water Level (m AHD)
PA3
PA5
PA6
PA7 AHD (Peg Dry at 1.64)
PA8
PA9 (Peg Dry at 1.56)
PA10
PA11
PA12 (Salted Up at about 1.0)



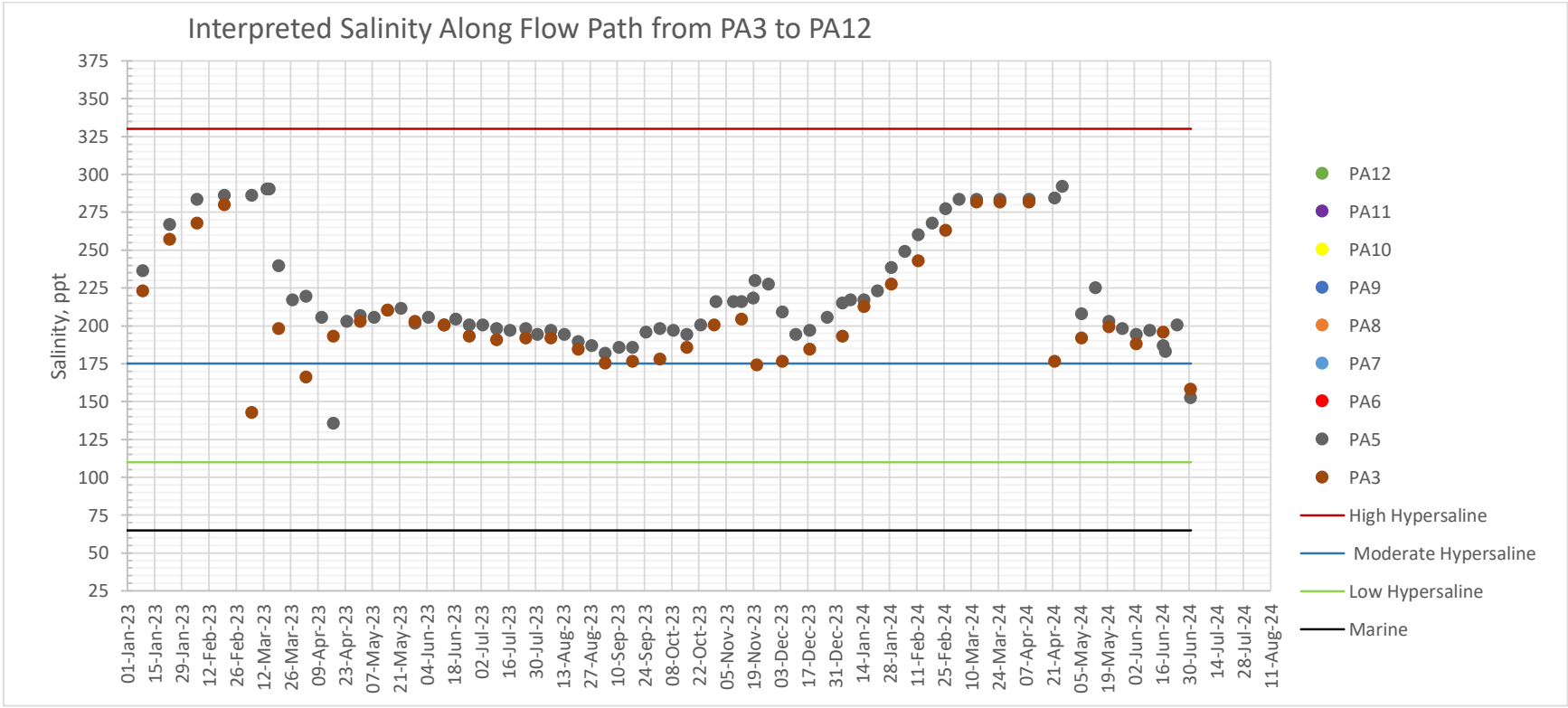
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

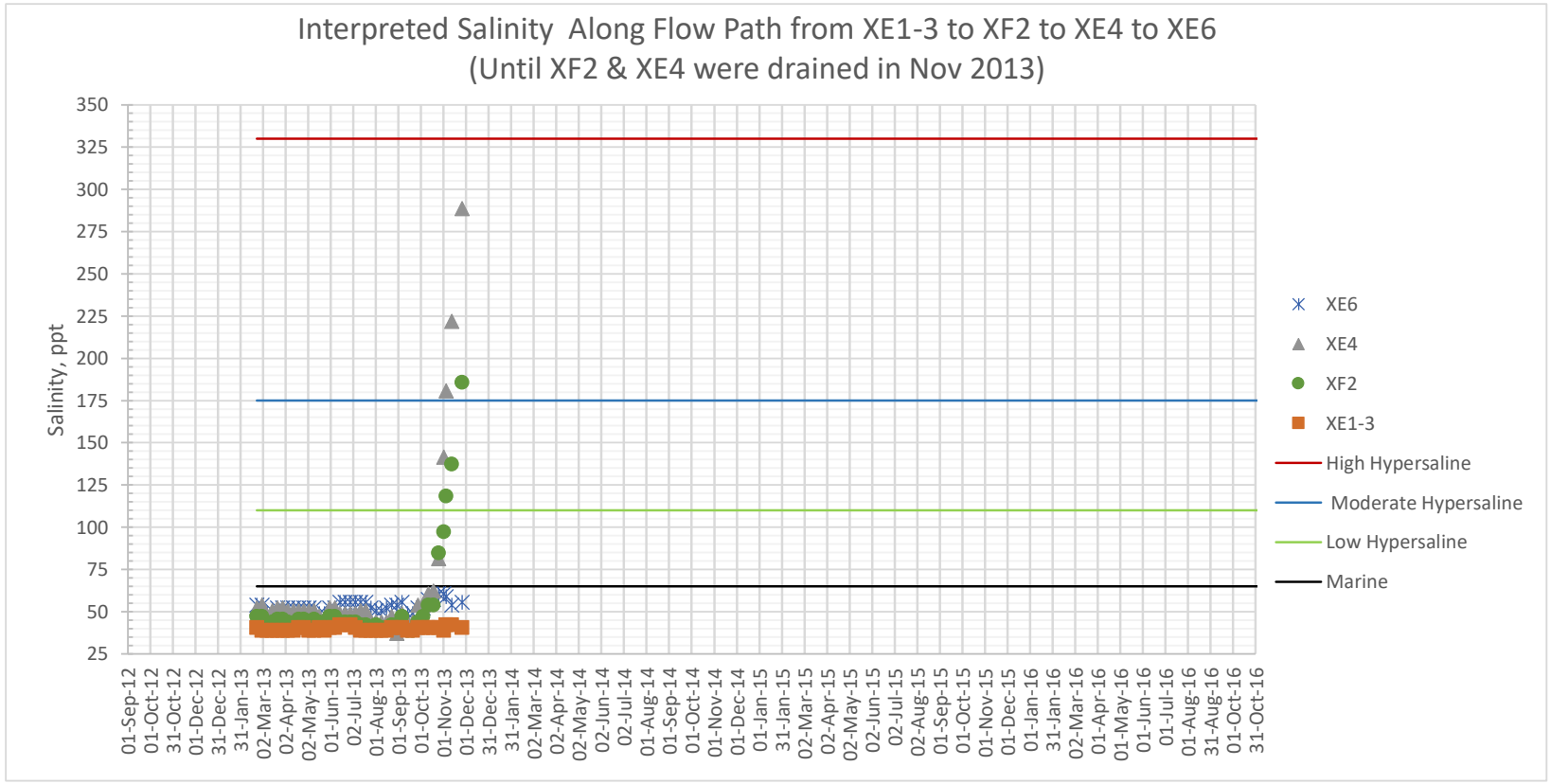


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

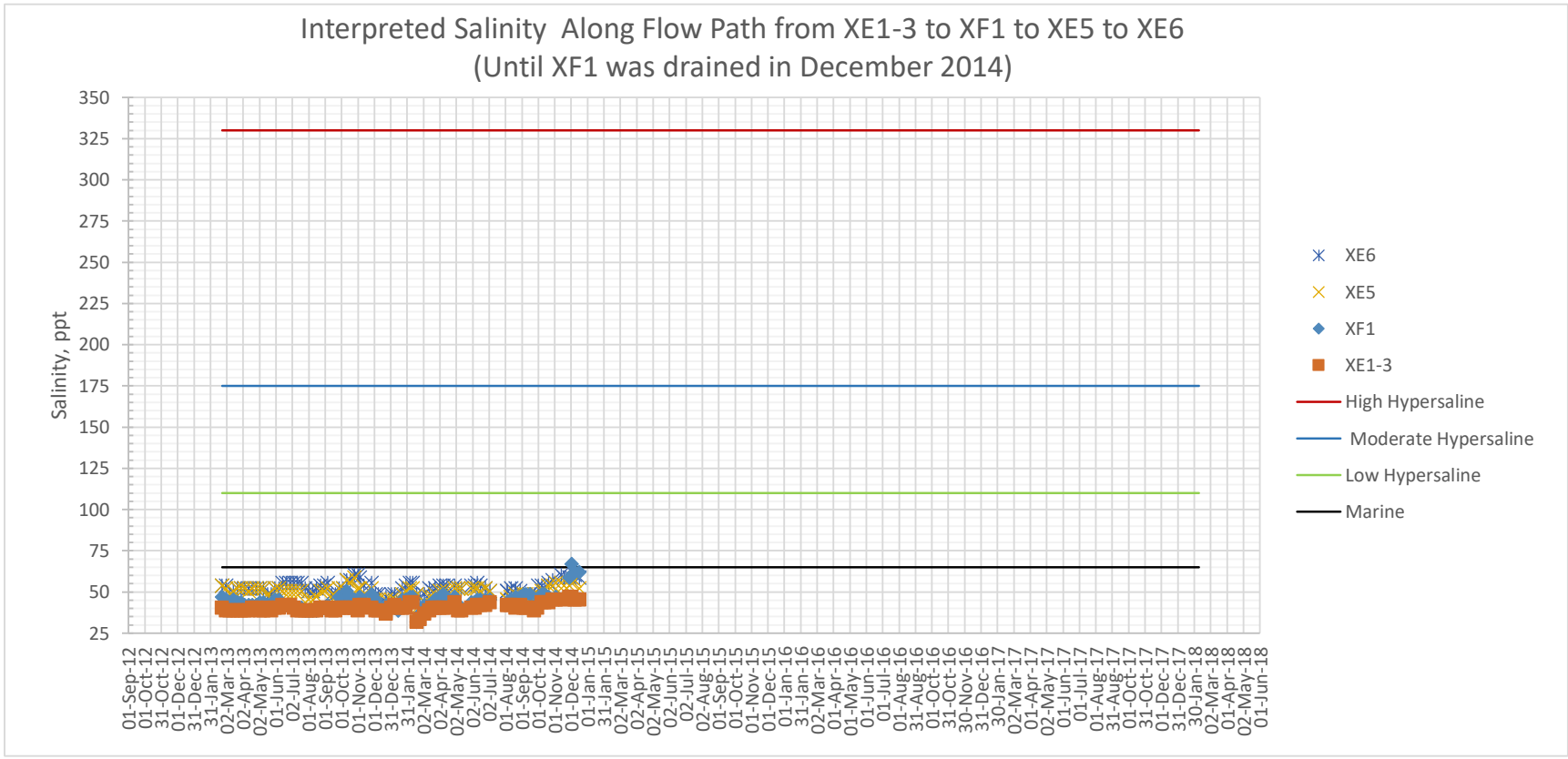


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

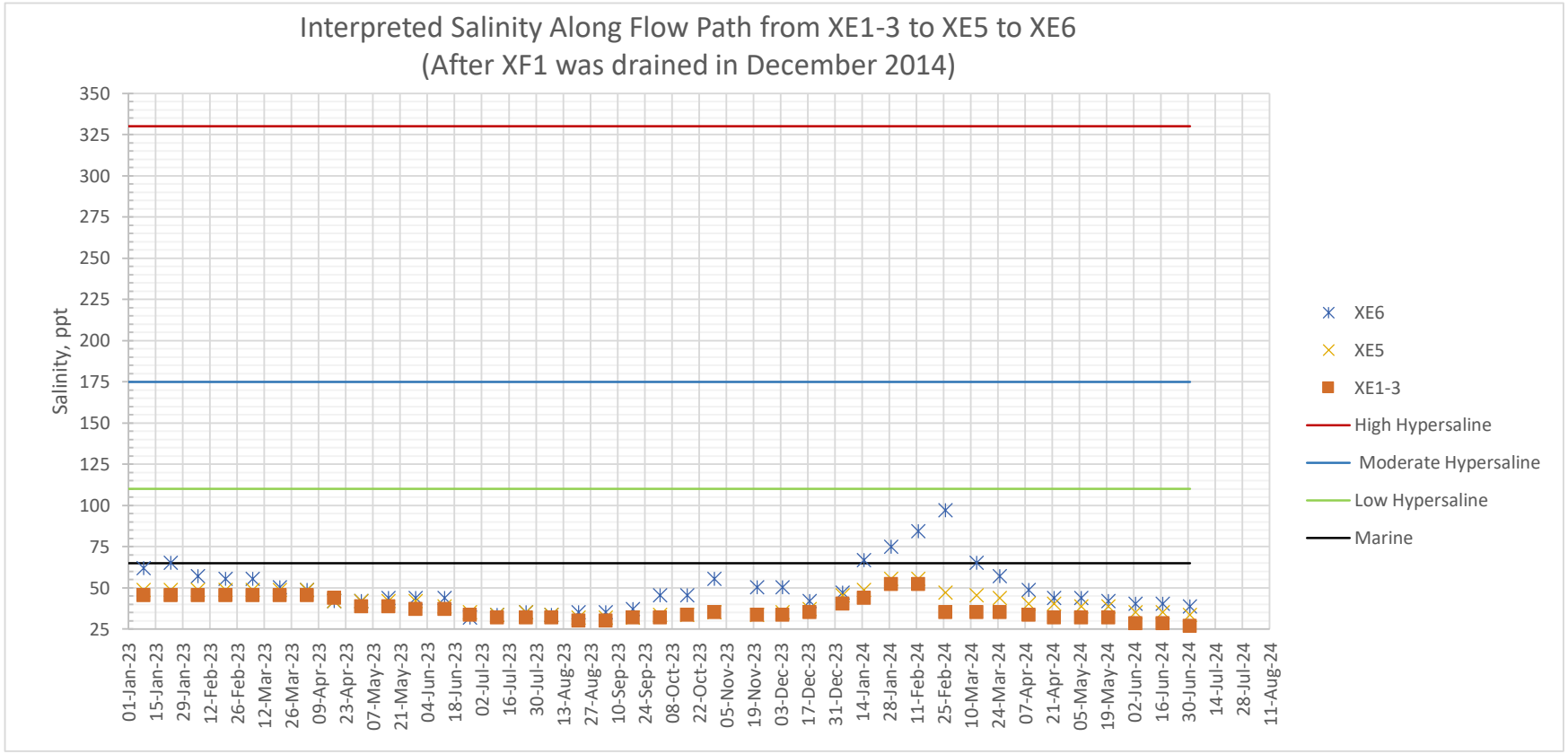

Interpreted Salinity Along Flow Path from PA3 to PA12
Salinity, ppt
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
12-Mar-23
26-Mar-23
09-Apr-23
23-Apr-23
07-May-23
21-May-23
04-Jun-23
18-Jun-23
02-Jul-23
16-Jul-23
30-Jul-23
13-Aug-23
27-Aug-23
10-Sep-23
24-Sep-23
08-Oct-23
22-Oct-23
05-Nov-23
19-Nov-23
03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
28-Jan-24
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
PA12
PA11
PA10
PA9
PA8
PA7
PA6
PA5
PA3
High Hypersaline
Moderate Hypersaline
Low Hypersaline
Marine



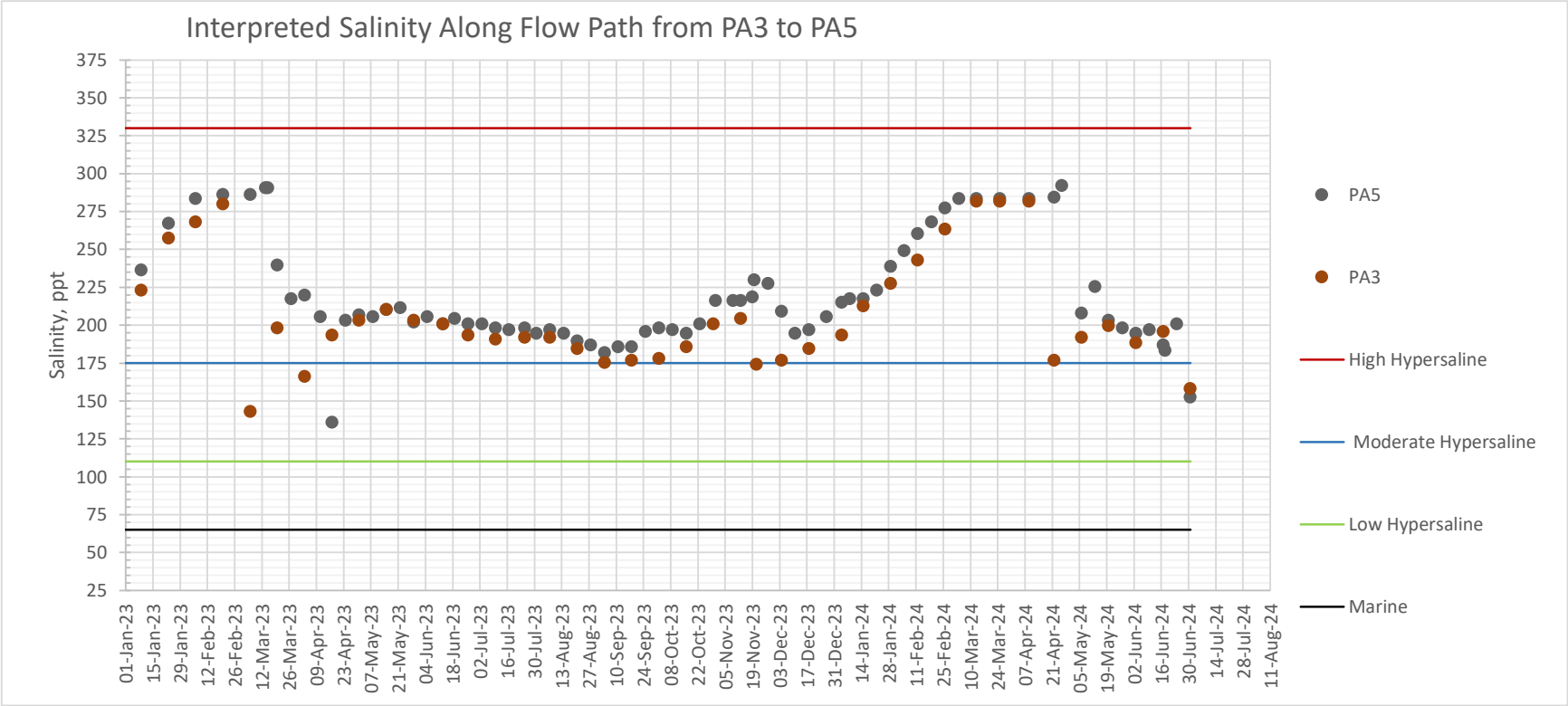
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

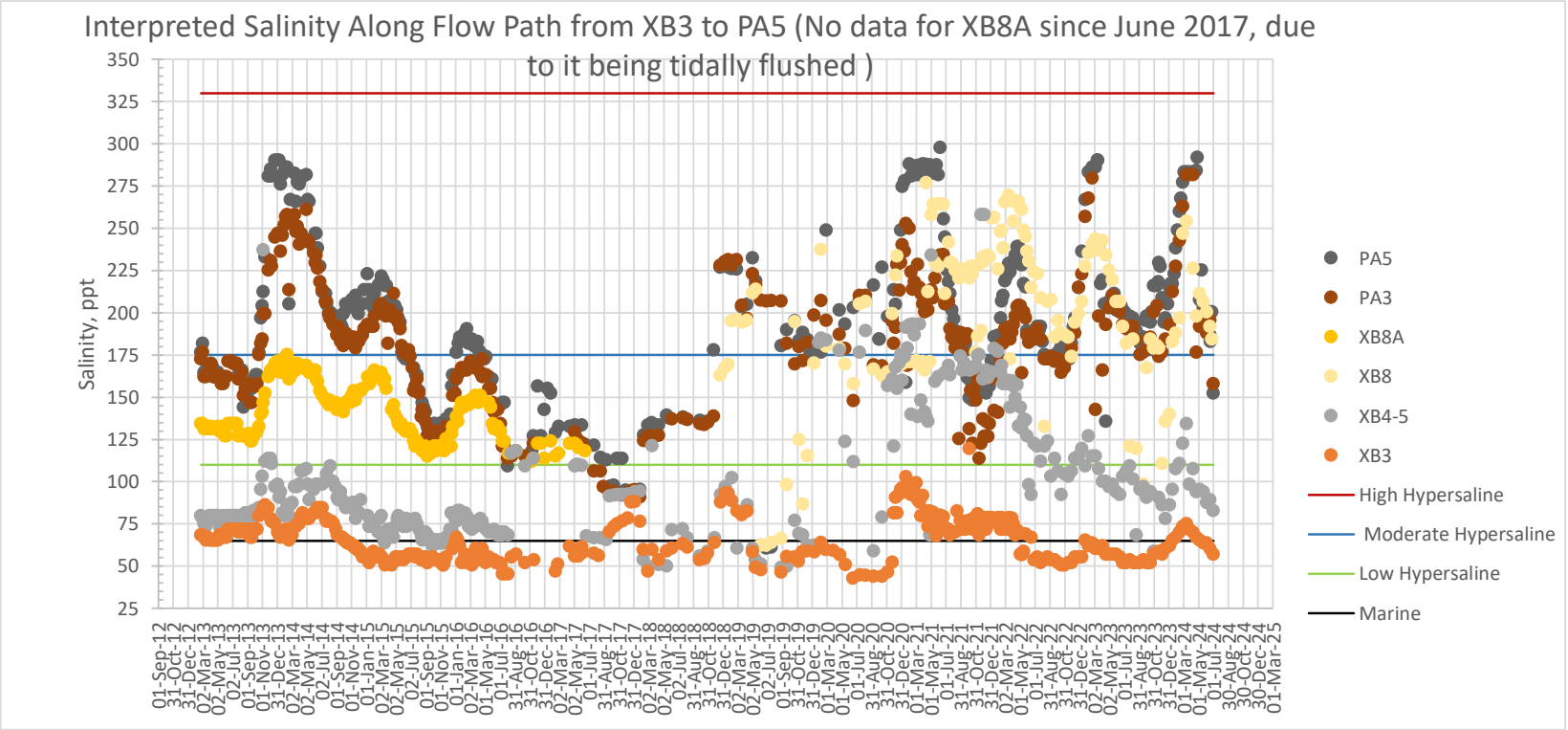


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

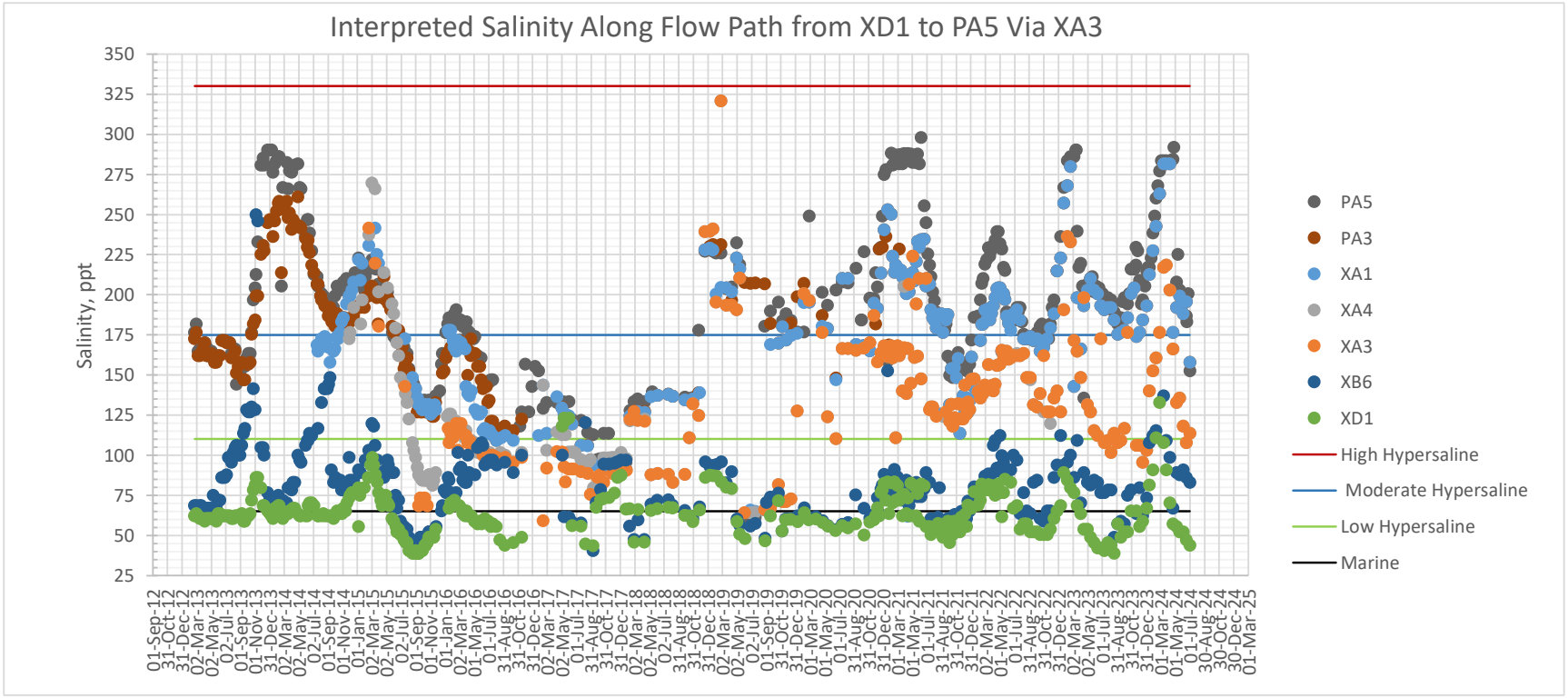


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

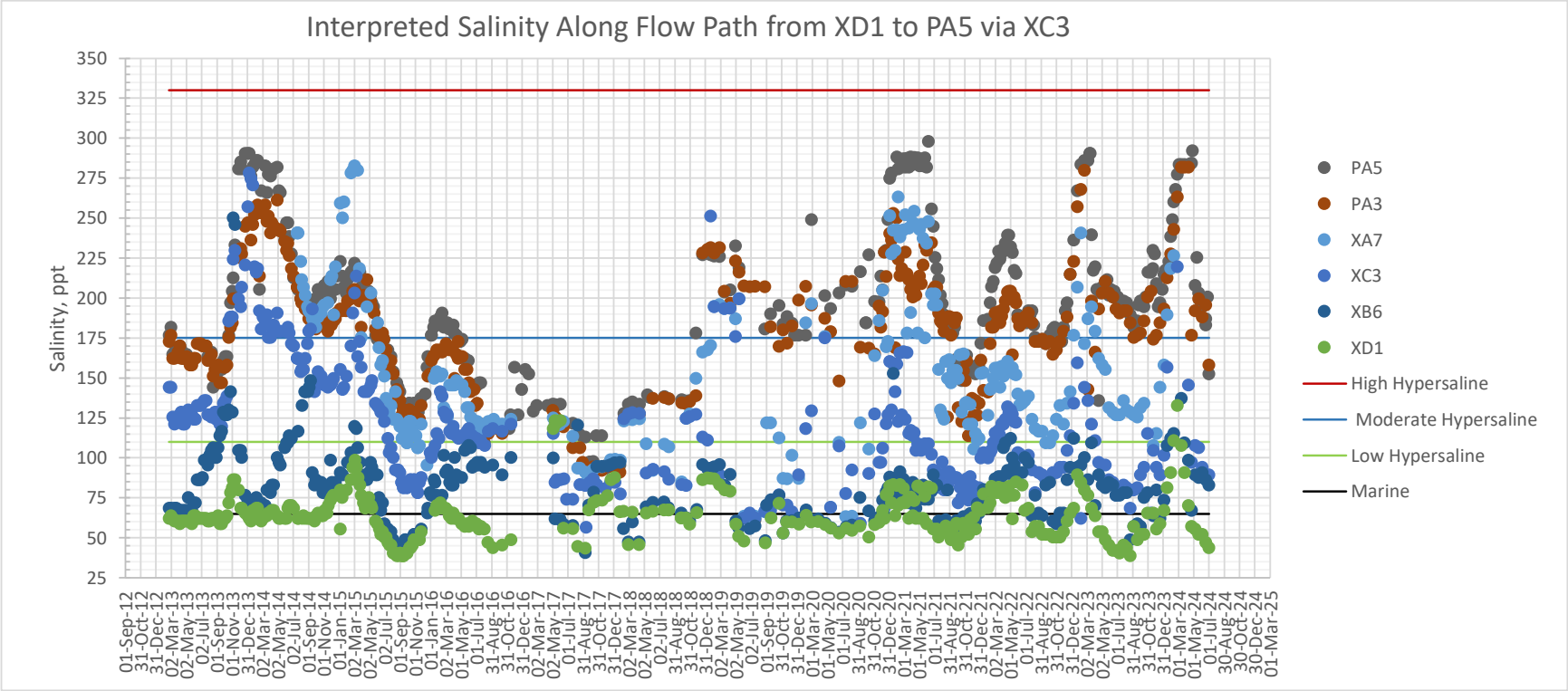

Interpreted Salinity Along Flow Path from PA3 to PA5
Salinity, ppt
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
01-Jan-23
15-Jan-23
29-Jan-23
12-Feb-23
26-Feb-23
12-Mar-23
26-Mar-23
09-Apr-23
23-Apr-23
07-May-23
21-May-23
04-Jun-23
18-Jun-23
02-Jul-23
16-Jul-23
30-Jul-23
13-Aug-23
27-Aug-23
10-Sep-23
24-Sep-23
08-Oct-23
22-Oct-23
05-Nov-23
19-Nov-23
03-Dec-23
17-Dec-23
31-Dec-23
14-Jan-24
28-Jan-24
11-Feb-24
25-Feb-24
10-Mar-24
24-Mar-24
07-Apr-24
21-Apr-24
05-May-24
19-May-24
02-Jun-24
16-Jun-24
30-Jun-24
14-Jul-24
28-Jul-24
11-Aug-24
PA5
PA3
High Hypersaline
Moderate Hypersaline
Low Hypersaline
Marine



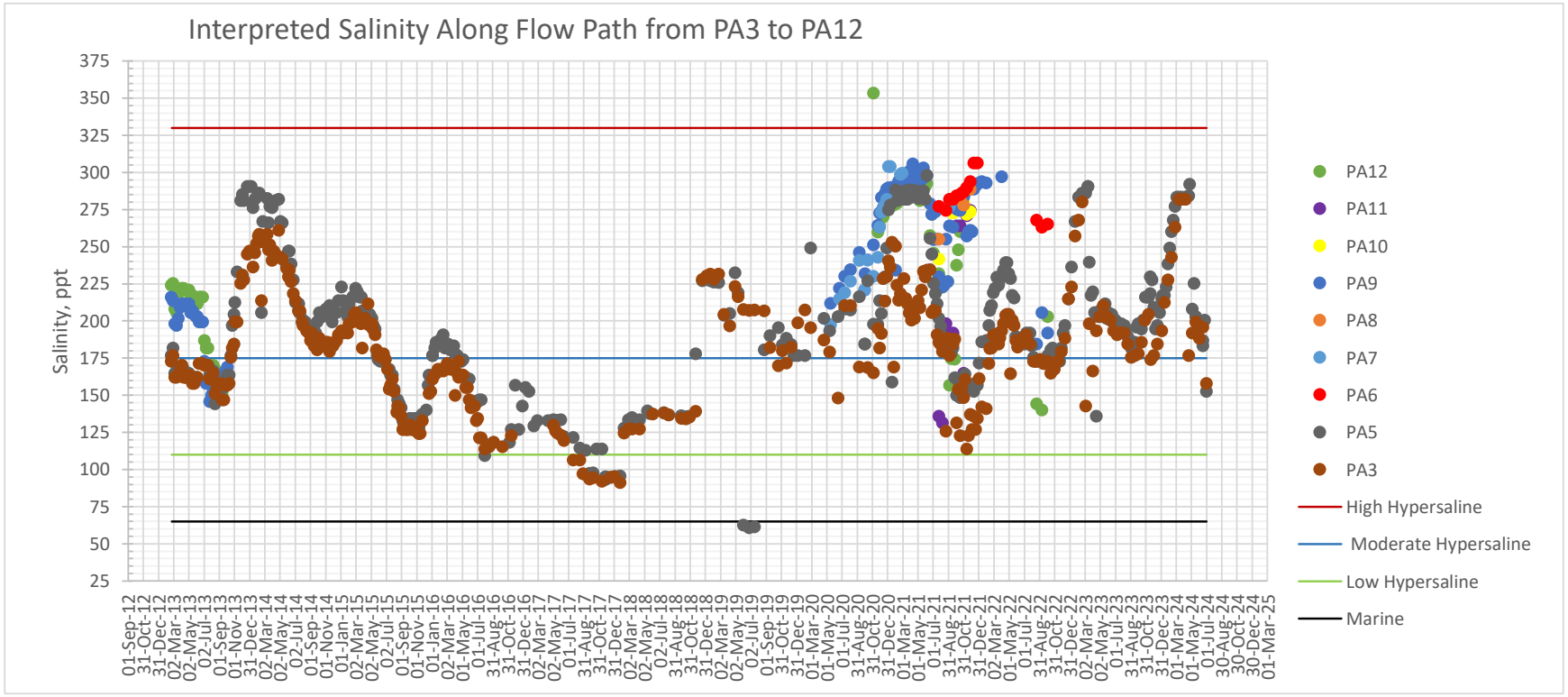
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

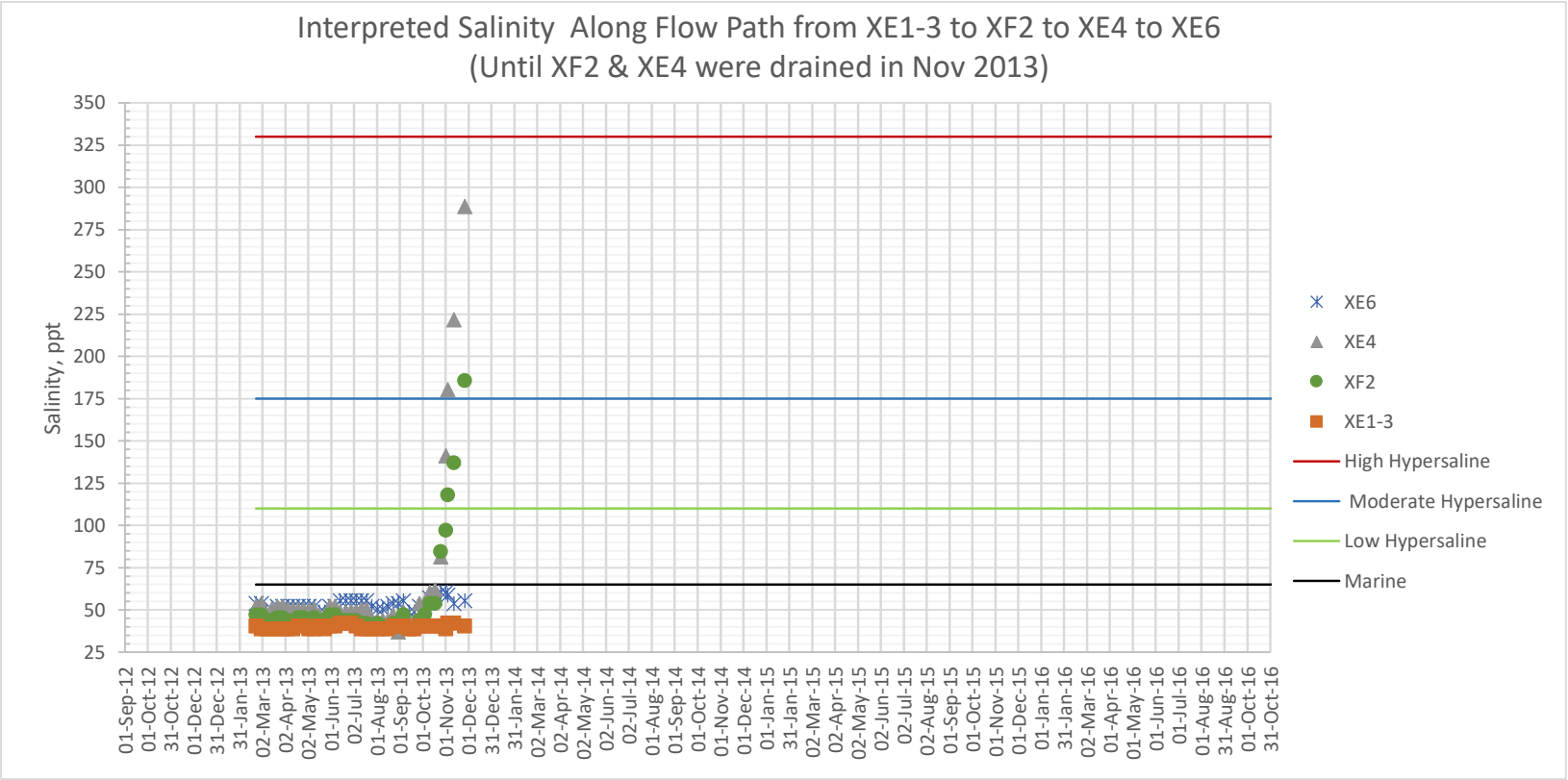


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

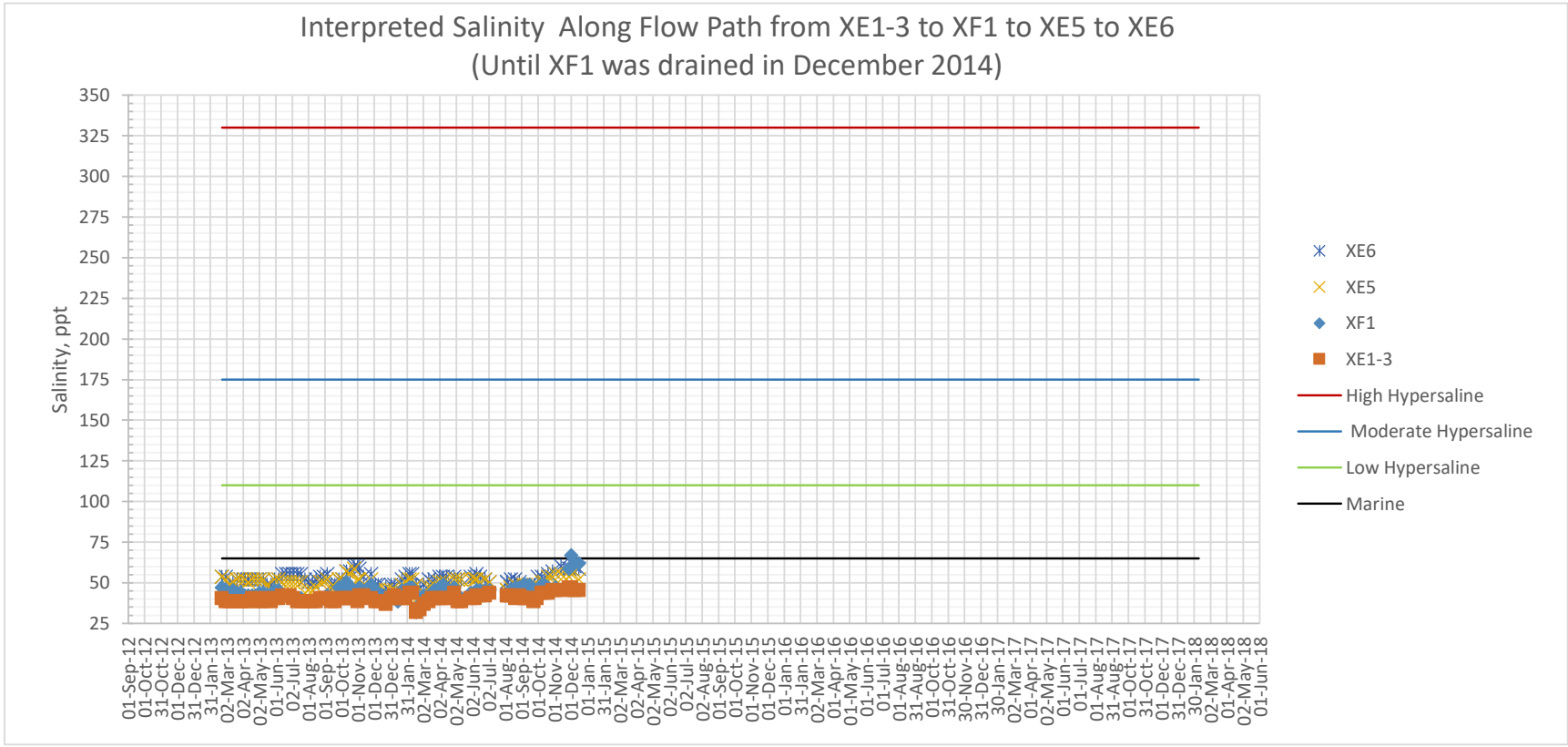


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

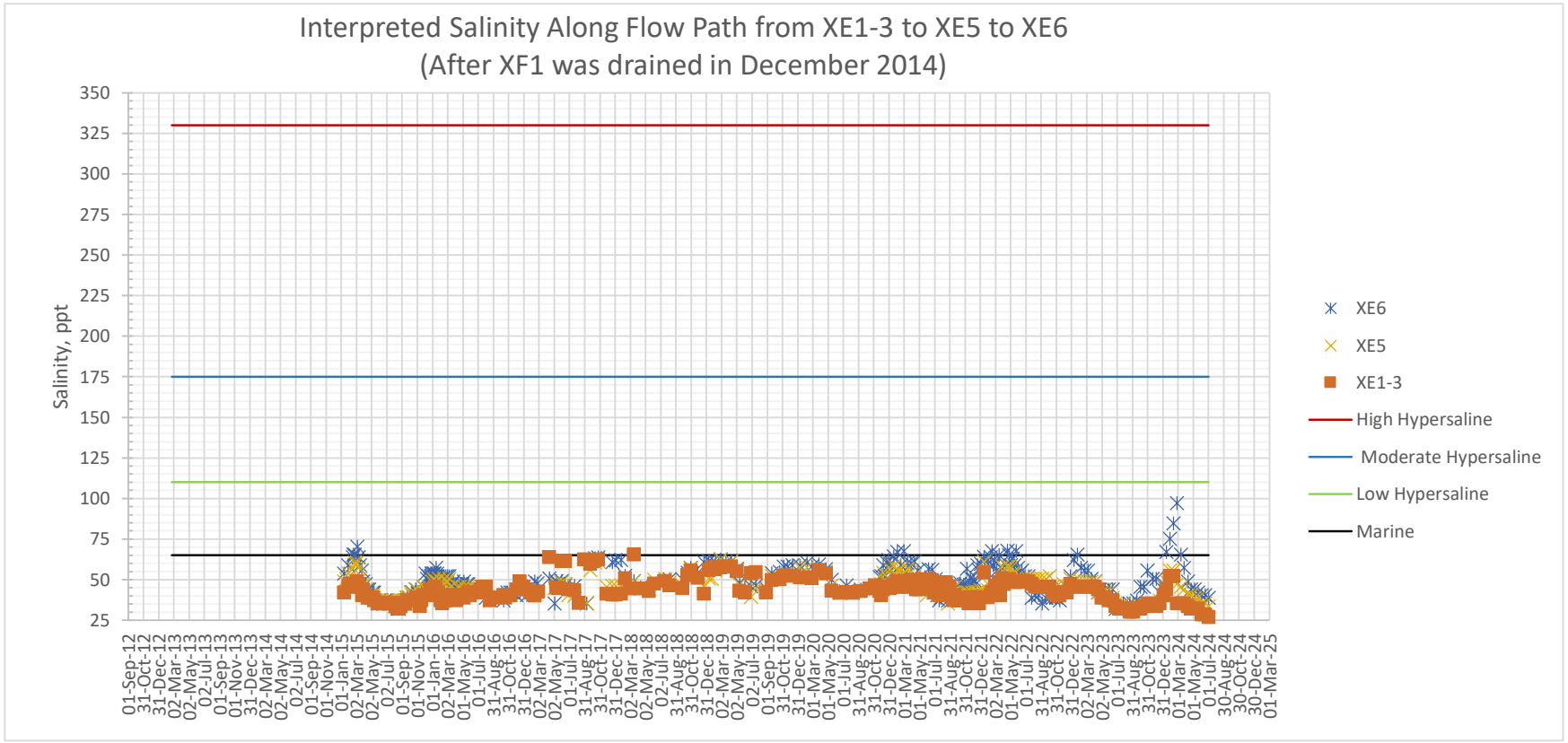

Interpreted Salinity Along Flow Path from PA3 to PA12
Salinity, ppt
375
350
325
300
275
250
225
200
175
150
125
100
75
50
25
01-Sep-12
31-Oct-12
31-Dec-12
02-Mar-13
02-May-13
02-Jul-13
01-Sep-13
01-Nov-13
31-Dec-13
02-Mar-14
02-May-14
02-Jul-14
01-Sep-14
01-Nov-14
01-Jan-15
02-Mar-15
02-May-15
02-Jul-15
01-Sep-15
01-Nov-15
01-Jan-16
02-Mar-16
01-May-16
01-Jul-16
31-Aug-16
31-Oct-16
31-Dec-16
02-Mar-17
02-May-17
01-Jul-17
31-Aug-17
31-Oct-17
31-Dec-17
02-Mar-18
02-May-18
02-Jul-18
31-Aug-18
31-Oct-18
31-Dec-18
02-Mar-19
02-May-19
02-Jul-19
01-Sep-19
31-Oct-19
31-Dec-19
01-Mar-20
01-May-20
01-Jul-20
31-Aug-20
31-Oct-20
31-Dec-20
01-Mar-21
01-May-21
01-Jul-21
31-Aug-21
31-Oct-21
31-Dec-21
02-Mar-22
01-May-22
01-Jul-22
31-Aug-22
31-Oct-22
31-Dec-22
02-Mar-23
02-May-23
01-Jul-23
31-Aug-23
31-Oct-23
31-Dec-23
01-Mar-24
01-May-24
01-Jul-24
30-Aug-24
30-Oct-24
30-Dec-24
01-Mar-25
PA12
PA11
PA10
PA9
PA8
PA7
PA6
PA5
PA3
High Hypersaline
Moderate Hypersaline
Low Hypersaline
Marine



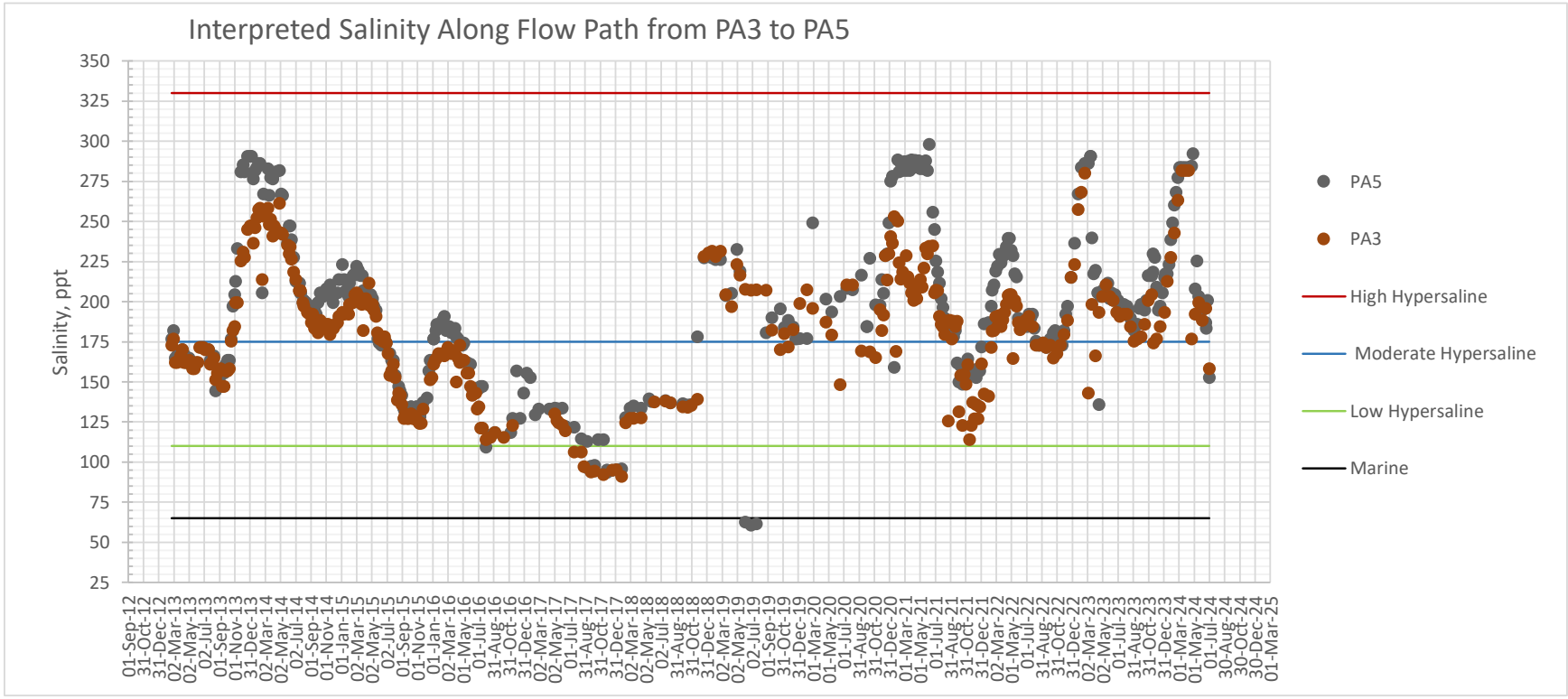
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

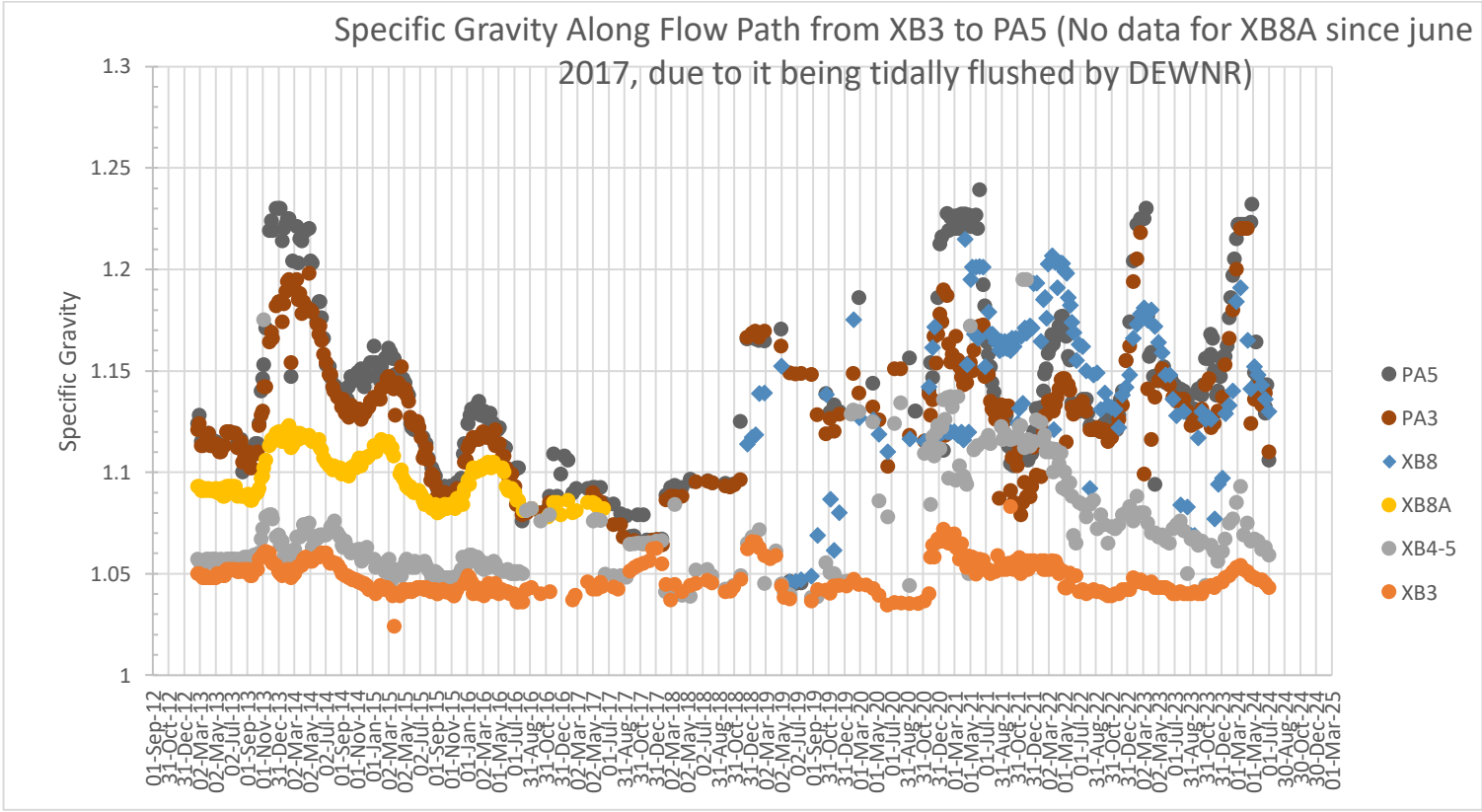


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

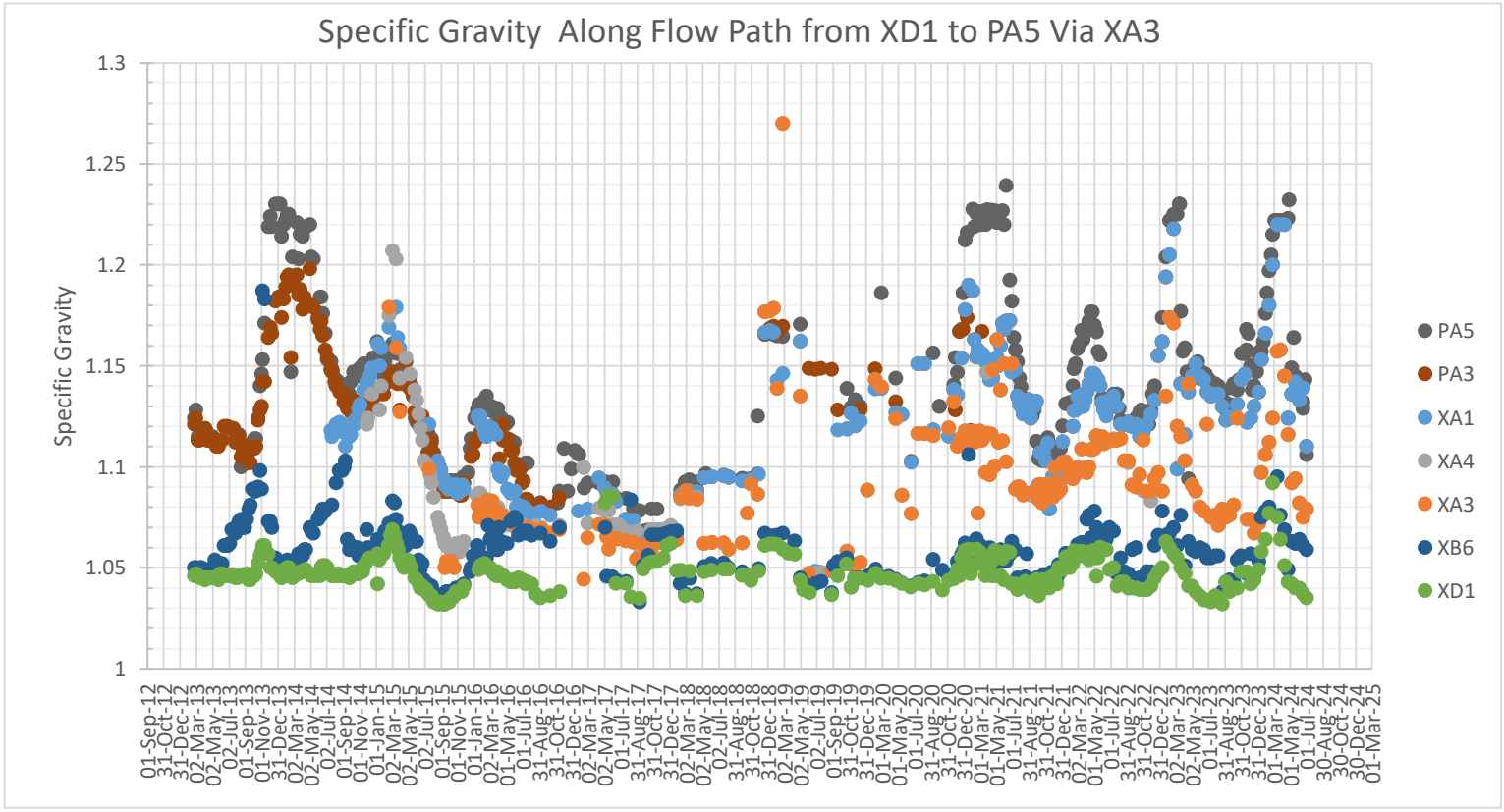


Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013

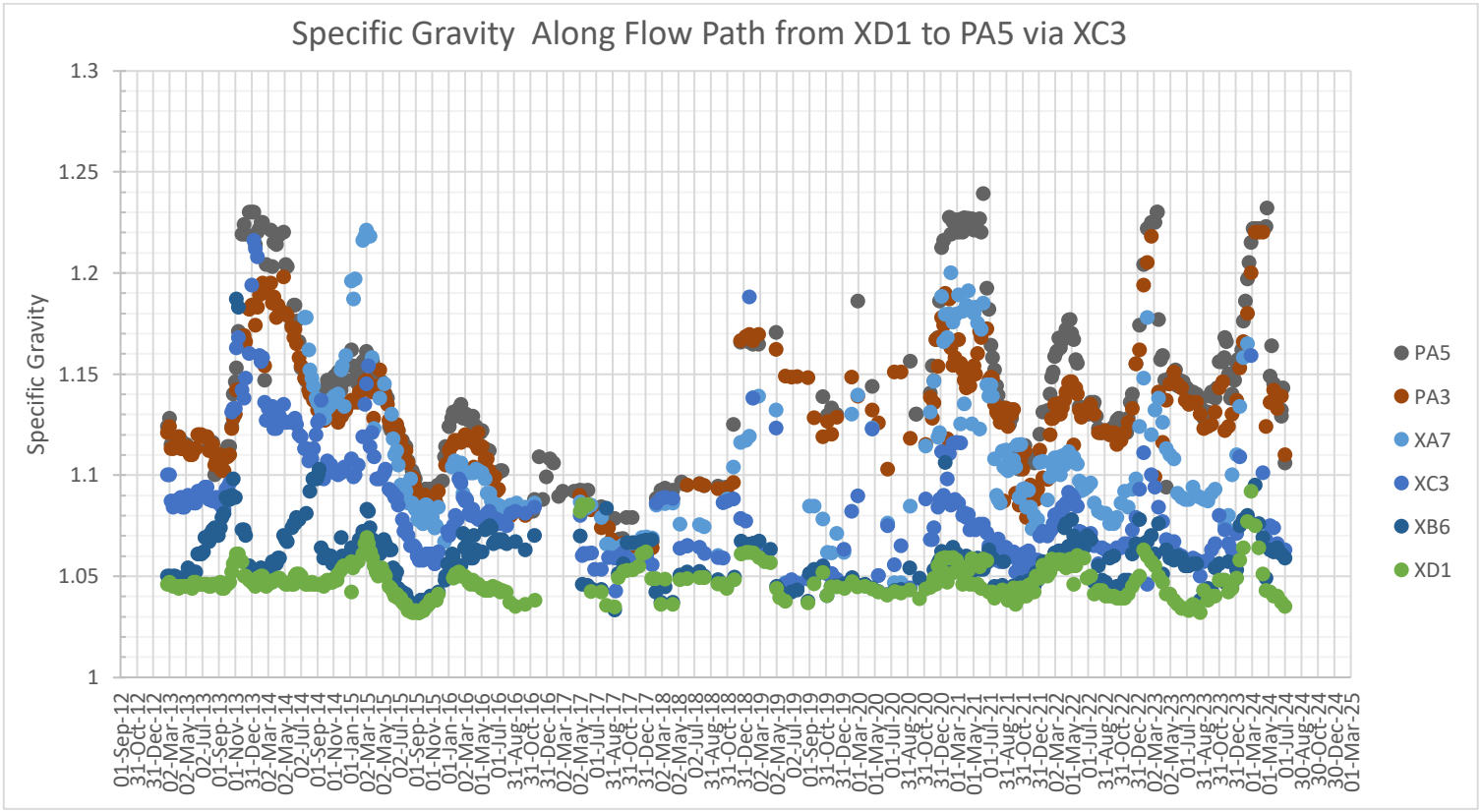

Interpreted Salinity Along Flow Path from PA3 to PA5
Salinity, ppt
350
325
300
275
250
225
200
175
150
125
100
75
50
25
01-Sep-12
31-Oct-12
31-Dec-12
02-Mar-13
02-May-13
02-Jul-13
01-Sep-13
01-Nov-13
31-Dec-13
02-Mar-14
02-May-14
02-Jul-14
01-Sep-14
01-Nov-14
01-Jan-15
02-Mar-15
02-May-15
02-Jul-15
01-Sep-15
01-Nov-15
01-Jan-16
02-Mar-16
01-May-16
01-Jul-16
31-Aug-16
31-Oct-16
31-Dec-16
02-Mar-17
02-May-17
01-Jul-17
31-Aug-17
31-Oct-17
31-Dec-17
02-Mar-18
02-May-18
02-Jul-18
31-Aug-18
31-Oct-18
31-Dec-18
02-Mar-19
02-May-19
02-Jul-19
01-Sep-19
31-Oct-19
31-Dec-19
01-Mar-20
01-May-20
01-Jul-20
31-Aug-20
31-Oct-20
31-Dec-20
01-Mar-21
01-May-21
01-Jul-21
31-Aug-21
31-Oct-21
31-Dec-21
02-Mar-22
01-May-22
01-Jul-22
31-Aug-22
31-Oct-22
31-Dec-22
02-Mar-23
02-May-23
01-Jul-23
31-Aug-23
31-Oct-23
31-Dec-23
01-Mar-24
01-May-24
01-Jul-24
30-Aug-24
30-Oct-24
30-Dec-24
01-Mar-25
PA5
PA3
High Hypersaline
Moderate Hypersaline
Low Hypersaline
Marine



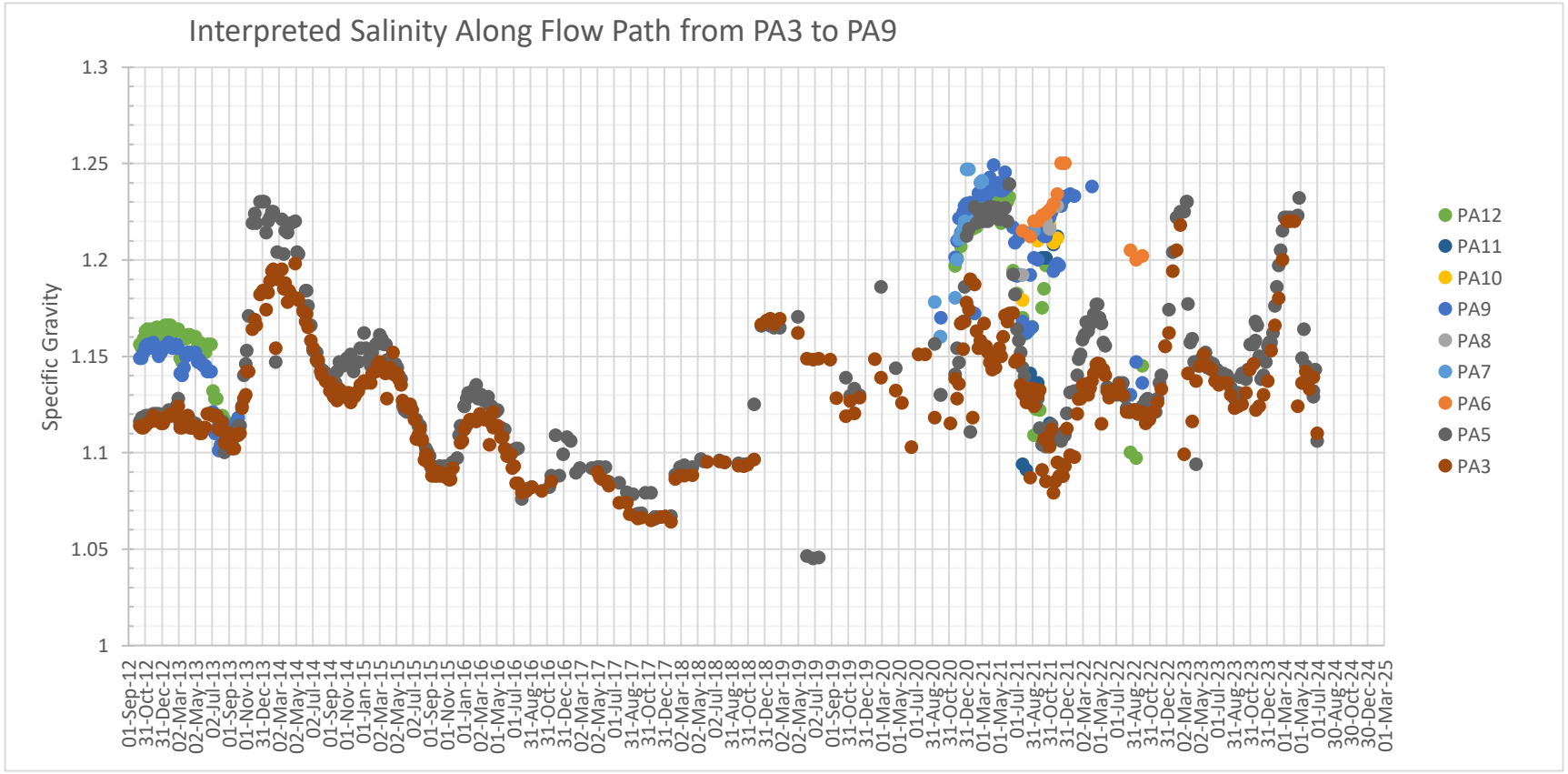
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013



Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013



Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013


Interpreted Salinity Along Flow Path from PA3 to PA9
Specific Gravity
1.3
1.25
1.2
1.15
1.1
1.05
1
01-Sep-12
31-Oct-12
31-Dec-12
02-Mar-13
02-May-13
02-Jul-13
01-Sep-13
01-Nov-13
31-Dec-13
02-Mar-14
02-May-14
02-Jul-14
01-Sep-14
01-Nov-14
01-Jan-15
02-Mar-15
02-May-15
02-Jul-15
01-Sep-15
01-Nov-15
01-Jan-16
02-Mar-16
01-May-16
01-Jul-16
31-Aug-16
31-Oct-16
31-Dec-16
02-Mar-17
02-May-17
01-Jul-17
31-Aug-17
31-Oct-17
31-Dec-17
02-Mar-18
02-May-18
02-Jul-18
31-Aug-18
31-Oct-18
31-Dec-18
02-Mar-19
02-May-19
02-Jul-19
01-Sep-19
31-Oct-19
31-Dec-19
01-Mar-20
01-May-20
01-Jul-20
31-Aug-20
31-Oct-20
31-Dec-20
01-Mar-21
01-May-21
01-Jul-21
31-Aug-21
31-Oct-21
31-Dec-21
02-Mar-22
01-May-22
01-Jul-22
31-Aug-22
31-Oct-22
31-Dec-22
02-Mar-23
02-May-23
01-Jul-23
31-Aug-23
31-Oct-23
31-Dec-23
01-Mar-24
01-May-24
01-Jul-24
30-Aug-24
30-Oct-24
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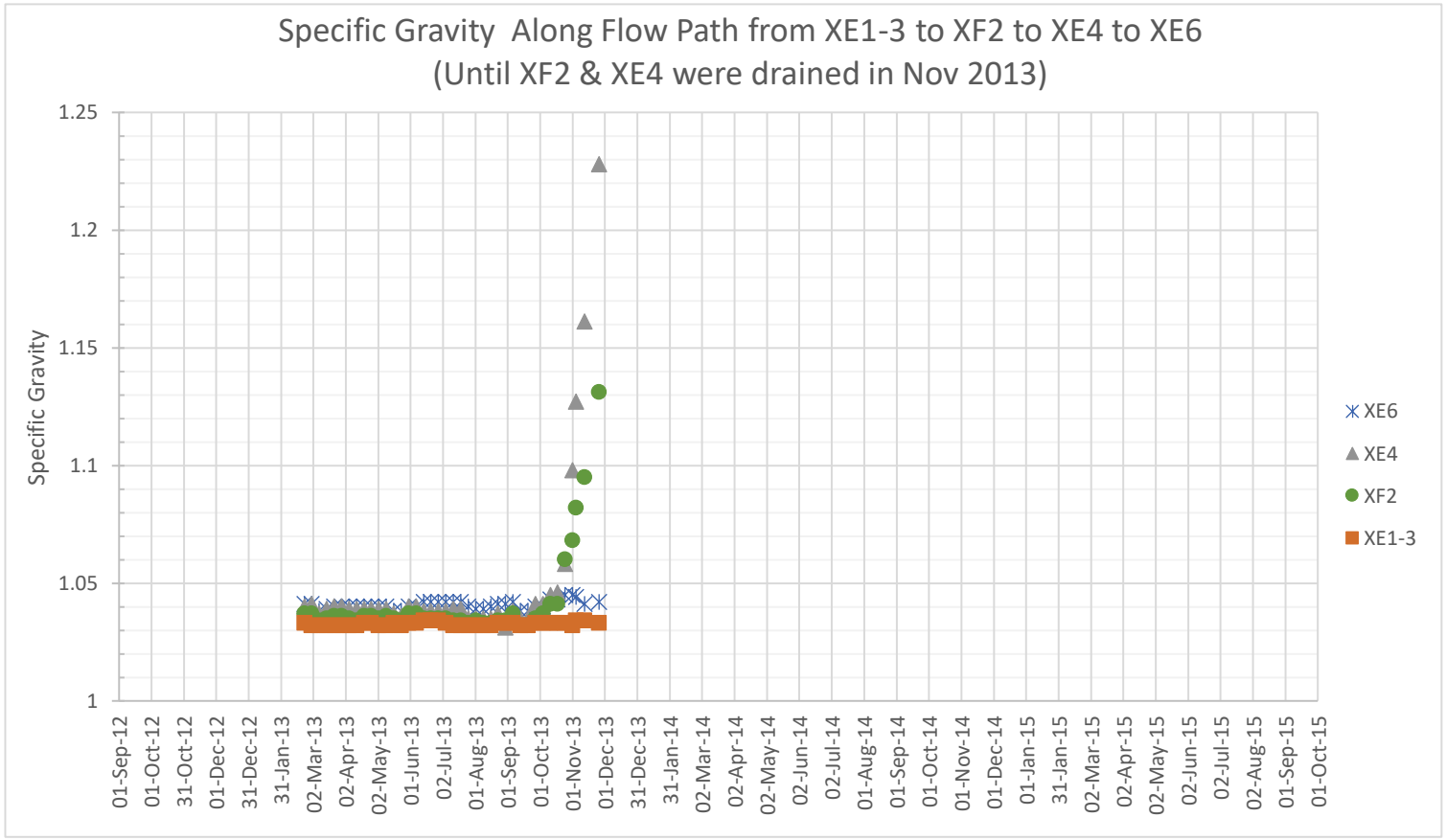
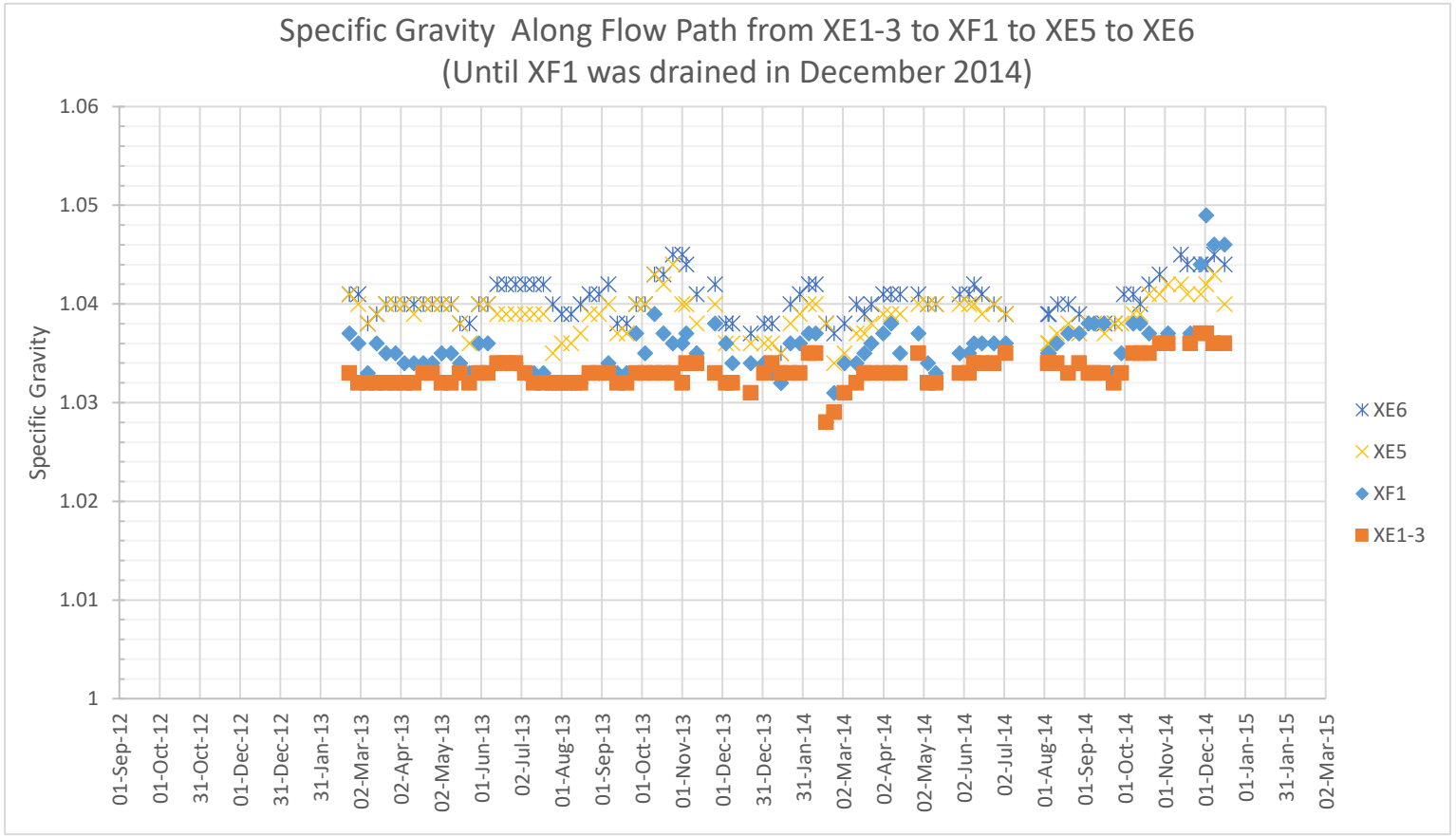
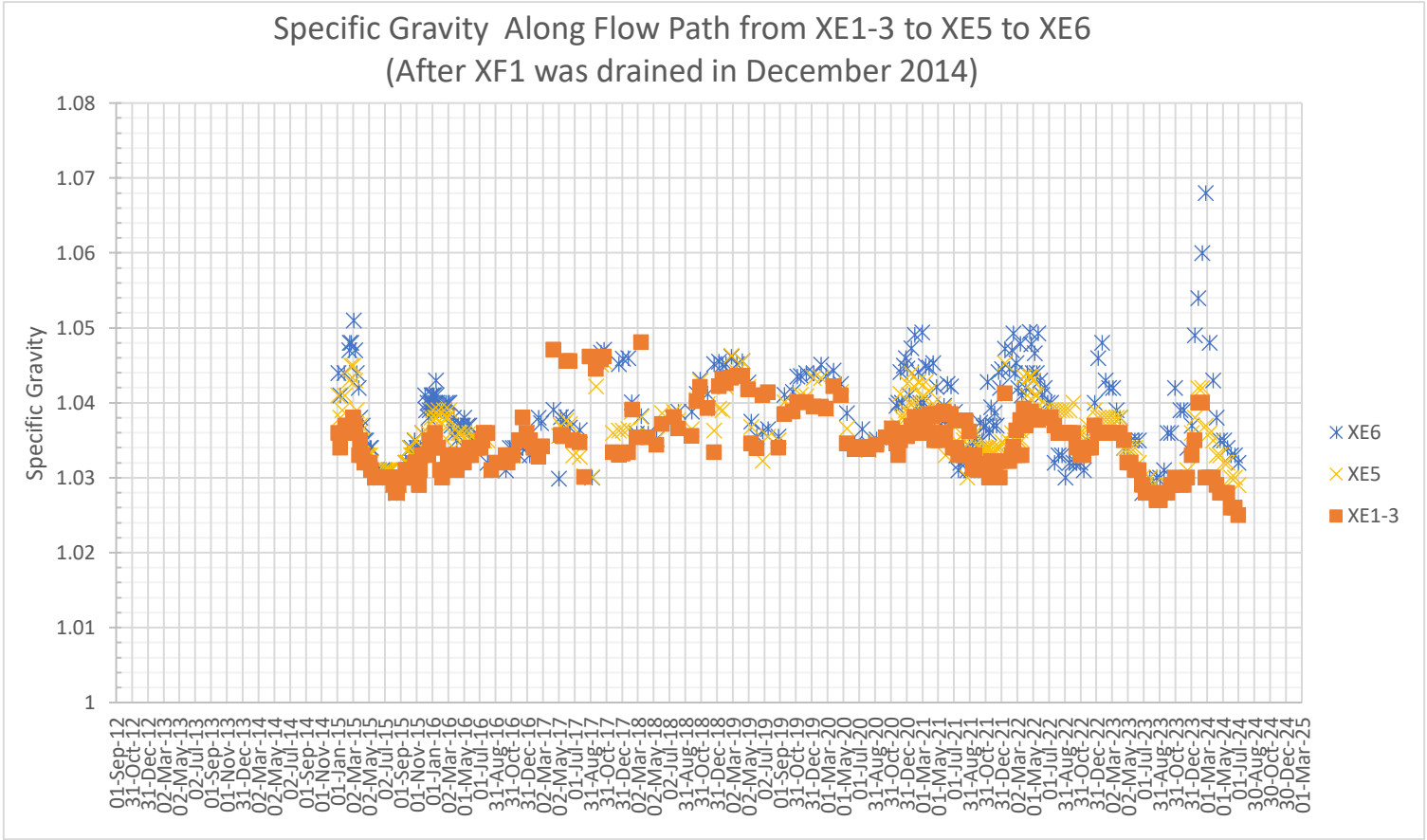
01-Mar-25
PA12
PA11
PA10
PA9
PA8
PA7
PA6
PA5
PA3



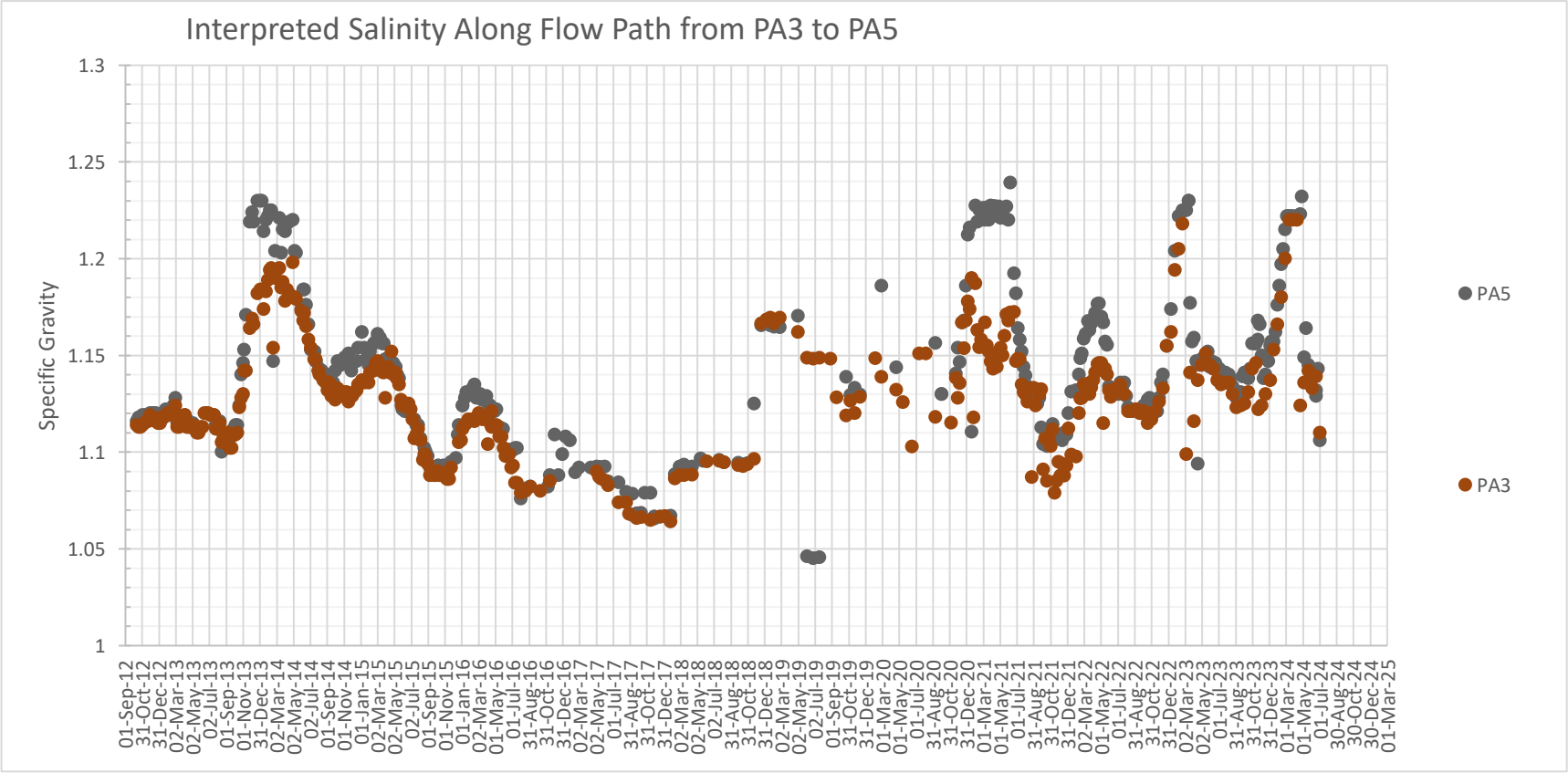
Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013



Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013



Note: Last Salt Production Season was Spring & Summer of 2012/2013: Holding Pattern started mid 2013


Interpreted Salinity Along Flow Path from PA3 to PA5
Specific Gravity
1.3
1.25
1.2
1.15
1.1
1.05
1
01-Sep-12
31-Oct-12
31-Dec-12
02-Mar-13
02-May-13
02-Jul-13
01-Sep-13
01-Nov-13
31-Dec-13
02-Mar-14
02-May-14
02-Jul-14
01-Sep-14
01-Nov-14
01-Jan-15
02-Mar-15
02-May-15
02-Jul-15
01-Sep-15
01-Nov-15
01-Jan-16
02-Mar-16
01-May-16
01-Jul-16
31-Aug-16
31-Oct-16
31-Dec-16
02-Mar-17
02-May-17
01-Jul-17
31-Aug-17
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31-Dec-17
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31-Aug-22
31-Oct-22
31-Dec-22
02-Mar-23
02-May-23
01-Jul-23
31-Aug-23
31-Oct-23
31-Dec-23
01-Mar-24
01-May-24
01-Jul-24
30-Aug-24
30-Oct-24
30-Dec-24
01-Mar-25
PA5
PA3

Average Water Levels (mAHD) During Salt Field Operations 2003 to 2013 and During Holding Pattern September 2023 to March 2024

	XE1-3	XE4	XE5	XE6	XF1	XF2	XE7	XD1	XB6	XA3	XA4	XA1	XB3	XB4-5	XA2	XB8	XB8A	XC1	XC2	XC2S	XC3	XA7	PA3	PA4	PA5	PA6	PA7	PA7A	PA8	PA9	PA10	PA11	PA12
Average Operational water level 2003 to 2013	2.65	2.97	2.59	2.18	3.11	3.96	2.9 estimated	2.82	2.48	2.08	2.1 estimated	2.12	2.26	2.1	2.09	2.08 estimated	2.07	3.23	3.24	3.16	2.49	2.1 estimated	2.03	2.02 estimated	2.01	water level controlled by PA9	water level controlled by PA9	2.37	water level controlled by PA9	1.98	water level controlled by PA12		1.57
Average Holding Pattern Water Level Sept 2023 to March 2024	2.71	Drained	2.53	2.22	Drained	Drained	2.8 estimated	2.73	2.40	1.71	1.71	2.03	2.25	2.08	not measured	not measured	Tidally flushed	Drained	Drained	Drained	2.39	2.13	2.03	2.00 estimated	1.99	Drained. Refilled from early 2020. Drained from late 2020 / early 2021	Drained until 2017 when added to SA Water Trial, then drained after that Trial. Refilled from early 2020. Drained from late 2020 / early 2021	Drained until 2017 when added to SA Water Trial, then drained after that Trial	Drained until 2017 when added to SA Water Trial, then drained after that Trial. Refilled from mid 2020. Drained from late 2020 / early 2021	Drained until 2017 when added to SA Water Trial, then drained after that Trial. Refilled from mid 2020. Drained from late 2020 / early 2021	Drained until 2017 when added to SA Water Trial, then drained after that Trial. Received small amounts of water pumped from PA9 from late 2020 / early 2021	Drained	Drained
Note	Estimated values interpolated from values for ponds immediately upstream and downstream																																

Fluctuation Range of Water Levels During Salt Field Operations 2003 to 2013 and During Holding Pattern September 2023 to March 2024

	XE1-3	XE4	XE5	XE6	XF1	XF2	XE7	XD1	XB6	XA3	XA4	XA1	XB3	XB4-5	XA2	XB8	XB8A	XC1	XC2	XC2S	XC3	XA7	PA3	PA4	PA5
Difference Maximum to Minimum Operational water level 2003 to 2013	0.58	0.66	0.62	0.34	0.37	0.31	No data	0.31	0.5	0.16	No data	No data	0.35	0.24	0.16	No data	0.19	0.25	0.2	0.24	0.51	No data	0.21	No data	0.47
Difference Maximum to Minimum Holding Pattern Water Level Sept 2023 to March 2024	0.39	Drained	0.36	0.37	Drained	Drained	No data	0.59	0.43	0.28	0.28	0.36	0.26	0.32	No data	No data	Tidally flushed	Drained	Drained	Drained	0.40	0.20	0.36	No data	0.32

Copied from Table of Environmental Outcomes and Measurement Criteria in PEPR							Statistics of Measured Levels (Sept 2020 to March 2021)		
Section	**Pond**	**Maximum Water Level (m AHD) 2003 - 2013**	**Average water level (m AHD) 2003 - 2013**	**Minimum Water Level (m AHD) 2003 - 2013**	**Fluctuation in Water Level (Maximum – Minimum) (m)**	**Min to Max Levels = Compliance Range for Purposes of Table 30**	**Minimum**	**Median**	**Maximum**
Section 4	XE1-3	3.10	2.65	2.52	0.58	Yes	2.40	2.74	2.79
	XF1	3.24	3.11	2.87	0.37	No – This is a drained / dry pond			
	XF2	4.08	3.96	3.77	0.31	No – This is a drained / dry pond			
	XE4	3.07	2.97	2.41	0.66	No – This is a drained / dry pond			
	XE5	2.68	2.59	2.06	0.62	Yes	2.30	2.54	2.66
	XE6	2.34	2.18	2.00	0.34	Yes.	1.98	2.22	2.35
Section 3	XE7	Water level controlled by XD1				No			
	XD1	2.90	2.82	2.59	0.31	Yes. Minimum slightly low; Median OK	2.30	2.76	2.89
	XB6	2.78	2.48	2.28	0.50	Yes. Minimum slightly low; Median OK	2.12	2.41	2.55
	XC1	3.35	3.23	3.10	0.25	No – This is a drained / dry pond			
	XC2	3.34	3.24	3.14	0.20	No – This is a drained / dry pond			
	XC2S	3.30	3.16	3.06	0.24	No – This is a drained / dry pond			
	XC3	2.56	2.49	2.05	0.51	Yes.	2.10	2.40	2.50
	XB3	2.38	2.26	2.03	0.35	Yes	2.06	2.25	2.32
	XB4-5	2.21	2.10	1.97	0.24	Yes. Minimum slightly low; Median OK	1.84	2.09	2.16
	XA3	2.14	2.08	1.98	0.16	No. Minimum and Median low	1.50	1.73	1.78
	XA4	Water level controlled by XA2 or XA1				No. Minimum and Median low	1.50	1.73	1.78
	XA2	2.16	2.09	2.00	0.16	Yes, Water level controlled by XB4-5 and XB8			
	XB8	Water level controlled by XB8A				Yes Water level now controlled by XB4-5 and XA1.			
	XB8A	2.16	2.07	1.97	0.19	No. This Pond taken over by DEWNR for Tidal flushing trial; and after the trial remains tidally flushed			
	XA7	Water level controlled by XA1 or PA3					1.80	2.10	2.18
	XA1	2.12	2.04	1.95	0.17	Yes. Minimum slightly low; Median OK	1.76	2.05	2.12
Section 2	PA3	2.11	2.03	1.90	0.21	Yes. Minimum slightly low; Median OK	1.76	2.05	2.12
	PA4	Water level controlled by PA5				Yes			
	PA5	2.12	2.01	1.65	0.47	Yes	1.75	2.00	2.07
	PA6	Water level controlled by PA9				No – This is a drained / dry pond that may be used for contingency brine containment and evaporation			
	PA7	Water level controlled by PA9				No – This is a drained / dry pond			
	PA7A	2.45	2.37	2.00	0.45	No – This is a drained / dry pond			
	PA8	Water level controlled by PA9				No – This is a drained / dry pond			
	PA9	2.20	1.98	1.86	0.34	No – This is a drained /dry pond			
	PA10	Water level controlled by PA12, and pumping from PA9				No – This is a drained /dry pond			
	PA11	Water level controlled by PA12, and pumping from PA9				No – This is a drained /dry pond			
	PA12	1.99	1.57	1.30	0.69	No – This is a drained /dry pond			

Appendix D - Bunds and Seepage Drains

See Section 3 in the following report

Buckland Dry Creek Pty Ltd

PEPR compliance reporting, 12 months to 30 June 2024

Report author:	David Kingston, Engineering Manager, CPEng, FIEAust
Company:	Buckland Dry Creek Pty Ltd
Address:	412 Hanson Road North, Dry Creek
Phone:	08 8244 8156
Report date:	27 September 2024
Report version:	1.0

1. Introduction

This document summarises a range of activities undertaken by Buckland Dry Creek Pty Ltd (BDC) at the Dry Creek Saltfields across the reporting period of 1 July 2023 and 30 June 2024. It is prepared in accordance with the requirements of the site's PEPR/MOP Ref:470606.

2. Section 1 filling works

Overview

BDC is proposing to develop eastern portions of private mine PM248 for future urban land development. Salt crystallisers F row, G row and H row are being progressively filled in accordance with bulk earthworks plans that set out construction and environmental management controls. Filling works continued in accordance with the Bulk Earthworks Plans for F & G Rows. Care and maintenance of the completely filled H Row continued across the period.

Fill importation

Filling of F row with ballast commenced just prior to the start of the reporting period, and by the end of the reporting period was about 98% complete, with just some small fringe areas along the eastern and northern boundaries of F Row still requiring ballast. Across the period, some 220,000 tonnes of ballast was imported from ARR and laid across F row.

Between 1 July 2023 and 30 June 2024, some 45,000 tonnes of waste soil meeting EPA waste fill criteria was delivered to Saltfields from 14 different off-site sources, with about 80% to G row and 20% to F row. Selection of either F Row or G row for receipt of waste soil was dependent of operational constraints such as degree of saturation of ground after rain, incoming soil type (e.g. sandy clay, clay) and availability of site crews. Soil from each of the offsite sources was verified by BDC's Auditor as complying with the EPA waste fill criteria prior to importation to site.

Relevant details of waste soil are set out in **Figure 1** and **Figure 2**.

Fill placement

For F Row, ballast was placed and compacted in a south to north direction. Waste soil was stockpiled in the southeastern corner of F Row, with some portions of the stockpiles pushed out and compacted during the reporting period. **Figure 3** shows the crystalliser at the start and end of the reporting period.

For G Row, as was indicated in the previous 12 month compliance report, focus was applied to placing fill along the eastern portion of G Row, in order to accommodate future land development requirements. Some stockpiles were placed in the southwestern corner of G row but not pushed out or compacted by the end of the reporting period. **Figure 4** shows the crystalliser at the start and end of the reporting period.

The southern and central portion of the stacking bay between G & H rows was cleaned out early in the reporting period with material stockpiled and ready to move to other parts of Section 1.

Fill compaction

Compaction was achieved using standard earthmoving machinery including compactors, dozers, graders, and drum rollers. Where necessary, water carts were used to raise moisture content of supplied fill and to manage dust during windy days. Fill was compacted in 200mm thick layers over the ballast, with each layer tested in accordance with AS3798.

Environmental investigations

During the reporting period, some soil and groundwater investigations were undertaken in G row and H row in the reporting period, and while compilation and reporting of the findings is yet to occur, the Auditor has been kept up to date on the progress of these investigations.

The completion report for H row is nearing finalisation and will be submitted to the Auditor for review in the latter part of 2024, with expectation that the audit will be finalised by the end of 2024.

Filling updates to DEM

For the 2023-24 period, BDC submitted the following filling progress reports to DEM:

Report date	Period covering
10 Oct 2023	Oct 22 – Aug 23 (incl. data from previous reporting period)
13 Sep 2024	Sep 23 – Jun 24

Filling findings

BDC makes the following observations regarding the filling of F row and G row during the reporting period:

- The fill source sites have been determined by BDC and verified by the Auditor as being suitable sources of waste soil.
- The compaction of fill has met the BEP specification and therefore complies with AS3798.
- Vertical settlement of the crystalliser bed has remained stable.

BDC is satisfied that the earthworks undertaken in F row and G row in the 12 months to 30 June 2024 complies with the BEPs and is sufficient to support the future land use.

3. Field management

Asset maintenance

There were several significant power outages to Section 3 and 4 in late 2023 and early 2024, resulting in the loss of sea water pumping from Middle Beach and Chapman's Creek for a number of weeks. Following power line repairs, resumption of pumping at Middle Beach and Chapmans Creek occurred in February and restoration of normal operating conditions and pond levels in Section 2 to 4 ponds was achieved by about April 2024. These events were reported to DEM in a **report dated 20 March 2024**.

Minor road and track maintenance works were performed from time to time in some areas across the field, and included actions such as filling in potholes, grading tracks and trimming back overhanging trees and shrubs along tracks.

Regular monitoring of the condition of the bund between ponds XB8 and XB8A occurred across the reporting period, with a number of written updates provided to DEM on the outcomes of monitoring. In addition, BDC decided to undertake bund improvement works in June 2024 and this included placement of sandbags along low and vulnerable portions of the bund wall. This work was outlined to DEM in a **report dated 28 June 2024**.

Incidents

Across the reporting period there were a number of night-time break-ins and attempted break-ins at the Dry Creek office and surrounding lands. Usually, access to the site was gained by cutting holes in the chain-wire fencing either along the North-South Motorway or near the bicycle track between the North-South Motorway and Salisbury Highway. BDC made repairs to external fencing and maintained security cameras in high-value asset areas such as the Dry Creek workshop and office.

Complaints

There were no public complaints raised regarding any aspect of the field in the reporting period.

Dust and surface waste management

BDC continued active management of the field across the period. For filling works in Section 1, truck movements were adjusted to accommodate dust or mud-related restrictions during dry and wet periods. Dust on site was controlled to good effect with the water cart, both on haul roads and on the fill pad. BDC deployed a full-time picker to collect any rubbish or unsuitable material in the waste soil as well as any blowing rubbish gathering along or near site boundaries.

Section 1 works compound

No further progress was made on the relocation of the site compound from its current position near the northern end of H row to the south-western corner of G row. Completed works consist of a hardstand area and perimeter fencing and a new water quickfill tank. Power is still to be connected to the compound and sheds and facilities remain at the H row compound.

4. Attachments

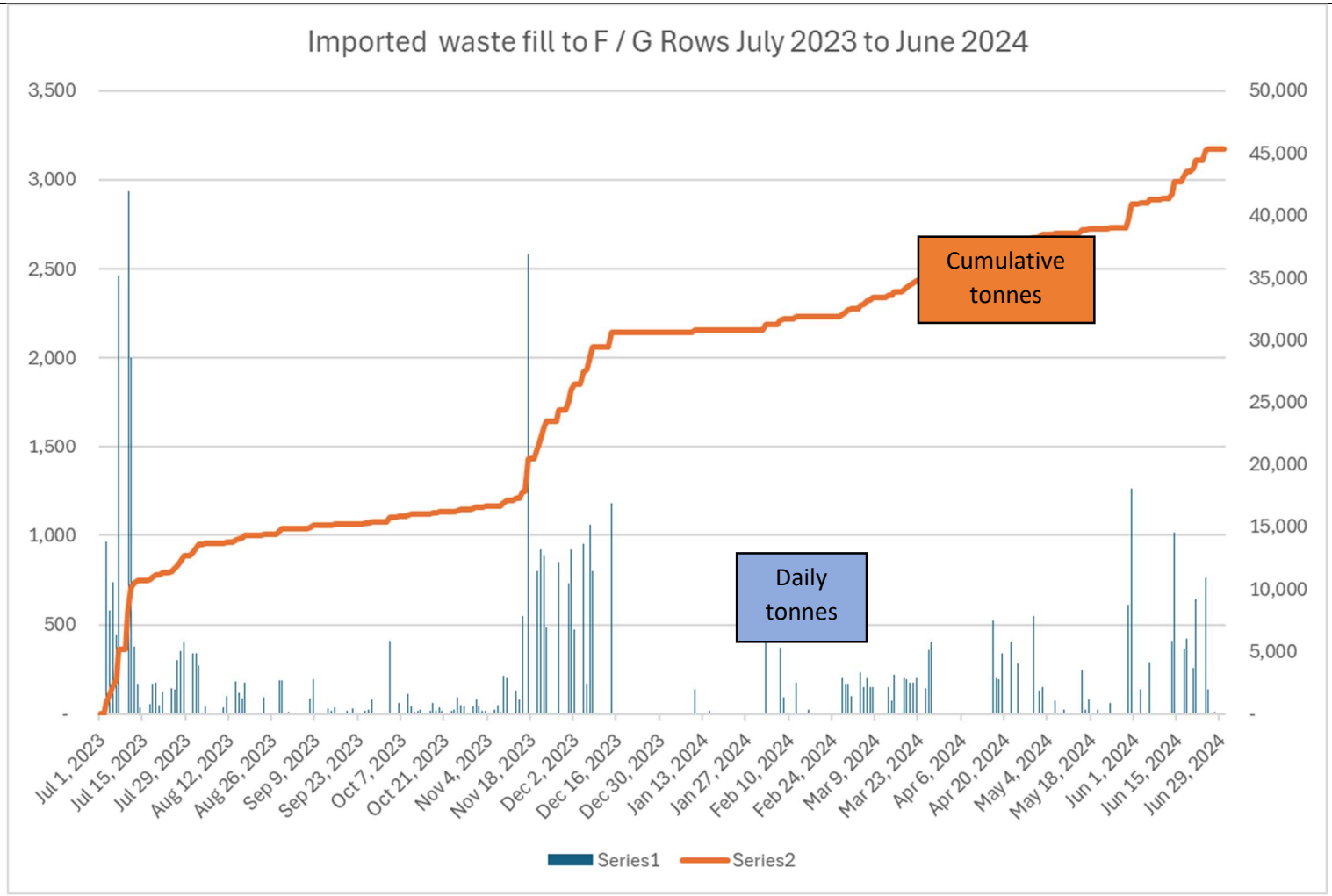


Figure 1: Daily importation of waste soil from ARR to F / G rows

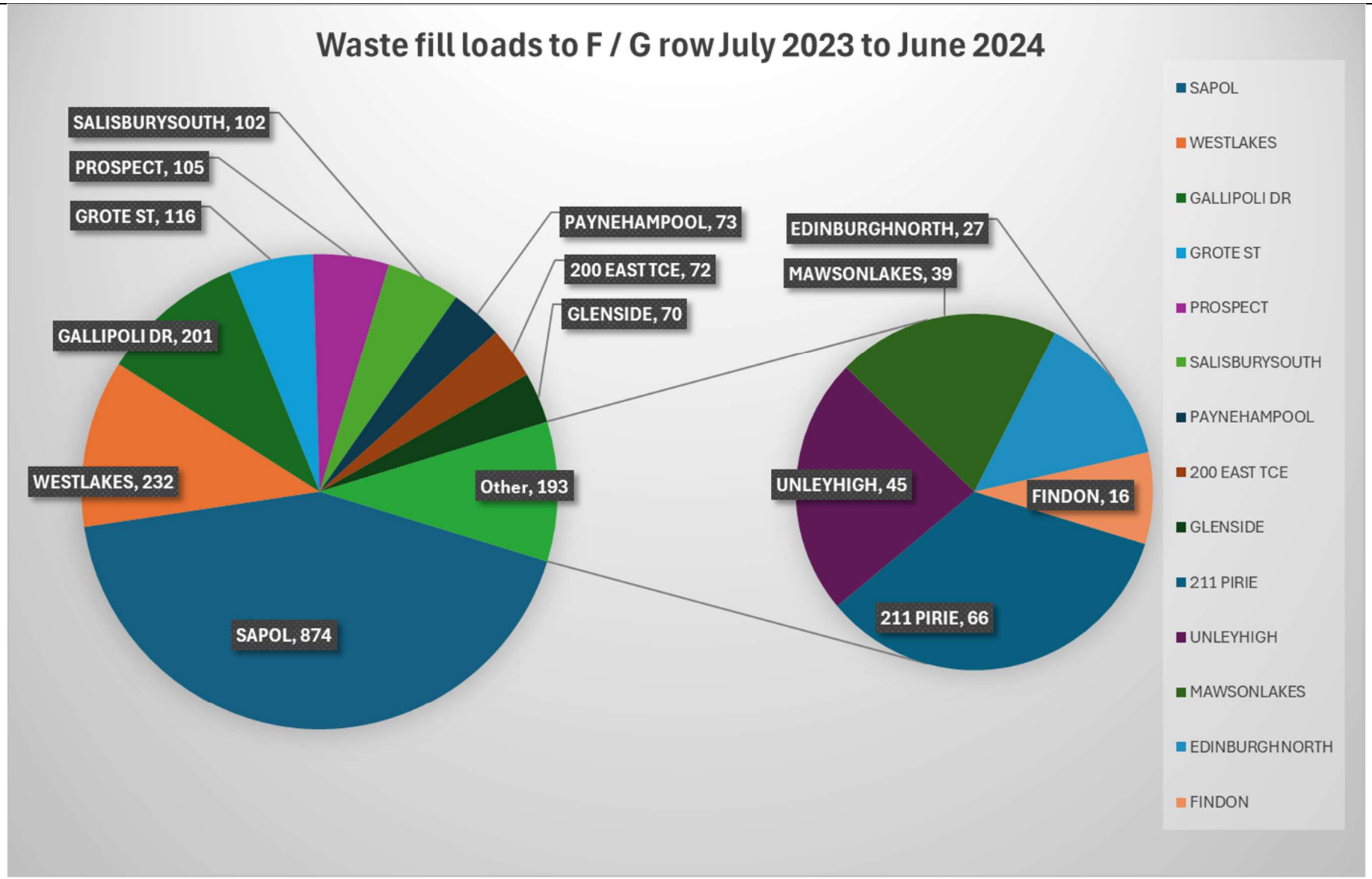


Figure 2: Source of waste soil delivered to Saltfields (both F & G rows)

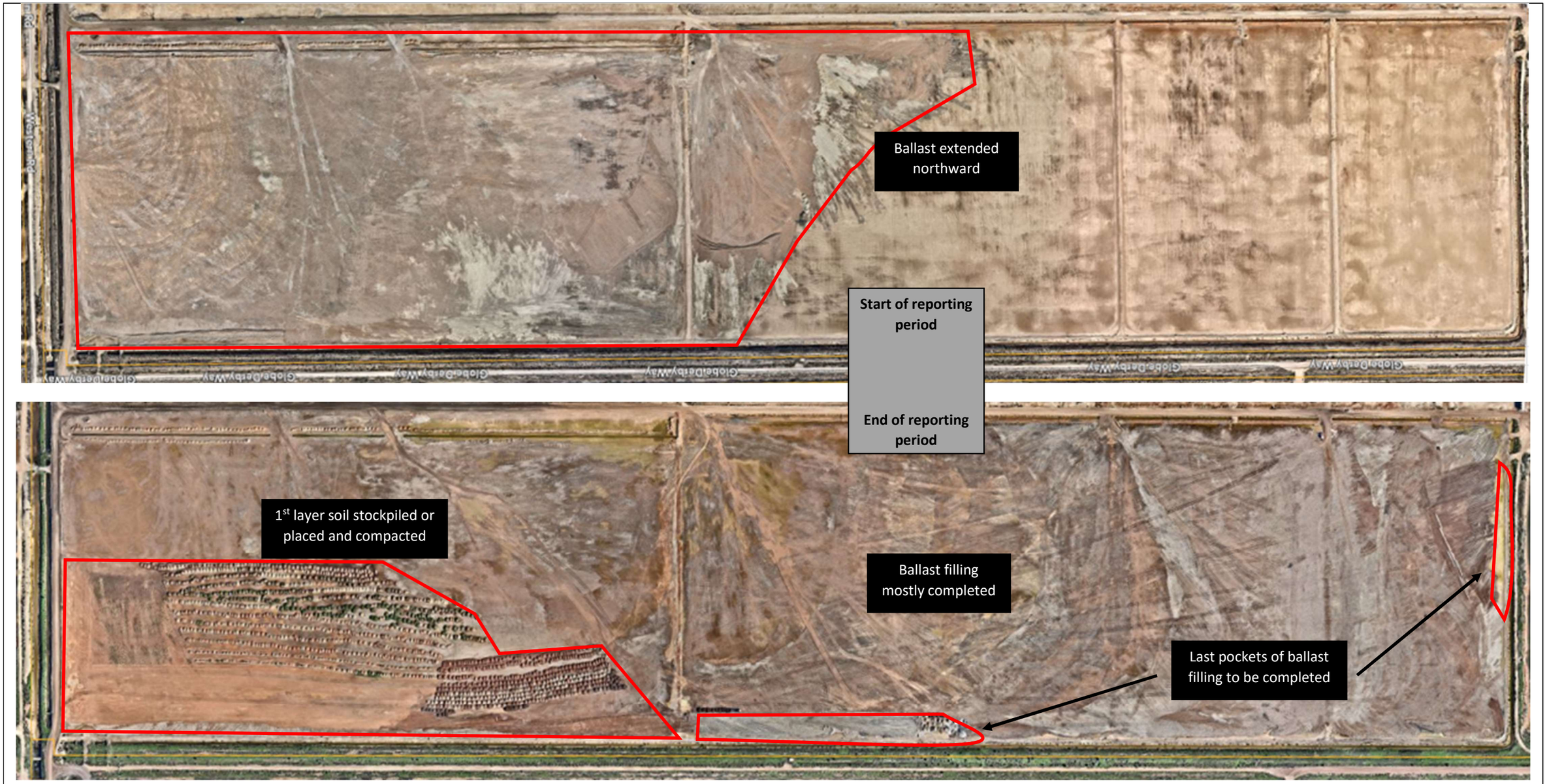


Figure 3: Filling status of F row at start and end of reporting period

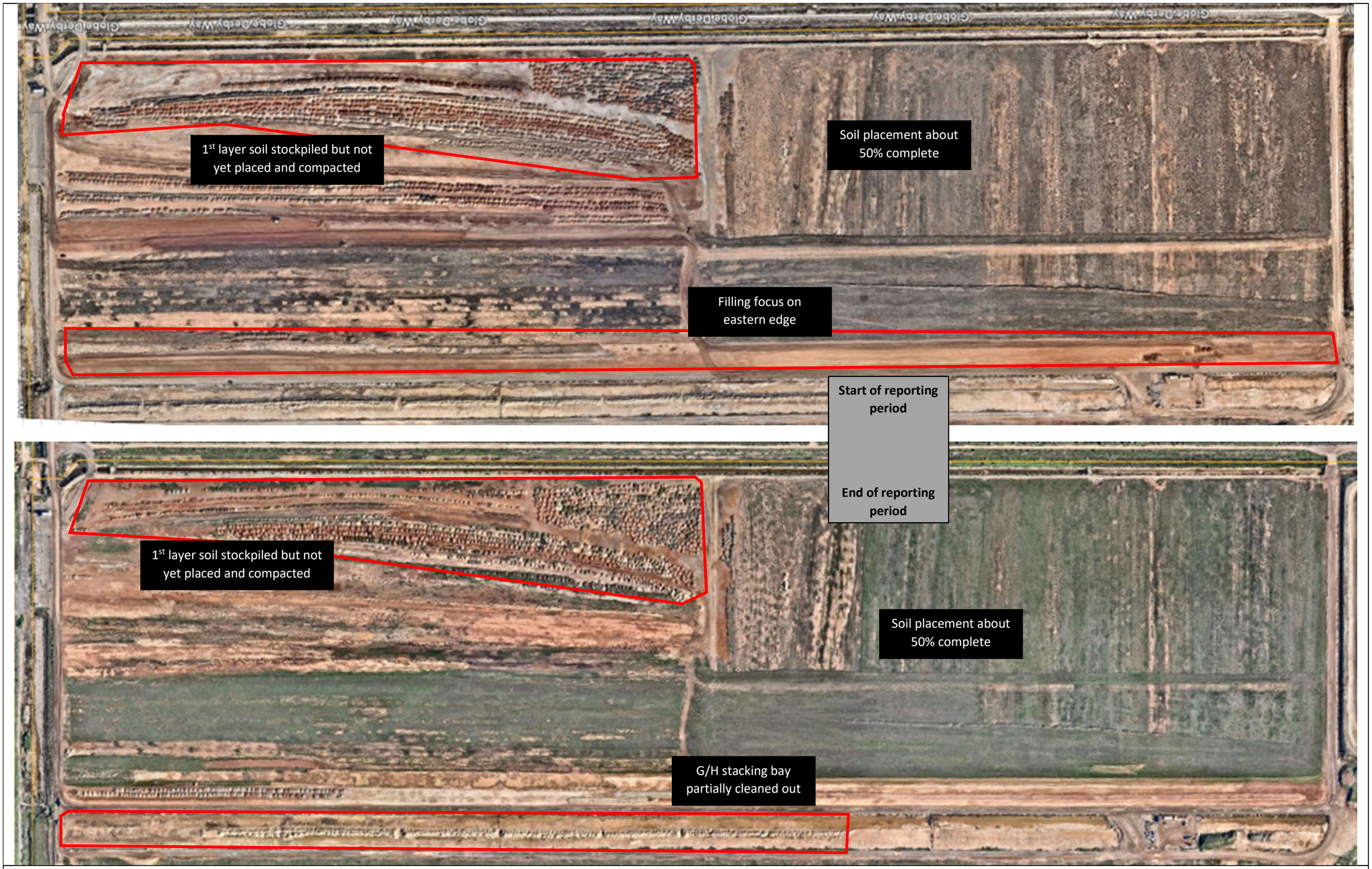
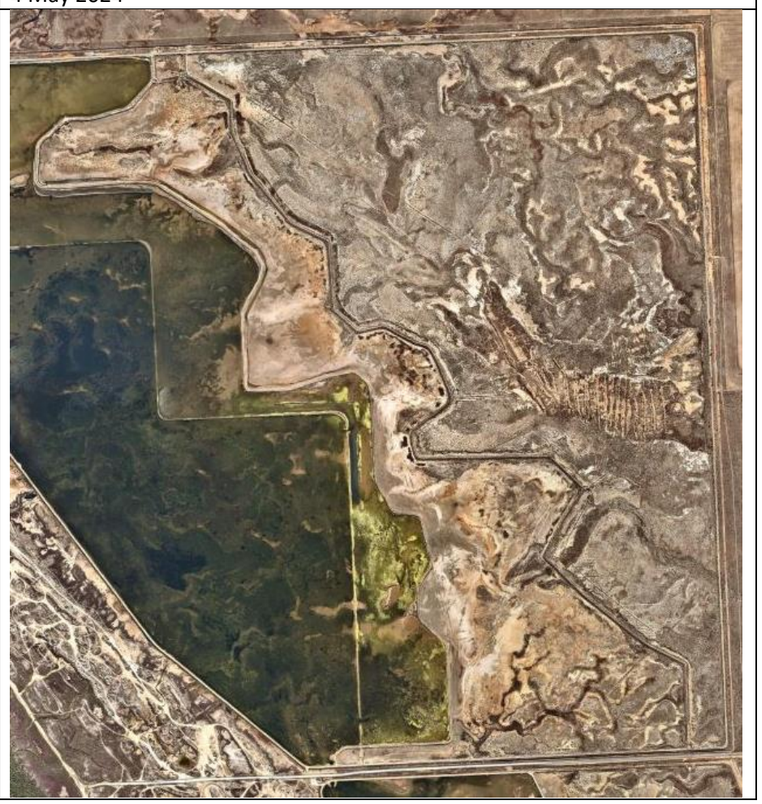


Figure 4: Filling status of G row at start and end of reporting period

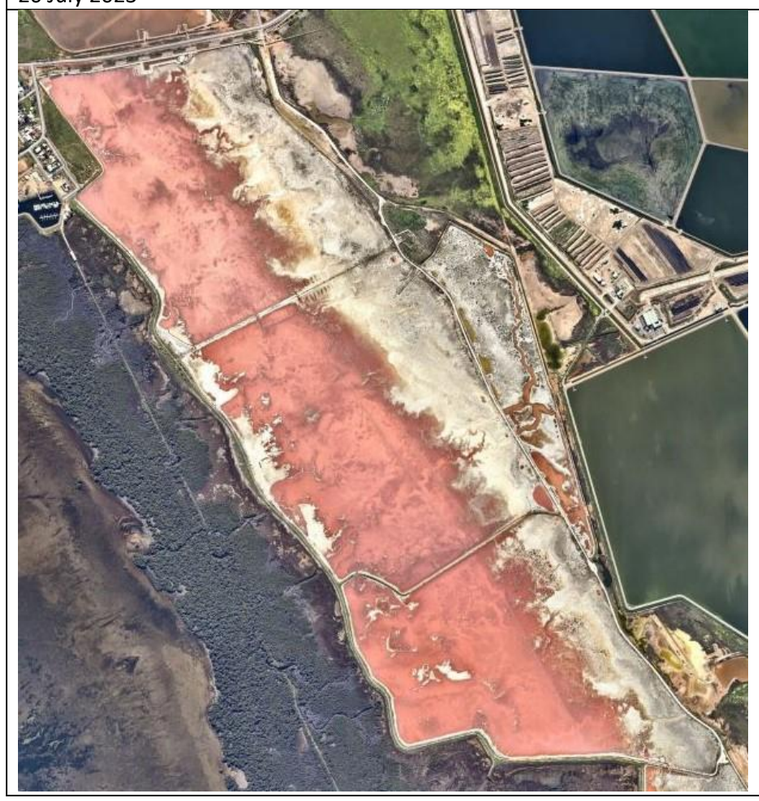
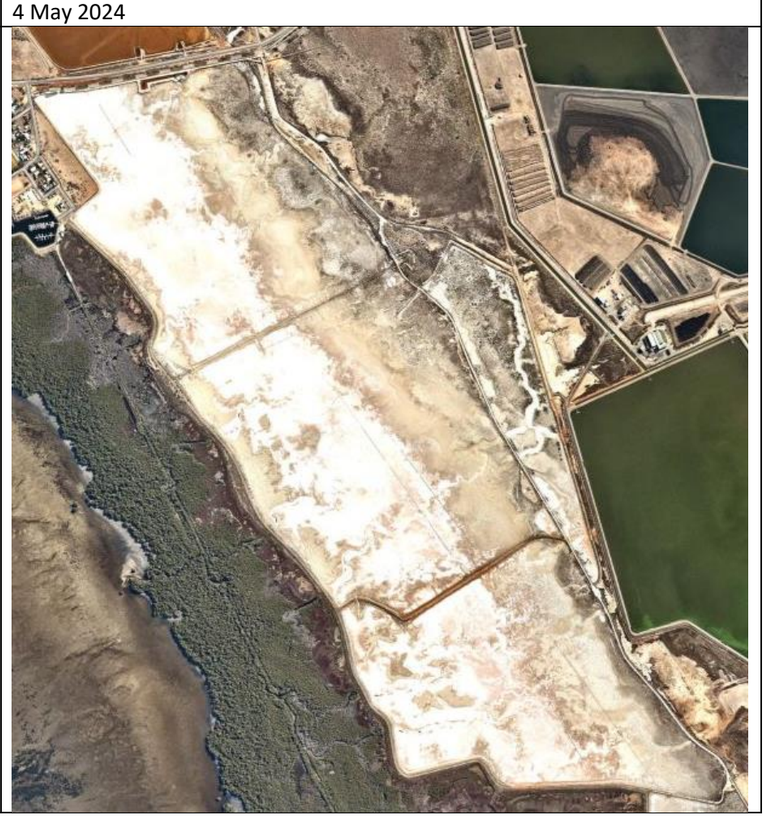
Appendix E – Vegetation

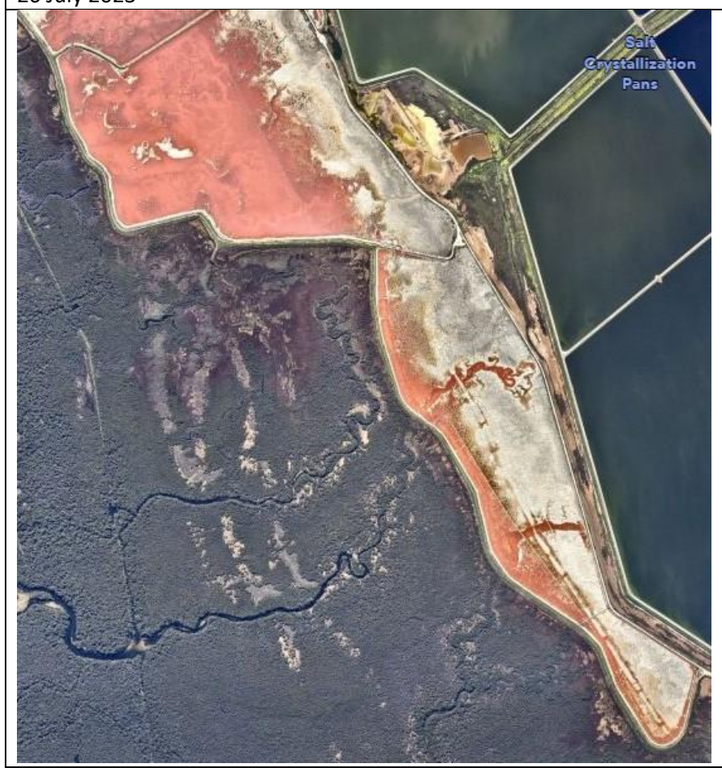
Vegetation In Drained Ponds – Pond XF1 & XF2		
26 July 2023	Aerial Photos from Nearmap	4 May 2024
		

Vegetation In Drained Ponds – Pond XE4		
26 July 2023		4 May 2024
		

Vegetation In Drained Ponds – Pond XC1, XC2, XC2E		
9 Aug 2023		4 May 2024
		

Vegetation In Drained Ponds – Pond XC2S		
9 Aug 2023		4 May 2024
		

Vegetation In Drained Ponds - Ponds PA6 to PA8		
26 July 2023		4 May 2024
		

Vegetation In Drained Ponds – Pond PA8 & PA9		
26 July 2023		4 May 2024
		

Vegetation In Drained Ponds – Ponds PA10 to PA12		
26 July 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond XE1-3		
26 July 2023	Aerial photos from Nearmap	4 May 2024
		

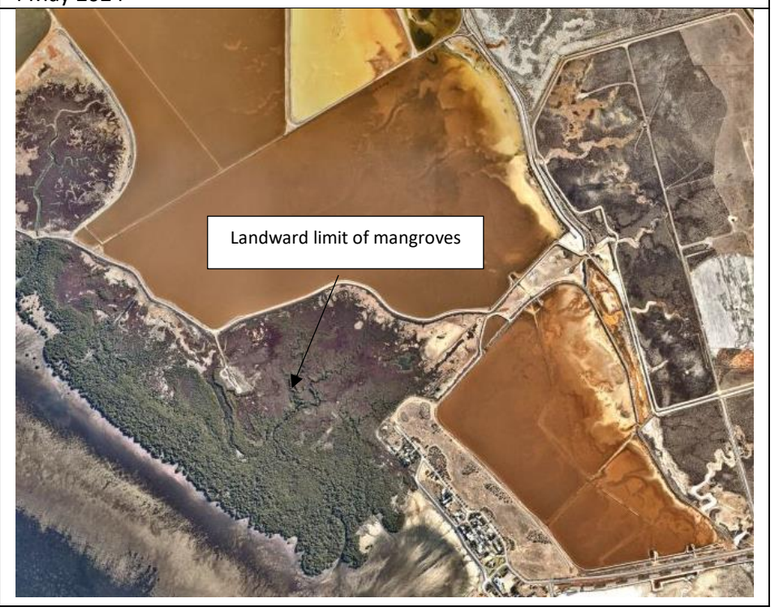
Vegetation To West of Sea Bund – Pond XE5		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond XE6		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond XB3		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond XB4-5		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond XB8 and XB8A		
9 Aug 2023		22 May 2022
		

Vegetation To West of Sea Bund – Pond PA3 and PA4		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond PA6 to PA8		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond PA8 to PA9		
9 Aug 2023		4 May 2024
		

Vegetation To West of Sea Bund – Pond PA10 to PA12		
9 Aug 2023		4 May 2024
		

Appendix F – Licensed Water Discharges (into SA Water Outfall and into Gawler River)

Gmail

Nick Withers <nick.at.withers@gmail.com>

Buckland Dry Creek: 27th Monthly Report - for July 2023

Nick Withers <nick.at.withers@gmail.com> Thu, Aug 3, 2023 at 1:03 PM
To: dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>, "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for July 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 230803"
    - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
    - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
    - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
    - Pages 4 & 5 = Entrainment pumping volumes to the 28 July 2023 compared with entrainment volumes during historic salt production
    - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 28 July 2023
    - Pages 7 to 33 =
        - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
        - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on the SA Water Citrix website, the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control the PA5 discharge.
        - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
        - The Cumulative Discharge from PA5 (dark blue line); and
        - The 45 ppt limit for 6 hr average salinity at Weir 2 (dashed orange line).
    - Page 34 = Brine entrainment from 1 July 2023 to 28 July 2023, discharge flows from 1 July 2023 to 28 July 2023 & outfall flows from 26 June 2023 to 28 July 2023
2. Pond Brine Level Graphs
    - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 230725 for levels from 1 Jan 2022 to 25 July 2023
    - See Holding Pattern Pond Water Levels with Graphs April 2013 to 25 July 2023 for levels from April 2013 to 25 July 2023
3. Pond Brine Salinity and SG
    - See Pond Salinity 1 Jan 2022 to this Year 230725 for salinity from 1 Jan 2022 to 25 July 2023
    - See Pond Salinity 2012 to this Year 230725 for salinity from 2012 to 25 July 2023
    - See Pond SG 2012 to this Year 230725 for specific gravity from 2012 to 25 July 2023

Commentary

1. Pond Brine Levels
    - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow rates to the next downstream pond. Inflow and outflow rates vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement to the next but the longer term trends in levels.
    - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
    - In Section 3:
        - PA3, PA5 levels are within the target ranges
        - XB6, XC3, XD1 levels are within target ranges
        - XA3, XA4 levels are within the target ranges
        - XA1, XA7 levels are within the target ranges
        - The western pond levels are within the target ranges
    - In Section 4: Are within target ranges.
    - In Section 2:
        - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 into PA6, and the only sources of water in the

ponds are:
- from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is above that of the water in these ponds).
- from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
- from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
- from direct rainfall on the pond areas inside their bunds

- With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage

2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally
   - Ponds with salinity approximately consistent with historic salt production levels at the end of March
     - In Section 3: XA1, XB3, XB6, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels at the end of March
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained unaffected by the reductions in salinity of the brine in PA5 On 4 October the salinity in PA6 was 265 ppt, in PA9 was 192 ppt, and PA12 was 203 ppt, compared with historic production salinity in the order of 200 ppt. These salinities in PA6 are anticipated to be approximately replicated in PA7 and PA8 reflect the absence of transmission of brine from PA5 through Section 2 to Section 1, and the dynamic balance of the salinity of incoming groundwater, the salinity of incident rainfall and the effect of dissolution of salts from the floor of the ponds. Evaporation also tends to keep concentrations high. The lower salinities in PA9 and PA12 compared with PA6 reflect the greater flux of groundwater seepage into these ponds due to the lower elevations of parts of their floors relative to groundwater levels at this time of year.
     - In Section 3: XA3, XA4, XA7, XB4-5, XB8, PA 3, PA5
   - PA5 salinity was 194 ppt on 31 July 2023
   - Pumped Entrainment in the month
     - 0 ML per ha, compared with about 0.0 to 0.2 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 437 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit at the compliance points defined in the licence. It is noted that, based on the Holding Pattern monitoring data collected from 2014 to 2017, a fully mixed salinity of 45 ppt measured at the Bridge corresponds to a measured salinity at the licence compliance points which is 5 to 10 ppt lower.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa). Due to planned SA Water operations the Bolivar outfall flow rate increased and decreased during May
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecast ranges for these flows. As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
5. Discharge Management
   - Since 4 April continuous pumping from PA5 has been resumed, following pulsed pumping having resumed on 15 March following the resumption of salt field entrainment disrupted by the disruption to power supplies in December 2022 - see previous monthly reports
   - We are assuming that the summer water management strategy set out on page 32 of the attached file "Entrainment & Discharge Diagrams 230803" will again need to be implemented in the summer of 2023/2024, unless the PERR revision 5 becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 33 of the attached file "Entrainment & Discharge Diagrams 230803" was computed and plotted. This brown line represents the salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by the PA5 discharge.
   - The data in the graphs on Pages 7 to 33 of the attached file "Entrainment & Discharge Diagrams 230803" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the sensor - when it was operating. This

gives confidence in the reliability of the green and brown lines as estimates of the 6 hr average salinity at the Bridge.

- The daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green and dashed blue lines have enabled ongoing provision of an acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
- The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
- The salinity at the Bridge has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

- **Entrainment & Discharge Diagrams 230803.pdf**
  4408K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 230725.pdf**
  113K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 25 July 2023.pdf**
  276K
- **Pond SG 2012 to this Year 230725.pdf**
  546K
- **Pond Salinity 1 Jan 2022 to 230725.pdf**
  276K
- **Pond Salinity 2012 to this Year 230725.pdf**
  626K

Gmail **Nick Withers <nick.at.withers@gmail.com>**

Buckland Dry Creek: 28th Monthly Report - for August 2023

Nick Withers <nick.at.withers@gmail.com> Fri, Sep 8, 2023 at 1:30 PM
To: "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>, dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for August 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 230906"
    - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
    - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
    - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
    - Pages 4 & 5 = Entrainment pumping volumes to the 1 September 2023 compared with entrainment volumes during historic salt production
    - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 27 August 2023 2023
    - Pages 7 to 34 =
        - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
        - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on the SA Water Citrix website, the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control the PA5 discharge.
        - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
        - The Cumulative Discharge from PA5 (dark blue line); and
        - The 45 ppt limit for 6 hr average salinity at Weir 2 (dashed orange line).
    - Page 35 = Brine entrainment from 29 July 2023 to 1 Sept 2023, discharge flows from 29 July 2023 to 27 Aug 2023 & outfall flows from 29 July 2023 to 27 Aug 2023
2. Pond Brine Level Graphs
    - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 230904 for levels from 1 Jan 2022 to 4 Sept 2023
    - See Holding Pattern Pond Water Levels with Graphs April 2013 to 4 Sept 2023 for levels from April 2013 to 4 Sept 2023
3. Pond Brine Salinity and SG
    - See Pond Salinity 1 Jan 2022 to this Year 230904 for salinity from 1 Jan 2022 to 4 Sept 2023
    - See Pond Salinity 2012 to this Year 230904 for salinity from 2012 to 4 Sept 2023
    - See Pond SG 2012 to this Year 230904 for specific gravity from 2012 to 4 Sept 2023

Commentary

1. Pond Brine Levels
    - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow rates to the next downstream pond. Inflow and outflow rates vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement to the next but the longer term trends in levels.
    - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
    - In Section 3:
        - PA3, PA5 levels are within the target ranges
        - XB6, XC3, XD1 levels are within target ranges
        - XA3, XA4 levels are within the target ranges
        - XA1, XA7 levels are within the target ranges
        - The western pond levels are within the target ranges
    - In Section 4: Are within target ranges.
    - In Section 2:
        - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 into PA6, and the only sources of water in the

ponds are:
    - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is above that of the water in these ponds).
    - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
    - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
    - from direct rainfall on the pond areas inside their bunds
  - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage

2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally
   - Ponds with salinity approximately consistent with historic salt production levels at the end of March
     - In Section 3: XA7 XB3, XB8, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels at the end of March
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained unaffected by the reductions in salinity of the brine in PA5 On 4 October the salinity in PA6 was 265 ppt, in PA9 was 192 ppt, and PA12 was 203 ppt, compared with historic production salinity in the order of 200 ppt. These salinities in PA6 are anticipated to be approximately replicated in PA7 and PA8 reflect the absence of transmission of brine from PA5 through Section 2 to Section 1, and the dynamic balance of the salinity of incoming groundwater, the salinity of incident rainfall and the effect of dissolution of salts from the floor of the ponds. Evaporation also tends to keep concentrations high. The lower salinities in PA9 and PA12 compared with PA6 reflect the greater flux of groundwater seepage into these ponds due to the lower elevations of parts of their floors relative to groundwater levels at this time of year.
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, PA 3, PA5
   - PA5 salinity was 182 ppt on 4 Sept 2023
   - Pumped Entrainment in the month
     - 1.9 ML per ha, compared with about 0.0 to 0.2 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 444 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit at the compliance points defined in the licence. It is noted that, based on the Holding Pattern monitoring data collected from 2014 to 2017, a fully mixed salinity of 45 ppt measured at the Bridge corresponds to a measured salinity at the licence compliance points which is 5 to 10 ppt lower.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa). Due to planned SA Water operations the Bolivar outfall flow rate increased and decreased during May
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecast ranges for these flows. As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
5. Discharge Management
   - Since 4 April continuous pumping from PA5 has been resumed - see previous monthly reports for more information
   - We are assuming that the summer water management strategy set out on page 35 of the attached file "Entrainment & Discharge Diagrams 230906" will again need to be implemented in the summer of 2023/2024, unless the PERR revision 5 becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 34 of the attached file "Entrainment & Discharge Diagrams 230906" was computed and plotted. This brown line represents the salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by the PA5 discharge.
   - The data in the graphs on Pages 7 to 34 of the attached file "Entrainment & Discharge Diagrams 2309063" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the sensor - when it was operating. This gives confidence in the reliability of the green and brown lines as estimates of the 6 hr average salinity at the Bridge.

- The daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green and dashed blue lines have enabled ongoing provision of an acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
- The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
- The salinity at the Bridge has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

- **Pond Salinity 1 Jan 2022 to 230904.pdf**
  281K
- **Pond Salinity 2012 to this Year 230904.pdf**
  630K
- **Pond SG 2012 to this Year 230904.pdf**
  549K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 4 Sept 2023.pdf**
  277K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 230904.pdf**
  114K
- **Entrainment & Discharge Diagrams 230906.pdf**
  4513K

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Buckland Dry Creek: 29th Monthly Report - for September 2023

Nick Withers <nick.at.withers@gmail.com> Fri, Oct 6, 2023 at 11:17 AM
To: "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>, dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for September 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 231006"
    - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
    - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
    - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
    - Pages 4 & 5 = Entrainment pumping volumes to the 1 September 2023 compared with entrainment volumes during historic salt production
    - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 29 September 2023 2023
    - Pages 7 to 35 =
        - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
        - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on the SA Water Citrix website, the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control the PA5 discharge.
        - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the daily recorded PA5 discharge flow rate and the estimated daily PA5 salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
        - The Cumulative Discharge from PA5 (dark blue line); and
        - The 45 ppt limit for 6 hr average salinity at Weir 2 (dashed orange line).
    - Page 36 = Brine entrainment from 2 Sept 2023 to 29 Sept 2023, discharge flows from 28 Aug 2023 to 29 Sept 2023 & outfall flows from 28 Aug 2023 to 29 Sept 2023
2. Pond Brine Level Graphs
    - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231002 for levels from 1 Jan 2022 to 2 Oct 2023
    - See Holding Pattern Pond Water Levels with Graphs April 2013 to 2 Oct 2023 for levels from April 2013 to 2 Oct 2023
3. Pond Brine Salinity and SG
    - See Pond Salinity 1 Jan 2022 to this Year 231002 for salinity from 1 Jan 2022 to 2 Oct 2023
    - See Pond Salinity 2012 to this Year 231002 for salinity from 2012 to 2 Oct 2023
    - See Pond SG 2012 to this Year 231002 for specific gravity from 2012 to 2 Oct 2023

Commentary

1. Pond Brine Levels
    - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow rates to the next downstream pond. Inflow and outflow rates vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement to the next but the longer term trends in levels.
    - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
    - In Section 3:
        - PA3, PA5 levels are within the target ranges
        - XB6, XC3, XD1 levels are within target ranges
        - XA3, XA4 levels are within the target ranges
        - XA1, XA7 levels are within the target ranges
        - The western pond levels are within the target ranges
    - In Section 4: Are within target ranges.
    - In Section 2:
        - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 into PA6, and the only sources of water in the

ponds are:
- from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is above that of the water in these ponds).
- from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
- from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
- from direct rainfall on the pond areas inside their bunds

- With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage

2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 3: XA7 XB3, XB8, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained unaffected by the salinity of the brine in PA5
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, PA 3, PA5
   - PA5 salinity was 198 ppt on 2 Oct 2023
   - Pumped Entrainment in the month
     - 1.4 ML per ha, compared with about 0.0 to 1.7 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 487 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit at the compliance points defined in the licence. It is noted that, based on the Holding Pattern monitoring data collected from 2014 to 2017, a fully mixed salinity of 45 ppt measured at the Bridge corresponds to a measured salinity at the licence compliance points which is 5 to 10 ppt lower.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa). Due to planned SA Water operations the Bolivar outfall flow rate increased and decreased during May
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecast ranges for these flows. As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
5. Discharge Management
   - Since 4 April continuous pumping from PA5 has been resumed - see previous monthly reports for more information
   - We are assuming that the summer water management strategy set out on page 36 of the attached file "Entrainment & Discharge Diagrams 231006" will again need to be implemented in the summer of 2023/2024, unless the PERR revision 5 becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 35 of the attached file "Entrainment & Discharge Diagrams 231006" was computed and plotted. This brown line represents the salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by the PA5 discharge.
   - The data in the graphs on Pages 7 to 34 of the attached file "Entrainment & Discharge Diagrams 231006" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the sensor - when it was operating. This gives confidence in the reliability of the green and brown lines as estimates of the 6 hr average salinity at the Bridge.
     - The daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green and dashed blue lines have enabled ongoing provision of an acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
     - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
     - The salinity at the Bridge has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

- **Pond Salinity 1 Jan 2022 to 231002.pdf**
  278K
- **Pond SG 2012 to this Year 231002.pdf**
  550K
- **Pond Salinity 2012 to this Year 231002.pdf**
  632K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 2 Oct 2023.pdf**
  278K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231002.pdf**
  115K
- **Entrainment & Discharge Diagrams 231006.pdf**
  4635K

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Nick Withers <nick.at.withers@gmail.com>

Buckland Dry Creek: 30th Monthly Report - for October 2023

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To: "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>, dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for October 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 231106"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to the 1 September 2023 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 29 October 2023
   - Pages 7 to 36 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at Weir 2 (dashed orange line).
   - Page 37 = Brine entrainment from 30 Sept 2023 to 27 Sept 2023, discharge flows from 30 Sept 2023 to 29 Oct 2023 & outfall flows from 30 Sept 2023 to 29 Oct 2023
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231016 for levels from 1 Jan 2022 to 16 Oct 2023
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 16 Oct 2023 for levels from April 2013 to 16 Oct 2023
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2022 to this Year 231016 for salinity from 1 Jan 2022 to 16 Oct 2023
   - See Pond Salinity 2012 to this Year 231016 for salinity from 2012 to 16 Oct 2023
   - See Pond SG 2012 to this Year 231016 for specific gravity from 2012 to 16 Oct 2023

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3:
     - PA3, PA5 levels are within the target ranges
     - XB6, XC3, XD1 levels are within target ranges
     - XA3, XA4 levels are within the target ranges
     - XA1, XA7 levels are within the target ranges
     - The western pond levels are within the target ranges
   - In Section 4: Are within target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warner weather
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 3: XB3, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, XB8, PA 3, PA5
   - PA5 salinity was 216 ppt on 31 Oct 2023
   - Pumped Entrainment in the month
     - 1.6 ML per ha, compared with about 0.8 to 2.1 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 305 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas

- As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.

5. Discharge Management
   - Since 4 April and until 20 October continuous pumping from PA5 has been maintained - see previous monthly reports for more information
   - We are assuming that the summer water management strategy set out on page 36 of the attached file "Entrainment & Discharge Diagrams 231006" will again need to be implemente becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 35 of the attached file "Entrainment & Discharge Di represents the salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by th
   - The data in the graphs on Pages 7 to 34 of the attached file "Entrainment & Discharge Diagrams 231106" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green and brown lines as estimates of the 6 hr average salinity at the Bridge.
     - The daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green and dashed blue lines have enabled c continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
     - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
     - The salinity at the Bridge has remained under control - and below the EPA licence limit for the designated compliance points

Regards

Nick

Nick Withers

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6 attachments

- **Entrainment & Discharge Diagrams 231106.pdf** 4808K
- **Pond SG 2012 to this Year 231016.pdf** 553K
- **Pond Salinity 2012 to this Year 231016.pdf** 634K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231016.pdf** 116K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 16 Oct 2023.pdf** 279K
- **Pond Salinity 1 Jan 2022 to 231016.pdf** 280K

Gmail

Nick Withers <nick.at.withers@gmail.com>

Buckland Dry Creek: 31st Monthly Report - for November 2023

Nick Withers <nick.at.withers@gmail.com>
To: "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>, dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for November 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 231207"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to the 1 December 2023 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 3 December 2023
   - Pages 7 to 37 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 38 = Brine entrainment from 28 Oct 2023 to 3 Dec 2023, discharge flows from 30 Oct 2023 to 3 Dec 2023 & outfall flows from 30 Oct 2023 to 3 Dec 2023
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231204 for levels from 1 Jan 2022 to 4 Dec 2023
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 4 Dec 2023 for levels from April 2013 to 4 Dec 2023
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2022 to this Year 231204 for salinity from 1 Jan 2022 to 4 Dec 2023
   - See Pond Salinity 2012 to this Year 231204 for salinity from 2012 to 4 Dec 2023
   - See Pond SG 2012 to this Year 231204 for specific gravity from 2012 to 4 Dec 2023

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3:
     - PA3, PA5 levels are within the target ranges
     - XB6, XC3, XD1 levels are within target ranges
     - XA3, XA4 levels are within the target ranges
     - XA1, XA7 levels are within the target ranges
     - The western pond levels are within the target ranges
   - In Section 4: Are within target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warner weather
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 3: XB3, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, XB8, PA 3, PA5
   - PA5 salinity was 209 ppt on 4 Dec 2023
   - Pumped Entrainment in the month
     - 2.6 ML per ha, compared with about 1.8 to 3.0 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 214 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas

- As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.

5. Discharge Management
   - In November as in late October, triggered by reductions in flow from Bolivar arising from SA Water operational requirements, continuous discharge from PA5 has been replaced with
     - periods of pulsed discharge; or
     - periods with no discharge
   - This change from continuous discharge had the desired effect of keeping the 6-hourly average
   - We are assuming that the summer water management strategy set out on page 38 of the attached file "Entrainment & Discharge Diagrams 231207" will again need to be implemente becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 37 of the attached file "Entrainment & Discharge Di represents the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt lo
   - The data in the graphs on Pages 7 to 37 of the attached file "Entrainment & Discharge Diagrams 231207" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less, for reasons that are outlined on the graph on page 37 of the attached file "Entrainment & Discharge Diagrams 23
     - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
     - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
     - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

- **Entrainment & Discharge Diagrams 231207.pdf**
  5043K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231204.pdf**
  118K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 4 Dec 2023.pdf**
  281K
- **Pond Salinity 1 Jan 2022 to 231204.pdf**
  289K
- **Pond SG 2012 to this Year 231204.pdf**
  558K
- **Pond Salinity 2012 to this Year 231204.pdf**
  558K

Gmail

Nick Withers <nick.at.withers@gmail.com>

Buckland Dry Creek: 32nd Monthly Report - for December 2023

Nick Withers <nick.at.withers@gmail.com>
To: "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>, dem.miningregrehab@sa.gov.au
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for November 2023:

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240104"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to the 1 December 2023 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 3 December 2023
   - Pages 7 to 38 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 39 = Brine entrainment from 2 Dec 2023 to 29 Dec 2023, discharge flows from 4 Dec 2023 to 29 Dec 2023 & outfall flows from 4 Dec 2023 to 29 Dec 2023
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231218 for levels from 1 Jan 2022 to 18 Dec 2023
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 18 Dec 2023 for levels from April 2013 to 18 Dec 2023
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2022 to this Year 231218 for salinity from 1 Jan 2022 to 18 Dec 2023
   - See Pond Salinity 2012 to this Year 231218 for salinity from 2012 to 18 Dec 2023
   - See Pond SG 2012 to this Year 231218 for specific gravity from 2012 to 18 Dec 2023

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3:
     - PA3, PA5 levels are within the target ranges
     - XB6, XC3, XD1 levels are within target ranges
     - XA3, XA4 levels are within the target ranges
     - XA1, XA7 levels are within the target ranges
     - The western pond levels are within the target ranges
   - In Section 4: Are within target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 3: XB3, XC3, XD1.
     - In Section 4: XE1-3, XE5, XE6
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, XB8, PA 3, PA5
   - PA5 salinity was 205 ppt on 27 Dec 2023
   - Pumped Entrainment in the month
     - 0.2 ML per ha, compared with about 0.7 to 3.1 ML per ha during historic salt production.
3. Pumped Discharge in the month
   - PA5 to Bolivar = 301 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
4. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas

- As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.

5. Discharge Management
   - In December, until the Xmas and New Year breaks, continuous discharge from PA5 resumed. For the Xmas and New Year breaks, pumped discharge paused to avoid any risk to salir
   - We are assuming that the summer water management strategy set out on page 38 of the attached file "Entrainment & Discharge Diagrams 240104" will again need to be implemente becomes approved, and a pipeline is constructed in time before then to conduct brine from PA5 to Section 1
   - Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 38 of the attached file "Entrainment & Discharge Di represents the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt lo
   - The data in the graphs on Pages 7 to 37 of the attached file "Entrainment & Discharge Diagrams 240104" show that:
     - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less, for reasons that are outlined on the graph on page 37 of the attached file "Entrainment & Discharge Diagrams 24
     - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
     - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
     - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

- **Entrainment & Discharge Diagrams 240104.pdf**
  5220K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2022 to 231218.pdf**
  118K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 18 Dec 2023.pdf**
  281K
- **Pond Salinity 1 Jan 2022 to 231218.pdf**
  290K
- **Pond SG 2012 to this Year 231218.pdf**
  560K
- **Pond Salinity 2012 to this Year 231218.pdf**
  642K

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Buckland Dry Creek: 33rd Monthly Report - for January 2024 - Draft for your review

Nick Withers <nick.at.withers@gmail.com> Fri, Mar 1, 2024 at 3:50 PM
To: dem.miningregrehab@sa.gov.au, "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

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6 attachments

- **Pond Salinity 1 Jan 2023 to 240129.pdf**
  251K
- **Pond SG 2012 to this Year 240129.pdf**
  564K
- **Pond Salinity 2012 to this Year 240129.pdf**
  647K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240129.pdf**
  101K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 240129.pdf**
  282K
- **Entrainment & Discharge Diagrams 240206.pdf**
  5228K

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Buckland Dry Creek: 34th Monthly Report - for February 2024. Draft for your Review

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Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for February 2024

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240301"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to the 1 March 2024 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 25 February 2023
   - Pages 7 to 40 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 41 = Brine entrainment from 3 Feb 2023 to 1 March 2024, discharge flows from 3 Feb 2023 to 1 March 2024 & outfall flows from 29 Jan 2024 to 25 Feb 2024
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240226 for levels from 1 Jan 2023 to 26 Feb 2024
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 240226 for levels from April 2013 to 26 Feb 2024
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2023 to 240226 for salinity from 1 Jan 2023 to 26 Feb 2024
   - See Pond Salinity 2012 to this Year 240226 for salinity from 2012 to 26 Feb 2024
   - See Pond SG 2012 to this Year 240226 for specific gravity from 2012 to 26 Feb 2024

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3, the restoration of entrainment from Middle Beach from 8 February is resulting progressive (i.e from north to south) restoration of brine levels to within target levels, where be largely achieved in all Section 3 ponds by about end March 2024
     - PA3, PA5 levels are within the target ranges
     - XB6, XC3, XD1 levels are below target ranges, XD1 rising
     - XA3, XA4 levels are below the target ranges
     - XA1, XA7 levels are within the target ranges
     - The western pond levels are within the target ranges
   - In Section 4: Restored to target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - The restoration of entrainment from Middle Beach from 8 February is resulting iprogressive (i.e from north to south) restoration of brine salinities to within target levels, where these hav achieved in all Section 3 ponds by about end April 2024

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Regards

Nick

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6 attachments

- **Entrainment & Discharge Diagrams 240301.pdf** 5370K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240226.pdf** 102K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 240226.pdf** 284K
- **Pond Salinity 1 Jan 2023 to 240226.pdf** 255K

Pond SG 2012 to this Year 240226.pdf
568K
Pond Salinity 2012 to this Year 240226.pdf
651K

Gmail

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Buckland Dry Creek: 35th Monthly Report - for March 2024.

1 message

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Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for February 2024

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240404"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to the 29 March 2024 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 24 March 2024
   - Pages 7 to 41 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 42 = Brine entrainment from 2 March 2023 to 29 March 2024, discharge flows from 2 March 2023 to 29 March 2024 & outfall flows from 26 Feb 2024 to 24 Mar 2024
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240325 for levels from 1 Jan 2023 to 25 Mar 2024
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 240325 for levels from April 2013 to 25 Mar 2024
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2023 to 240325 for salinity from 1 Jan 2023 to 25 Mar 2024
   - See Pond Salinity 2012 to this Year 240325 for salinity from 2012 to 25 Mar 2024
   - See Pond SG 2012 to this Year 240325 for specific gravity from 2012 to 25 Mar 2024

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3, the restoration of entrainment from Middle Beach from 8 February is resulting progressive (i.e from north to south) restoration of brine levels to within target levels, where be largely achieved in all Section 3 ponds by about end March 2024
     - XB6, XC3, XA1, XA3, XA4, XC3, XA7 , PA3, PA5 levels are below target ranges,
     - XB3, XD1, XB6, are within the target ranges
   - In Section 4: Restored to target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - The restoration of entrainment from Middle Beach from 8 February is resulting iprogressive (i.e from north to south) restoration of brine salinities to within target levels, where these hav achieved in all Section 3 ponds by about end April 2024
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 4: XE1-3, XE5 , XE6
     - In Section 3: XB3
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA1, XA3, XA4, XA7, XB4-5, XB6, XB8, PA 3, PA5 , XC3, XD1
   - PA5 salinity has risen from 277 ppt on 26 February 2024 to 283 ppt on 25 March 2024
3. Pumped Entrainment in the month
   - 2.9 ML per ha, compared with about 0.8 to 2.3 ML per ha during historic salt production.
4. Pumped Discharge in the month
   - PA5 to Bolivar = 0 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
5. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).

- Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas
  - As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.

6. Discharge Management

- In February there was no discharge from PA5, due to the consequences of a fault in the power supply cables for the Middle Beach pumps. Until the fault was rectified there was no entrai Gawler from Section 4 into Section 3. There was however entrainment at Chapman Creek. Rectification of that fault allowed entrainment at Middle Beach to resume on 8 February, follow entrainment is progressively restoring pond water levels from north to south in Section 3. It is currently estimated that discharge from PA5 may be able to resume by about end April. The
  - The effects of entrainment have now reached as far south as XA3, and XA4 with the following trends in water levels and salinities
  - Water Levels:
    - Water levels stable in Ponds XE1-3, XE5, XE6, XB6, XD1,
    - Water levels falling in ponds XA1, XB8, PA3, PA5
    - Water levels rising in ponds XB3, XB4-5, XA3, XA4,
    - Dry Ponds XC3, XA7
  - Salinities
    - Salinies stable in ponds XE1-3, XA1, PA3, PA5, XA3, XA4
    - Salinities falling in ponds XD1, XE5, XE6, XB3, XB4-5, XB6
    - Salinities rising in ponds XB8
  -
- We note the summer water management strategy set out on page 42 of the attached file "Entrainment & Discharge Diagrams 240404"
- Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 40 of the attached file " Entrainment & Discharge Diag represents the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load
- The data in the graphs on Pages 7 to 40 of the attached file " Entrainment & Discharge Diagrams 240301 " show that:
  - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less.
  - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
  - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
  - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

Nick
Nick Withers

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6 attachments

- **Entrainment & Discharge Diagrams 240404.pdf**
  5383K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240325.pdf**
  103K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 240325.pdf**
  285K
- **Pond SG 2012 to this Year 240325.pdf**
  571K
- **Pond Salinity 1 Jan 2023 to 240325.pdf**
  301K
- **Pond Salinity 2012 to this Year 240325.pdf**
  654K

Gmail Nick Withers <nick.at.withers@gmail.com>

Fwd: Buckland Dry Creek: 36th Monthly Report - for April 2024.

Nick Withers <nick.at.withers@gmail.com>
To: dem.miningregrehab@sa.gov.au, "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for April 2024

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240509"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to 3 May 2024 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 28 April 2024
   - Pages 7 to 42 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 42 = Brine entrainment from 30 March 2023 to 3 May 2024, discharge flows from 30 March 2023 to 3 May 2024 & outfall flows from 25 Mar 2024 to 28 April 2024
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240506 for levels from 1 Jan 2023 to 6 May 2024
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 240506 for levels from April 2013 to 6 May 2024
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2023 to 240506 for salinity from 1 Jan 2023 to 6 May 2024
   - See Pond Salinity 2012 to this Year 240506 for salinity from 2012 to 6 May 2024
   - See Pond SG 2012 to this Year 240506 for specific gravity from 2012 to 6 May 2024

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3, the restoration of entrainment from Middle Beach from 8 February has resulted in progressive (i.e from north to south) restoration of brine levels to within target levels
   - In Section 4: Restored to target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - The restoration of entrainment from Middle Beach from 8 February has resulted in iprogressive (i.e from north to south) restoration of brine salinities towards target levels, where these
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 4: XE1-3, XE5 , XE6
     - In Section 3: XB3, XA1, XA3, XA4, XB6, XD1
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA7, XB4-5, XB8 , PA 3, PA5 , XC3,
   - PA5 salinity has fallen from 283 ppt on 25 March 2024 to 208 ppt on 6 May 2024
3. Pumped Entrainment in the month
   - 3.1 ML per ha, compared with about 0.2 to 1.1 ML per ha during historic salt production.
4. Pumped Discharge in the month
   - PA5 to Bolivar = 21 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
5. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas
     - As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
6. Discharge Management

   - In April, till April 29th, when discharge resumed, there was no discharge from PA5, for the reasons previously reported. The status as at 6 May 2024 was

- Water Levels - the effects of entrainment have now reached as far south as PA5
  - Dry Ponds XC3, XA7
  - Water levels rising in ponds PA3, PA5, XA3, XA4, XB4-5, XA1, XB8
  - Water levels falling in ponds None
  - Water levels stable in Ponds XE1-3, XE5, XE6, XB6, XD1, XC3, XB3

- Salinities - the effects of entrainment have now reached as far south as PA5
  - Salinities rising in ponds XA1, PA3
  - Salinities falling in ponds XB3, PA5, XA3, XA4
  - Salinies stable in ponds XE1-3, XE6, XE5, XB4-5, XC3, XD1, XB6, XB8

- We note the summer water management strategy set out on page 43 of the attached file "Entrainment & Discharge Diagrams 240509"
- Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 42 of the attached file " Entrainment & Discharge Diagrams 2 the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by the P
- The data in the graphs on Pages 7 to 40 of the attached file " Entrainment & Discharge Diagrams 240509 " show that:

  - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less.
  - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
  - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
  - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

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6 attachments

Entrainment & Discharge Diagrams 240509.pdf
5487K

Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240506.pdf
105K

Holding Pattern Pond Water Levels with Graphs April 2013 to 240506.pdf
285K

Pond Salinity 1 Jan 2023 to 240506.pdf
260K

Pond SG 2012 to this Year 240506.pdf
574K

Pond Salinity 2012 to this Year 240506.pdf
659K

Gmail

Nick Withers <nick.at.withers@gmail.com>

Fwd: Buckland Dry Creek: 37th Monthly Report - for May 2024.

Nick Withers <nick.at.withers@gmail.com>
To: dem.miningregrehab@sa.gov.au, "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for May 2024

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240606"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to 31 May 2024 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 5 May 2024. (SA Water data files for producing this graph not available past this date)
   - Pages 7 to 43 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 44 = Brine entrainment from 4 May 2024 to 31 May 2024, discharge flows from 4 May 2024 to 31 May 2024. Note: outfall flows for May not known as SA Water data files fc
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240603
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 240603
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2023 to 240603
   - See Pond Salinity 2012 to this Year 240603
   - See Pond SG 2012 to this Year 240603

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3, the restoration of entrainment from Middle Beach from 8 February has resulted in progressive (i.e from north to south) restoration of brine levels to within target levels
   - In Section 4: Restored to target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - The restoration of entrainment from Middle Beach from 8 February has resulted in iprogressive (i.e from north to south) restoration of brine salinities towards target levels, where these
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 4: XE1-3, XE5 , XE6
     - In Section 3: XB3, XA1, XA3, XA4, XB6, XD1
   - Ponds with salinity higher than historic salt production levels
     - In Section 2: PA 6 to PA12 - These ponds have not received brine from PA5 since issue of the Environmental Direction, and so the salinities in these ponds have remained una
     - In Section 3: XA7, XB4-5, XB8 , PA 3, PA5 , XC3,
   - PA5 salinity has fallen from 208 ppt on 6 May 2024 to 194 ppt on 3 June 2024
3. Pumped Entrainment in the month
   - 1.1 ML per ha, compared with about 0.0 to 0.8 ML per ha during historic salt production.
4. Pumped Discharge in the month
   - PA5 to Bolivar = 408 ML compared with 0 ML in this period during historic salt production
   - PA5 to PA6 = 0 ML, compared with an average of 0 ML during historic salt production.
   - PA9 to PA10 = 0 ML , compared with an average of 0 ML during historic salt production.
   - PA12 to Section 1 = 0 ML , compared with average of 0 ML during historic salt production
5. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas
     - As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
6. Discharge Management
   - The status as at 6 June 2024 was

- Water Levels - the effects of entrainment have now reached as far south as PA5
  - Dry Ponds XC3, XA7
  - Water levels rising in ponds None
  - Water levels falling in ponds None
  - Water levels stable in Ponds XE1-3, XE5, XE6, XB6, XD1, XC3, XB3, PA3, PA5, XA3, XA4, XB4-5, XA1, XB8
- Salinities - the effects of entrainment have now reached as far south as PA5
  - Salinities rising in ponds None
  - Salinities falling in ponds XB3, PA5, XA1, PA3
  - Salinies stable in ponds XE1-3, XE6, XE5, XB4-5, XC3, XD1, XB6, XB8, XB3, XA3, XA4

- We note the summer water management strategy set out on page 43 of the attached file "Entrainment & Discharge Diagrams 240606"
- Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 43 of the attached file " Entrainment & Discharge Diagrams 2 the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt load provided by the P
- The data in the graphs on Pages 7 to 43 of the attached file " Entrainment & Discharge Diagrams 240606 " show that:
  - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less.
  - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
  - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
  - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

Nick

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6 attachments

Entrainment & Discharge Diagrams 240606.pdf
5756K

Pond Salinity 1 Jan 2023 to 240603.pdf
263K

Pond SG 2012 to this Year 240603.pdf
577K

Pond Salinity 2012 to this Year 240603.pdf
661K

Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240603.pdf
106K

Holding Pattern Pond Water Levels with Graphs April 2013 to 240603.pdf
286K

Gmail

Nick Withers <nick.at.withers@gmail.com>

Buckland Dry Creek: 38th Monthly Report - for June 2024.

1 message

Nick Withers <nick.at.withers@gmail.com>
To: dem.miningregrehab@sa.gov.au, "Stewart, Mark (DEM)" <mark.stewart2@sa.gov.au>
Cc: George Kontogeorgos <georgekonto01@yahoo.com.au>

To whom it may concern,

Please find attached a set of information that together with the commentary below represent the monthly report for June 2024

1. Information on Brine Flows - see attached file "Entrainment & Discharge Diagrams 240708"
   - Page 1 = Salt field layout with flow patterns and brine specific gravity during historic salt production - for context
   - Page 2 = Indicative typical brine entrainment and discharge flows during historic salt production - for context
   - Page 3 = Indicative typical brine entrainment and discharge flows during holding pattern before XBA closed to the rest of the field and opened to tidal flows - for context
   - Pages 4 & 5 = Entrainment pumping volumes to 28 June 2024 compared with entrainment volumes during historic salt production
   - Page 6 = SA Water Bolivar Flows, expressed as ML/ Month, to 30 June 2024.
   - Pages 7 to 44 =
     - The Moving 6 Hr average salinity as measured at the Bridge (orange line);
     - The daily estimate of the Fully Mixed Salinity (green line) given the estimated average daily Bolivar flow rate and salinity taken from the graphs of moving 6 hrly average data on flow rate and the estimated daily PA5 salinity based on trends in the prior week; This fully mixed is estimated daily to provide a trend line for forward projection to help control th
     - The weekly estimate of the moving 6 hrly average Fully Mixed Salinity (brown iine) given the SA Water weekly provided 15 minute interval Bolivar flow and salinity data , the dail salinity based on trends in the prior week; This is an after-the-fact check on the daily estimate
     - The Cumulative Discharge from PA5 (dark blue line); and
     - The 45 ppt limit for 6 hr average salinity at the compliance points (dashed orange line).
   - Page 45 = Brine entrainment from 31 May 2024 to 28 June 2024, discharge flows from 31 May 2024 to 30 June 2024 .
2. Pond Brine Level Graphs
   - See Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240701
   - See Holding Pattern Pond Water Levels with Graphs April 2013 to 240701
3. Pond Brine Salinity and SG
   - See Pond Salinity 1 Jan 2023 to 240701
   - See Pond Salinity 2012 to this Year 240701
   - See Pond SG 2012 to this Year 240701

Commentary

1. Pond Brine Levels
   - Brine levels in each pond fluctuate in response to evaporation, rainfall, seepage losses from the ponds and between ponds, inflow rates from the adjacent upstream pond and outflow r vary with the water level difference between ponds, or in the case of pumped flow, with the pumping hours. What matters therefore is not the variation in level from one measurement t
   - Brine levels in PA6, PA8, PA9, PA10, PA11, PA12 are not measured routinely.
   - In Section 3, Within target ranges
   - In Section 4: Within target ranges.
   - In Section 2:
     - These ponds have brine levels - consistent with the ranges in levels achieved during the Holding Pattern from 2014 to 2019, when there was also no pumped inflow from PA5 in
       - from inward groundwater seepage into the low parts of PA6, PA7, PA8, PA9, PA12 (from the regional groundwater to the east of the ponds, when its piezometric head is a
       - from inward seepage of water from external sea water when tide levels raise the external piezometric head above that in the ponds;
       - from outward seepage of water to external sea water when tide levels allow raise the external piezometric head below that in the ponds;
       - from direct rainfall on the pond areas inside their bunds
     - With no pumped inflow of brine from PA5, the brine levels represent the balance of this rainfall, evaporation, and seepage
2. Pond Salinity Levels
   - Salinities in ponds fluctuate seasonally, and have started their seasonal rise with the onset of warmer weather
   - Ponds with salinity approximately consistent with historic salt production levels
     - In Section 4: XE1-3, XE5 , XE6
     - In Section 3: XB3, XA1, XA3, XA4, XB6, XD1, PA5, PA3
   - Ponds with salinity higher than historic salt production levels
     - In Section 3: XA7, XB4-5, XB8 , XC3,
   - PA5 salinity has fallen from 194 ppt on 3 June 2024 to 152 ppt on 1 July 2024
3. Pumped Entrainment in the month
   - 0.3 ML per ha, compared with about 0.0 to 0.2 ML per ha during historic salt production.
4. Pumped Discharge in the month
   - PA5 to Bolivar = 430 ML
   - PA5 to PA6 = 0 ML
   - PA9 to PA10 = 0 ML
   - PA12 to Section 1 = 0 ML
5. Salinity at the Bridge
   - The data indicates no exceedance of the EPA licence compliance limit of 45 ppt for the 6 hour moving average salinity at the compliance points defined in the licence.
   - For a given settings of the return valves, the discharge flow rate reflects the density of the brine (lower density = higher volume flow rate)
   - The settings of the return valves have been adjusted if necessary during the month in response to fluctuations in flow rates and salinities of the discharges from the Bolivar STP
   - The salinity at the Bridge is mostly responsive to changes in Bolivar outfall flow rate (increases in flow rate = decreases in salinity and vice versa).
   - Due to operational issues at the Bolivar STP these changes in the Bolivar outfall flow rates have on occasion deviated significantly, unpredictably and rapidly, from the SA water forecas
     - As DEM has been advised, this has presented significant challenges for control of the PA5 discharges.
6. Discharge Management
   - We note the summer water management strategy set out on page 45 of the attached file "Entrainment & Discharge Diagrams 240708"

- Using the weekly spreadsheet of the previous week's flow and salinity data received from SA Water the brown line on Pages 11 to 44 of the attached file " Entrainment & Discharge Di represents the 6 hourly average salinity at the Bridge computed using 15 minute time steps and assuming there is a mass balance from the salt load provided by Bolivar and the salt lo
- The data in the graphs on Pages 7 to 44 of the attached file " Entrainment & Discharge Diagrams 240708 " show that:
  - There is an acceptable level of agreement between the results from the different methods of estimating salinity at the Bridge, and the measured 6 hr average salinity from the se reliability of the green, dashed blue and brown lines as estimates of the 6 hr average salinity at the Bridge, when there is continuous discharge. When there is pulsed discharge hourly average salinity from the measurements becomes less.
  - When there is continuous discharge, the daily measurements, plus the weekly provided 15 minute interval data from SA Water, producing the combination of the brown, green a acceptably reliable estimate of the continuous 6 hr average salinity at the Bridge in the temporary absence of the sensor
  - The spot checks of specific gravity at the Weir confirmed the acceptable accuracy of these computed lines
  - The salinity has remained under control - and below the EPA licence limit for the designated compliance points

Regards

Nick Withers

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ACN 167 144 087; ABN 87 289 385 627

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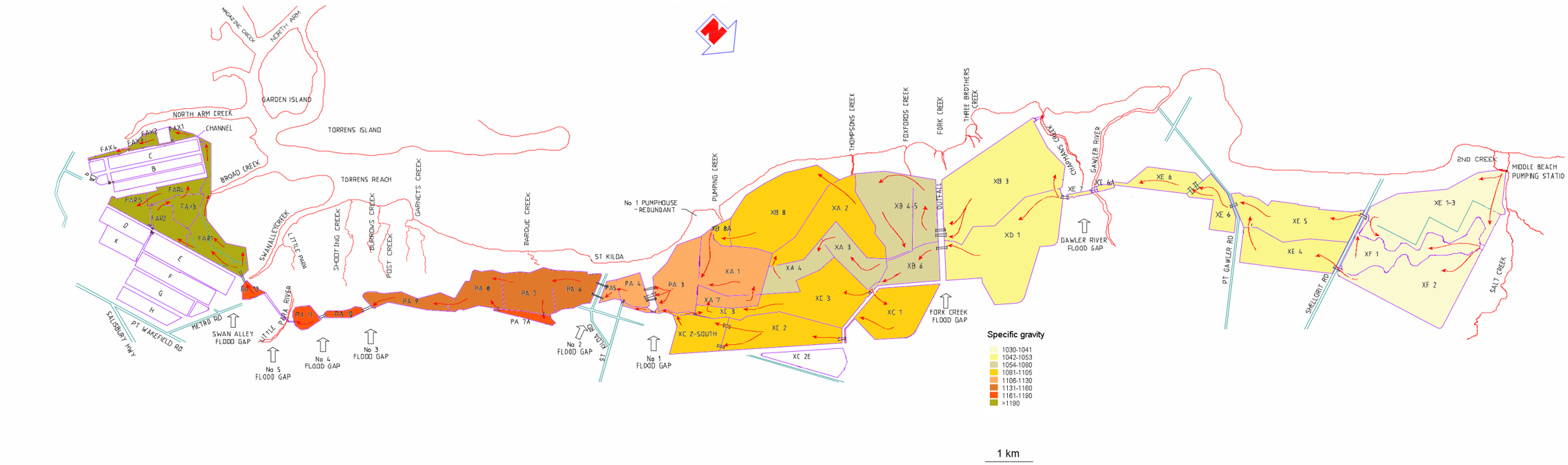
email nick.at.withers@gmail.com

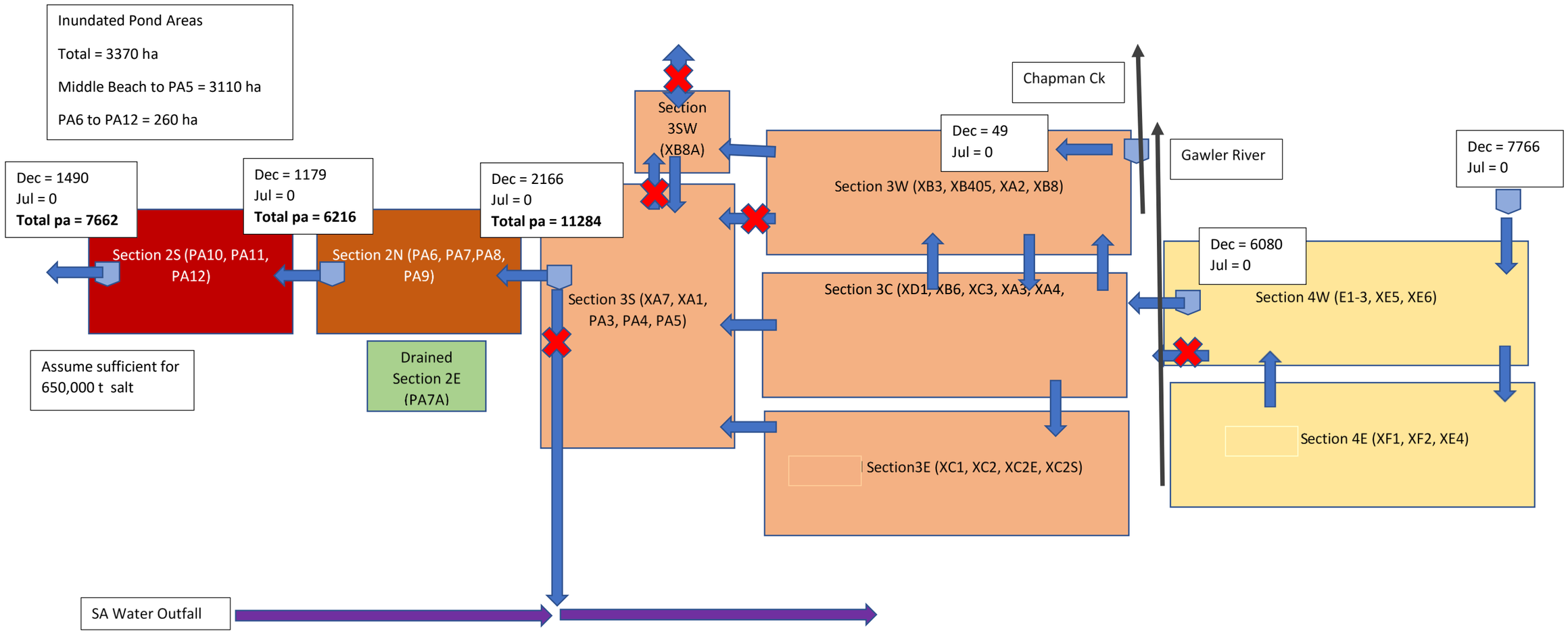
6 attachments

- **Pond Salinity 2012 to this Year 240701.pdf**
  665K
- **Pond Salinity 1 Jan 2023 to 240701.pdf**
  265K
- **Pond SG 2012 to this Year 240701.pdf**
  580K
- **Holding Pattern Pond Water Levels with Graphs 1 Jan 2023 to 240701.pdf**
  107K
- **Holding Pattern Pond Water Levels with Graphs April 2013 to 240701.pdf**
  287K
- **Entrainment & Discharge Diagrams 240708.pdf**
  5771K

The Layout of the Salt Field Showing Flow Patterns and Salinity (Specific Gravity) During Historic Salt Production



Indicative Entrainment & Discharge Flows (ML /Month) During Salt Production to 2013



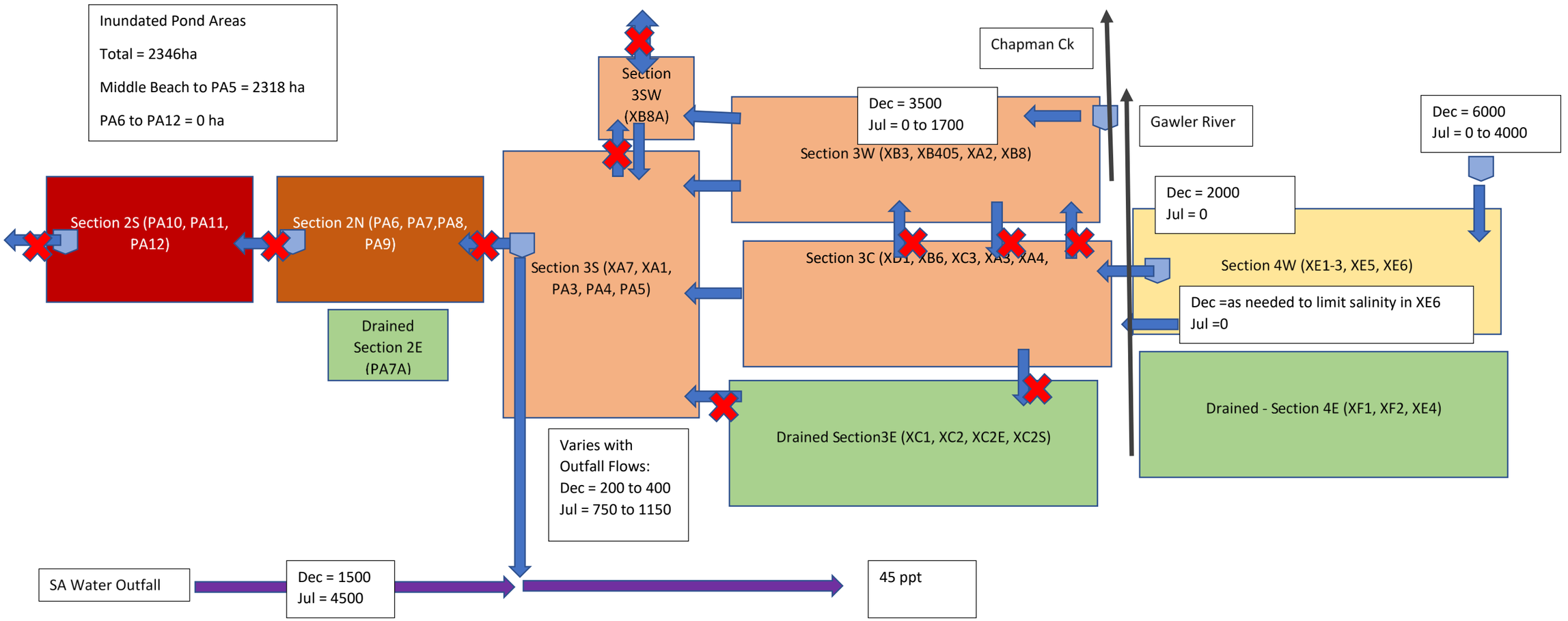
	Salt production Sept to April		Holding Pattern December (assuming July salinities)		Holding Pattern July	
Location	SG	Target Salinity (assuming no precipitation)	SG	Typical Salinity	SG	Typical July Salinity
XE1-3	1.035	35	1.035	35	1.035	35
XE6	1.045	45	1.07	69	1.045	45
XB8A/XC3/ XA4	1.105	107	1.14	147	1.11	112
PA5	1.13	135	1.17	184	1.12	124
PA9	1.16	172	na	na	na	na
PA12	1.19	211	na	na	na	na

Typical Salinities for Salt Production and for The Holding Pattern

	Average ML Pumped 2003/4 to 2008/9					
	Middle Beach	Gawler River	Chapman Creek	St Kilda	PA9	PA12
Aug	0	0	0	0	0	0
Sept	2211	1286	0	184	54	43
Oct	3772	2376	0	804	352	463
Nov	9258	5994	0	1574	831	1010
Dec	7766	6080	49	2166	1179	1490
Jan	9249	6236	58	2382	1329	1645
Feb	8185	6283	0	2190	1281	1552
Mar	6442	5575	0	1592	938	1184
Apr	2120	1843	0	369	224	241
May	388	401	0	23	28	34

Average Flows During Salt Production Years

Entrainment & Discharge Flows (ML / Month) from 2013 /2014 to before XB8A Opened to Tidal Flows



Water Management Goals = a) Maintain water levels within historic ranges; b) reduce salinity (specific gravity) well below historic levels in winter in order to; c) maintain salinity (specific gravity) as close as possible to but below historic levels in summer. This for environmental reasons

Water Management Strategy =

- Winter: Entrain and Discharge as much as necessary to reduce salinities to provide capacity for salinities to increase in summer when discharge is constrained. This means salinities fluctuate much more winter to summer than would be permissible with salt production
- Summer: Entrain and discharge as much as is needed in Section 4 to keep salinity at XE 6 as low as possible; Entrain at Chapman Creek to keep salinity at XB3 as low as possible; When flow in SA Water outfall constrains discharge from PA5, 1st stop flow from XB8, then XC, to preserve flow through XA3, XA4. . Note that with too low a discharge from PA5, the salinity in PA5 rises and gypsum precipitates in the PA5 pump, and pipeline and flow control valves / orifice plate. This means than lower than historic holding pattern discharges from PA5 cannot be tolerated

	Salt production Sept to April		Holding Pattern December (assuming July salinities)		Holding Pattern July	
Location	SG	Target Salinity (assuming no precipitation)	SG	Typical Salinity	SG	Typical July Salinity
XE1-3	1.035	35	1.035	35	1.035	35
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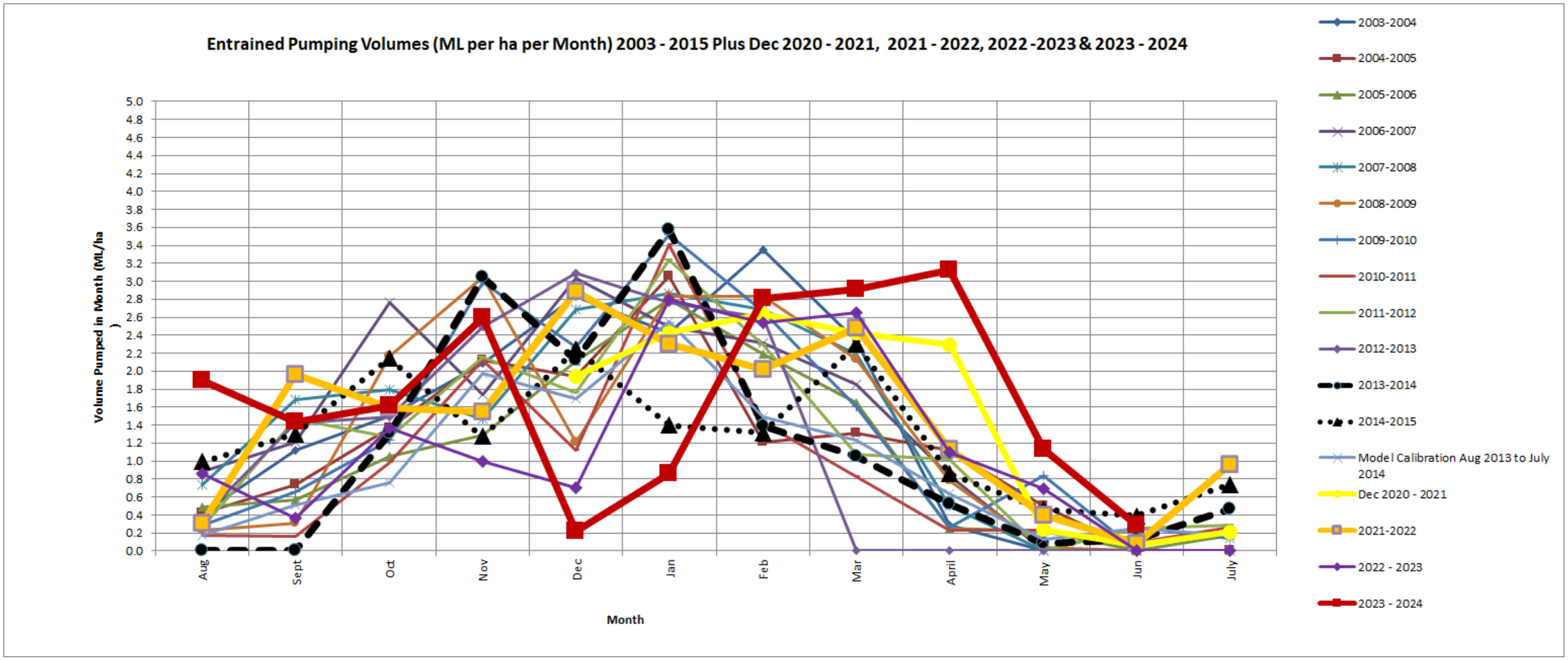
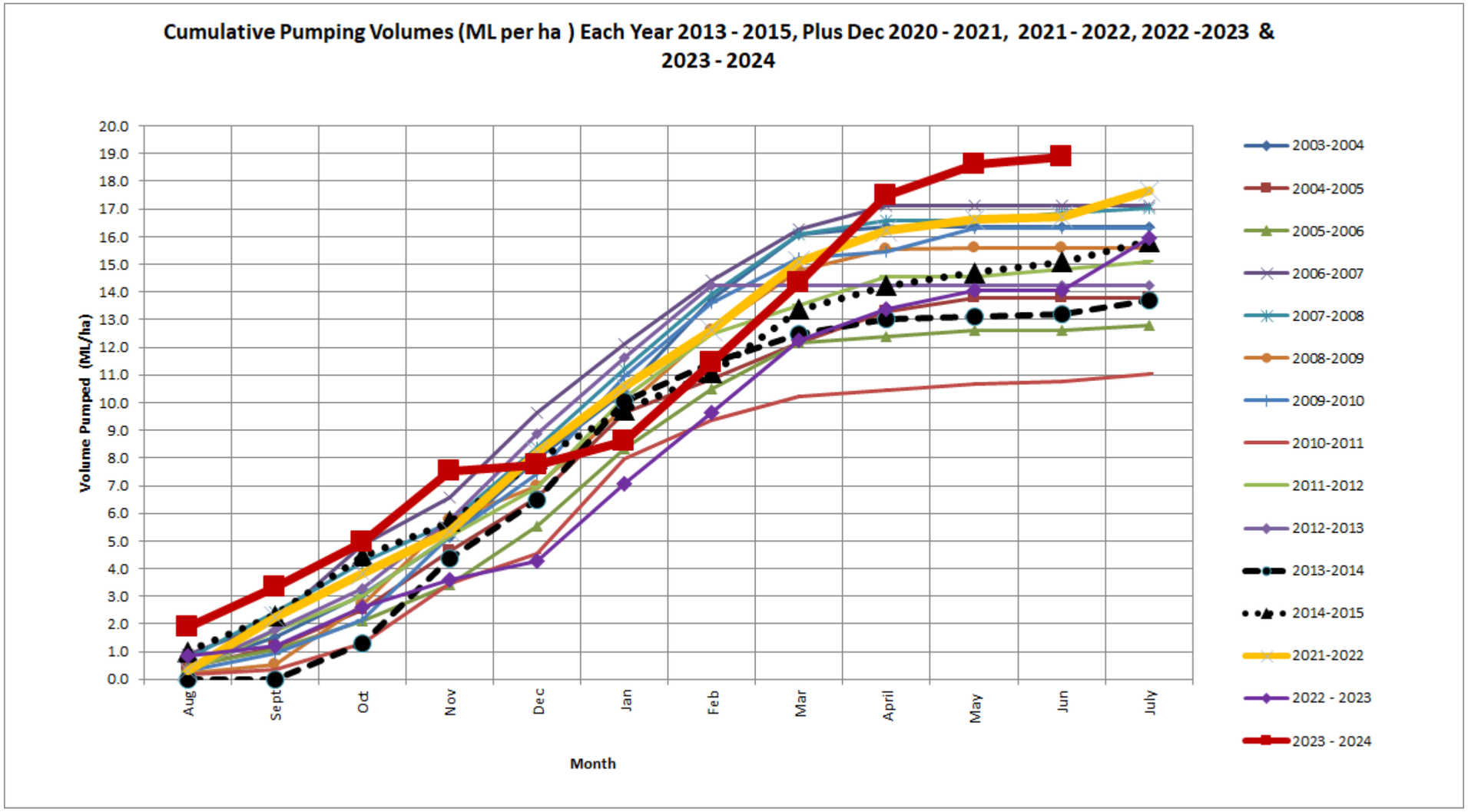
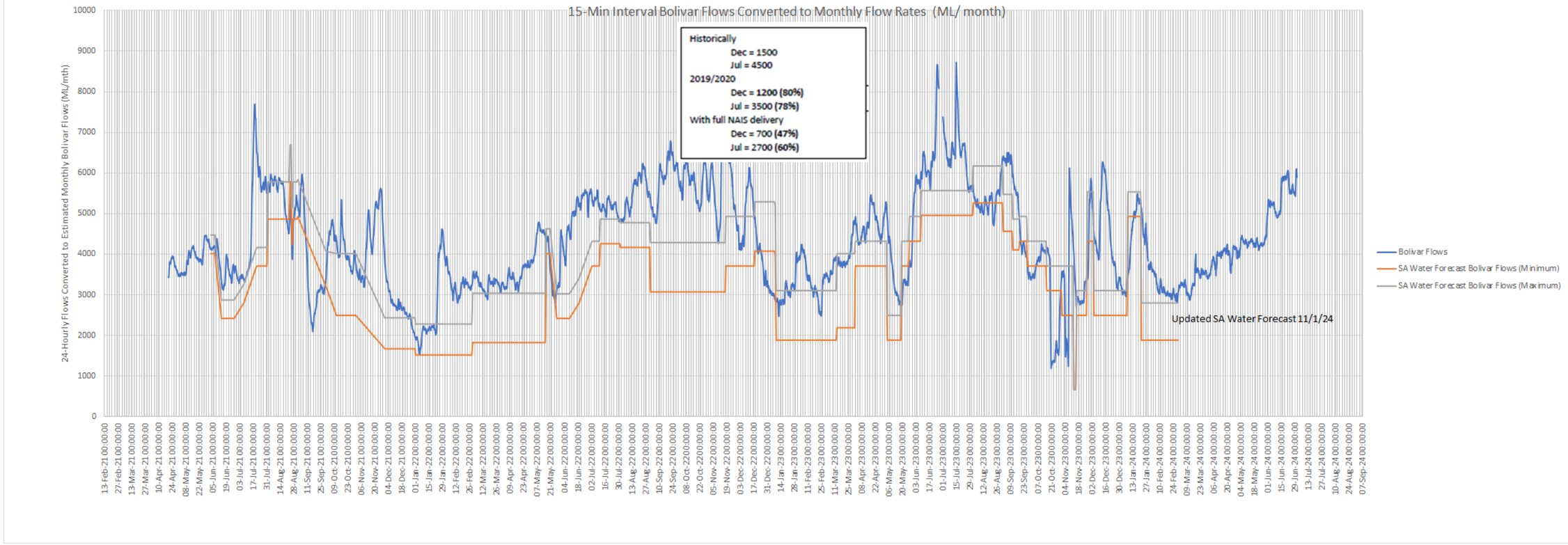
PA5	1.13	135	1.17	184	1.12	124
PA9	1.16	172	na	na	na	na
PA12	1.19	211	na	na	na	na

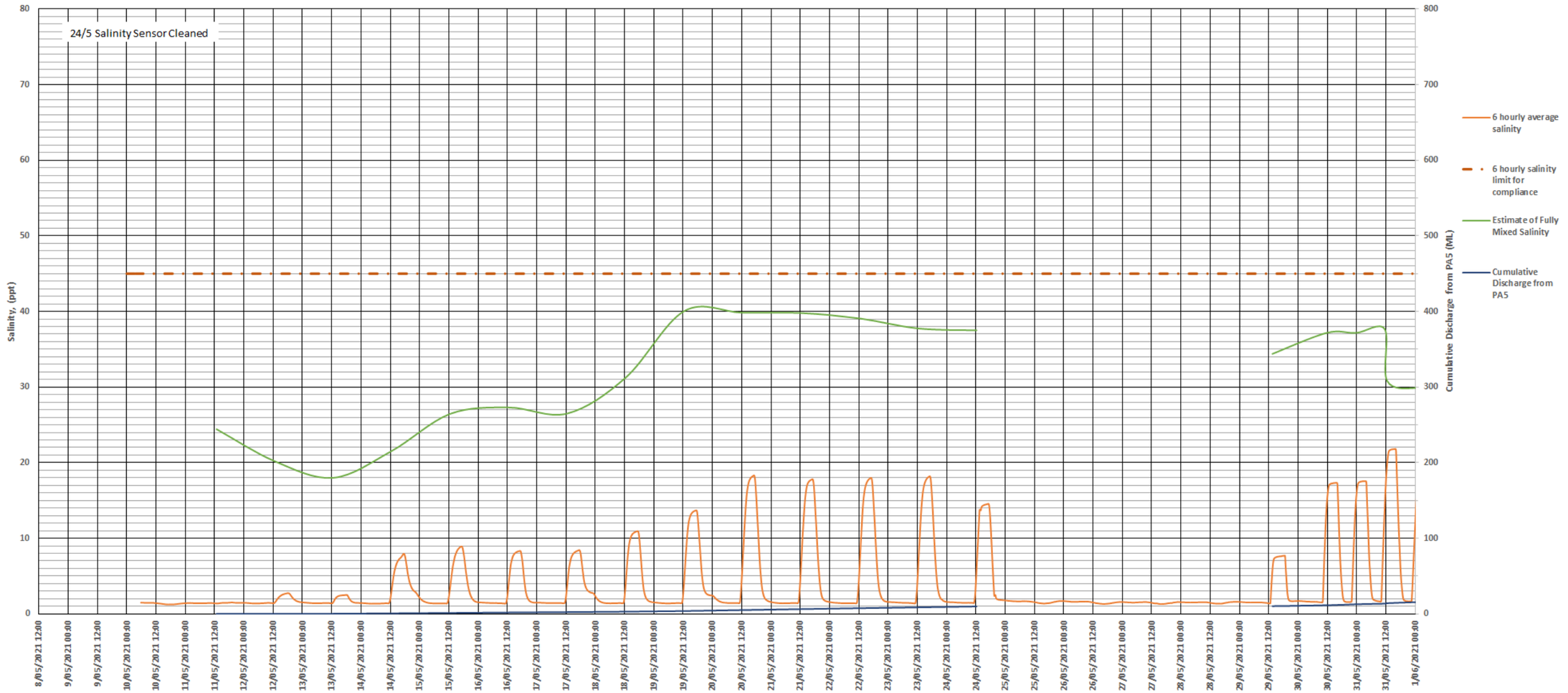
Typical Salinities for Salt Production and for The Holding Pattern


Entrained Pumping Volumes (ML per ha per Month) 2003 - 2015 Plus Dec 2020 - 2021, 2021 - 2022, 2022 -2023 & 2023 - 2024
Volume Pumped in Month (ML/ha)
5.0
4.8
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
April
May
Jun
July
Month
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
Model Calibration Aug 2013 to July 2014
Dec 2020 - 2021
2021-2022
2022 - 2023
2023 - 2024

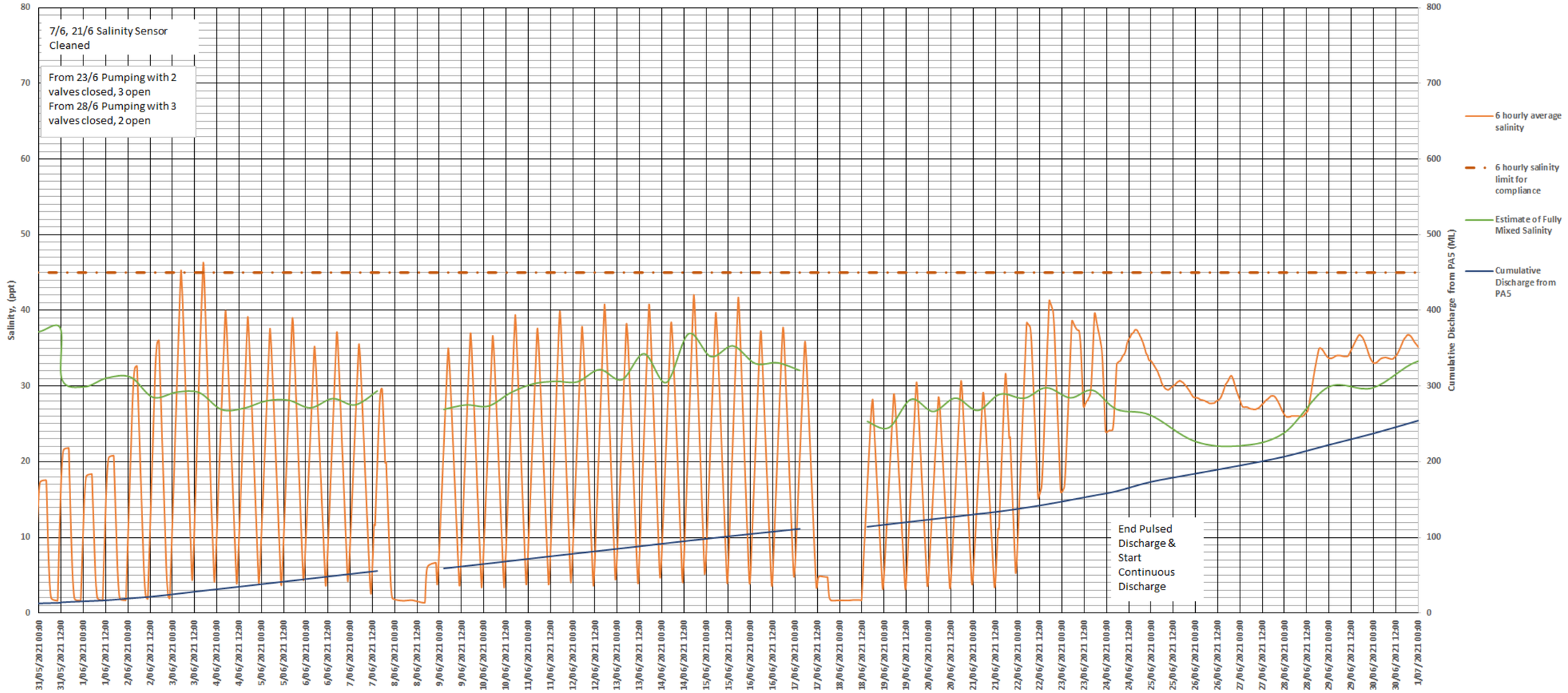

Cumulative Pumping Volumes (ML per ha) Each Year 2013 - 2015, Plus Dec 2020 - 2021, 2021 - 2022, 2022 -2023 & 2023 - 2024
Volume Pumped (ML/ha)
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
April
May
Jun
July
Month
2003-2004
2004-2005
2005-2006
2006-2007
2007-2008
2008-2009
2009-2010
2010-2011
2011-2012
2012-2013
2013-2014
2014-2015
2021-2022
2022 - 2023
2023 - 2024


15-Min Interval Bolivar Flows Converted to Monthly Flow Rates (ML/ month)
Historically
Dec = 1500
Jul = 4500
2019/2020
Dec = 1200 (80%)
Jul = 3500 (78%)
With full NAIS delivery
Dec = 700 (47%)
Jul = 2700 (60%)
24-Hourly Flows Converted to Estimated Monthly Bolivar Flows (ML/mth)
Updated SA Water Forecast 11/1/24
Bolivar Flows
SA Water Forecast Bolivar Flows (Minimum)
SA Water Forecast Bolivar Flows (Maximum)

Salinity at The Bridge - May

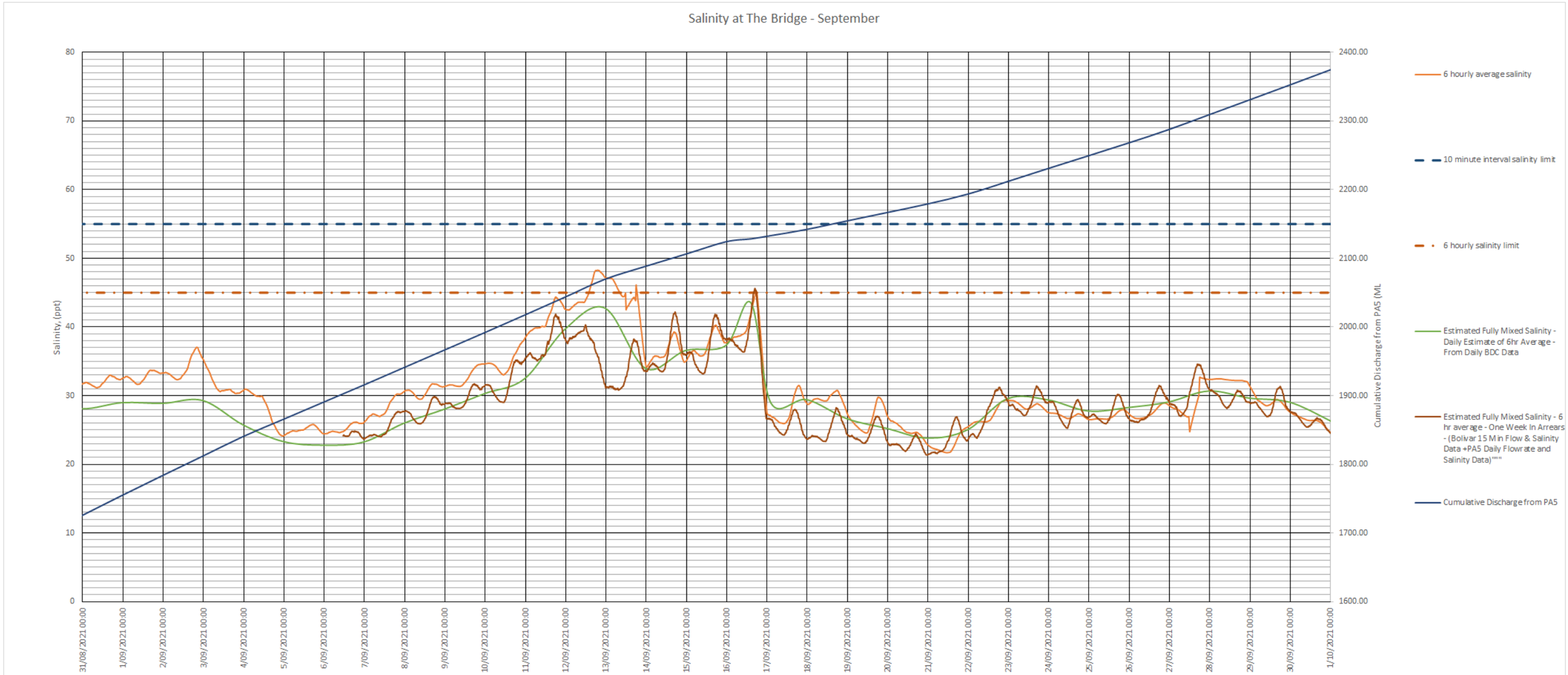


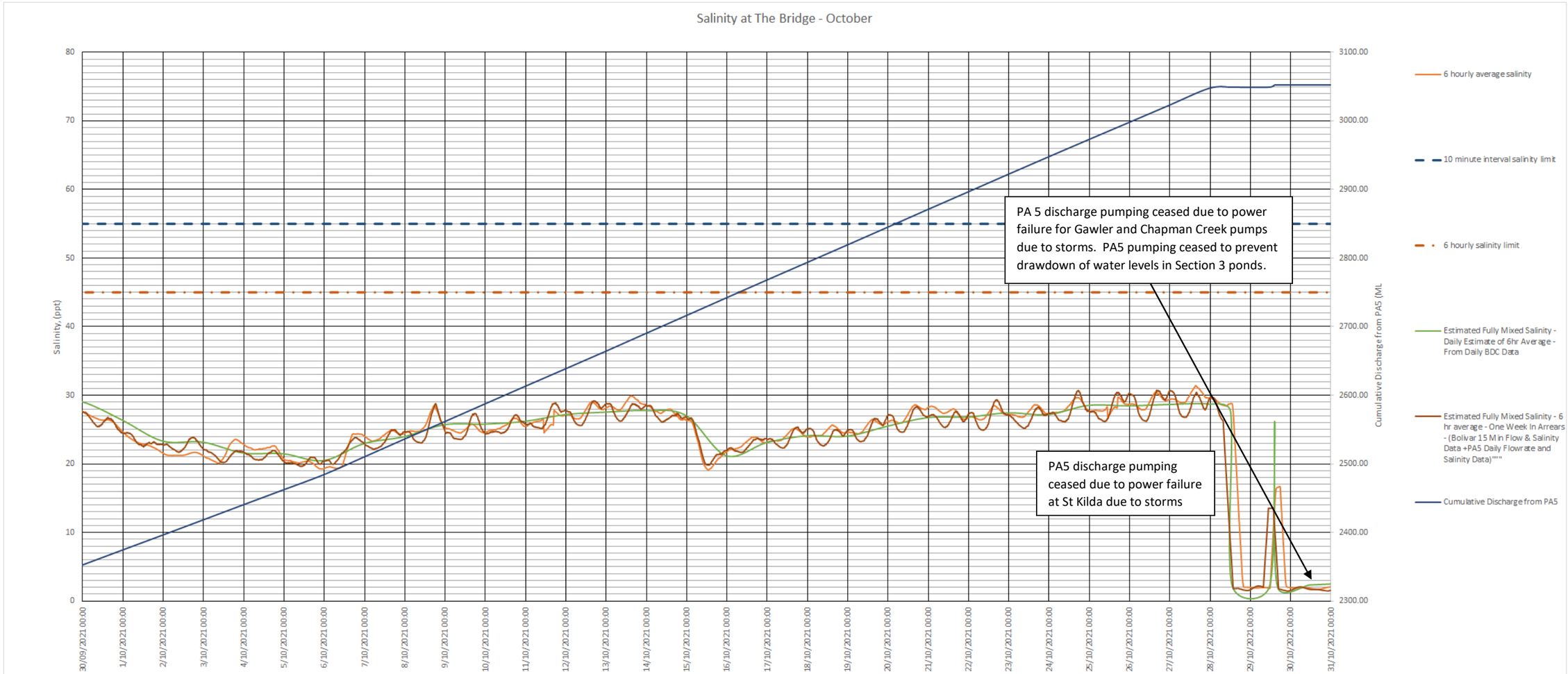
Salinity at The Bridge - June

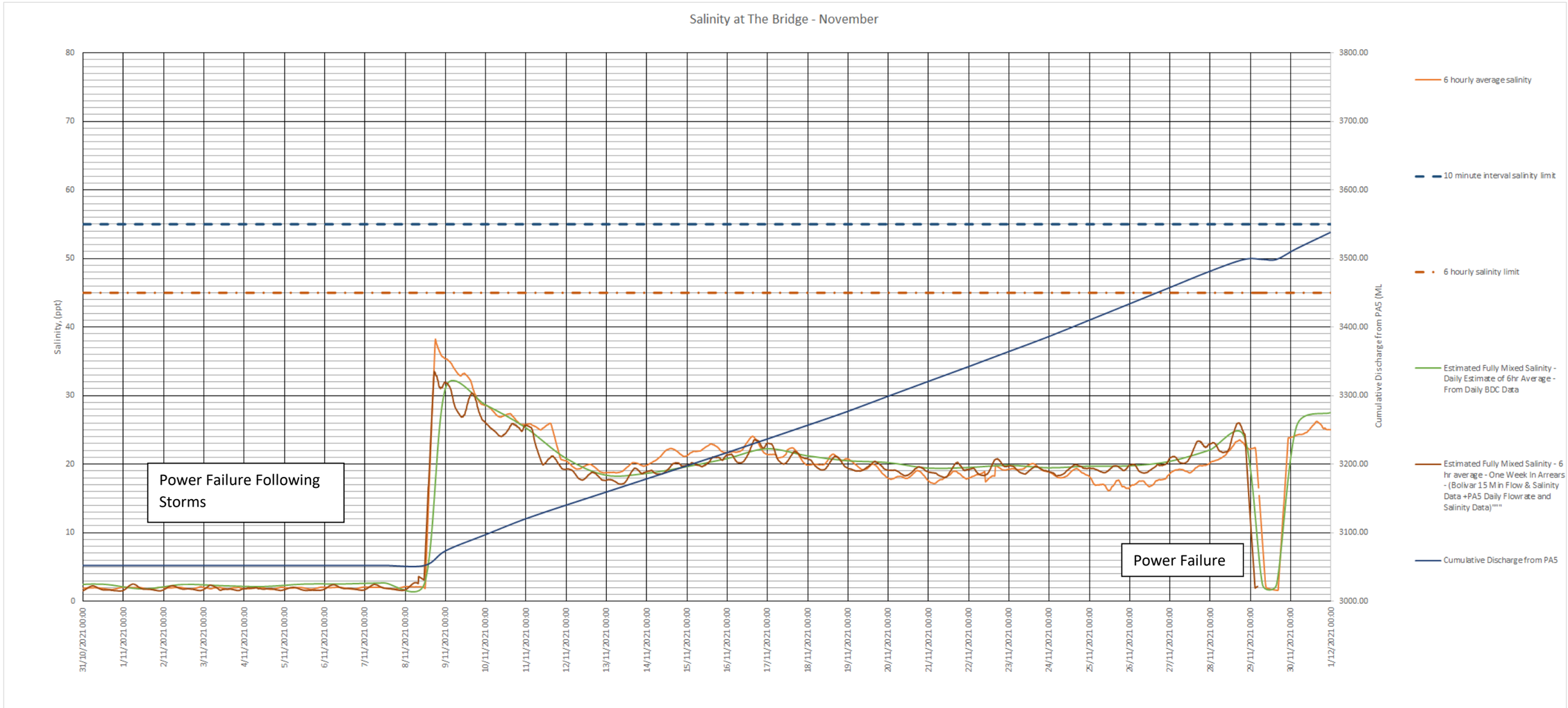



Salinity at The Bridge - July
19 / 7 Power off from 7.15 am to 9.45 am
5/7, 19/7, 24/7 Salinity Sensor cleaned
From 10 /7 Pumping with 4 valvs closed 1 open
From 28/7 Pumping with 4.5 valves closed, 0.5 open
Salinity, (ppt)
Travel Time of Salinity Pulse to Bridge (Hours:Minutes)
6 hourly average salinity
6 hourly salinity limit for compliance
Estimated Fully Mixed Salinity
Cumulative Discharge from PA5


Salinity at The Bridge - August
2/8 Salinity Sensor cleaned
Power Outage 24/8 12 ,00 to 16.30 - No PA5 Pumping 24/8 12.00 to 25/8 07.30
24/8 to 26 / *DAFF Works at Bolivar change outfall flows
16/8 Salinity Sensor cleaned
30/8 Salinity Sensor cleaned
Salinity, (ppt)
Cumulative Discharge from PA5 (ML)
6 hourly average salinity
6 hourly salinity limit for compliance
Estimated Fully Mixed Salinity
Travel Time to The Bridge of 10-Minute Interval Measured Salinity Pulse
Cumulative Discharge from PA5


Salinity at The Bridge - September
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
2400.00
2300.00
2200.00
2100.00
2000.00
1900.00
1800.00
1700.00
1600.00
31/08/2021 00:00
1/09/2021 00:00
2/09/2021 00:00
3/09/2021 00:00
4/09/2021 00:00
5/09/2021 00:00
6/09/2021 00:00
7/09/2021 00:00
8/09/2021 00:00
9/09/2021 00:00
10/09/2021 00:00
11/09/2021 00:00
12/09/2021 00:00
13/09/2021 00:00
14/09/2021 00:00
15/09/2021 00:00
16/09/2021 00:00
17/09/2021 00:00
18/09/2021 00:00
19/09/2021 00:00
20/09/2021 00:00
21/09/2021 00:00
22/09/2021 00:00
23/09/2021 00:00
24/09/2021 00:00
25/09/2021 00:00
26/09/2021 00:00
27/09/2021 00:00
28/09/2021 00:00
29/09/2021 00:00
30/09/2021 00:00
1/10/2021 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)""
Cumulative Discharge from PA5


Salinity at The Bridge - October
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
3100.00
3000.00
2900.00
2800.00
2700.00
2600.00
2500.00
2400.00
2300.00
30/09/2021 00:00
1/10/2021 00:00
2/10/2021 00:00
3/10/2021 00:00
4/10/2021 00:00
5/10/2021 00:00
6/10/2021 00:00
7/10/2021 00:00
8/10/2021 00:00
9/10/2021 00:00
10/10/2021 00:00
11/10/2021 00:00
12/10/2021 00:00
13/10/2021 00:00
14/10/2021 00:00
15/10/2021 00:00
16/10/2021 00:00
17/10/2021 00:00
18/10/2021 00:00
19/10/2021 00:00
20/10/2021 00:00
21/10/2021 00:00
22/10/2021 00:00
23/10/2021 00:00
24/10/2021 00:00
25/10/2021 00:00
26/10/2021 00:00
27/10/2021 00:00
28/10/2021 00:00
29/10/2021 00:00
30/10/2021 00:00
31/10/2021 00:00
PA 5 discharge pumping ceased due to power failure for Gawler and Chapman Creek pumps due to storms. PA5 pumping ceased to prevent drawdown of water levels in Section 3 ponds.
PA5 discharge pumping ceased due to power failure at St Kilda due to storms
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Cumulative Discharge from PA5


Salinity at The Bridge - November
Salinity (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
3800.00
3700.00
3600.00
3500.00
3400.00
3300.00
3200.00
3100.00
3000.00
Power Failure Following Storms
Power Failure
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Cumulative Discharge from PA5
31/10/2021 00:00
1/11/2021 00:00
2/11/2021 00:00
3/11/2021 00:00
4/11/2021 00:00
5/11/2021 00:00
6/11/2021 00:00
7/11/2021 00:00
8/11/2021 00:00
9/11/2021 00:00
10/11/2021 00:00
11/11/2021 00:00
12/11/2021 00:00
13/11/2021 00:00
14/11/2021 00:00
15/11/2021 00:00
16/11/2021 00:00
17/11/2021 00:00
18/11/2021 00:00
19/11/2021 00:00
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25/11/2021 00:00
26/11/2021 00:00
27/11/2021 00:00
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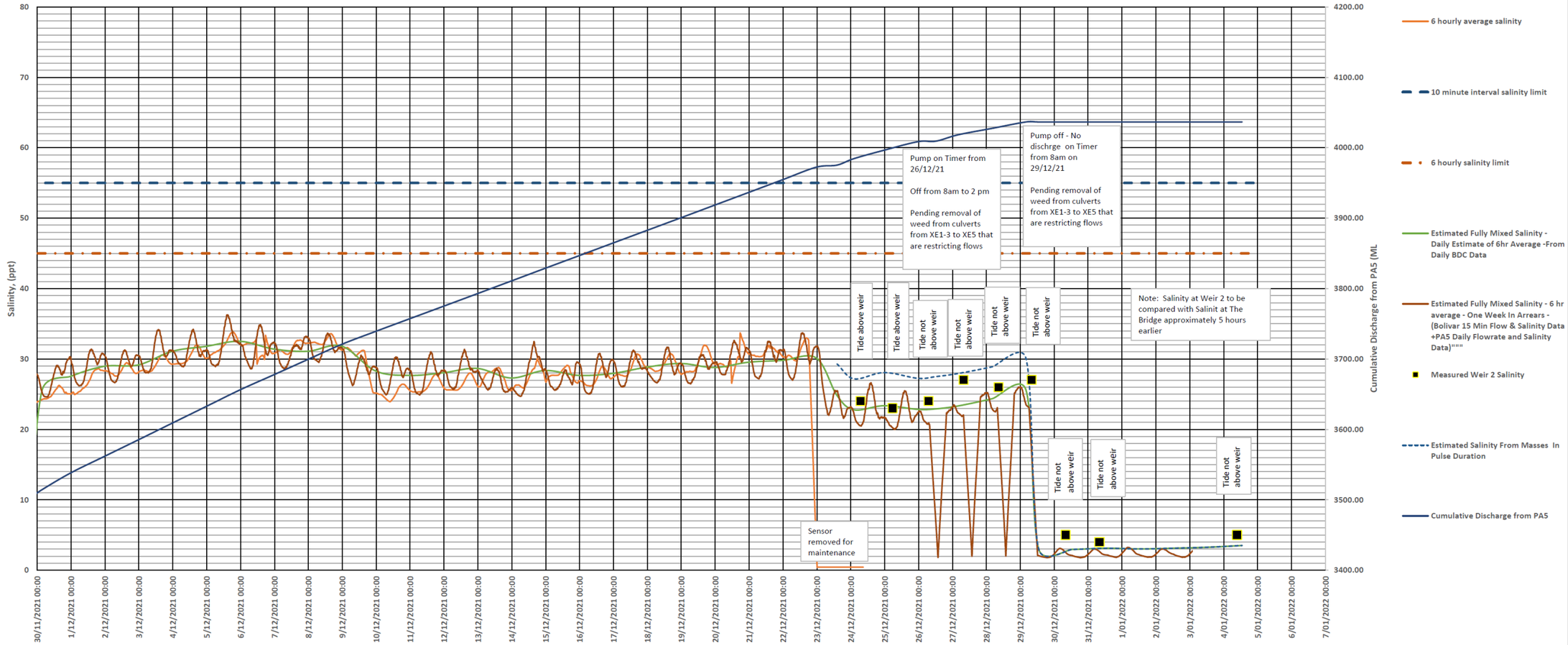
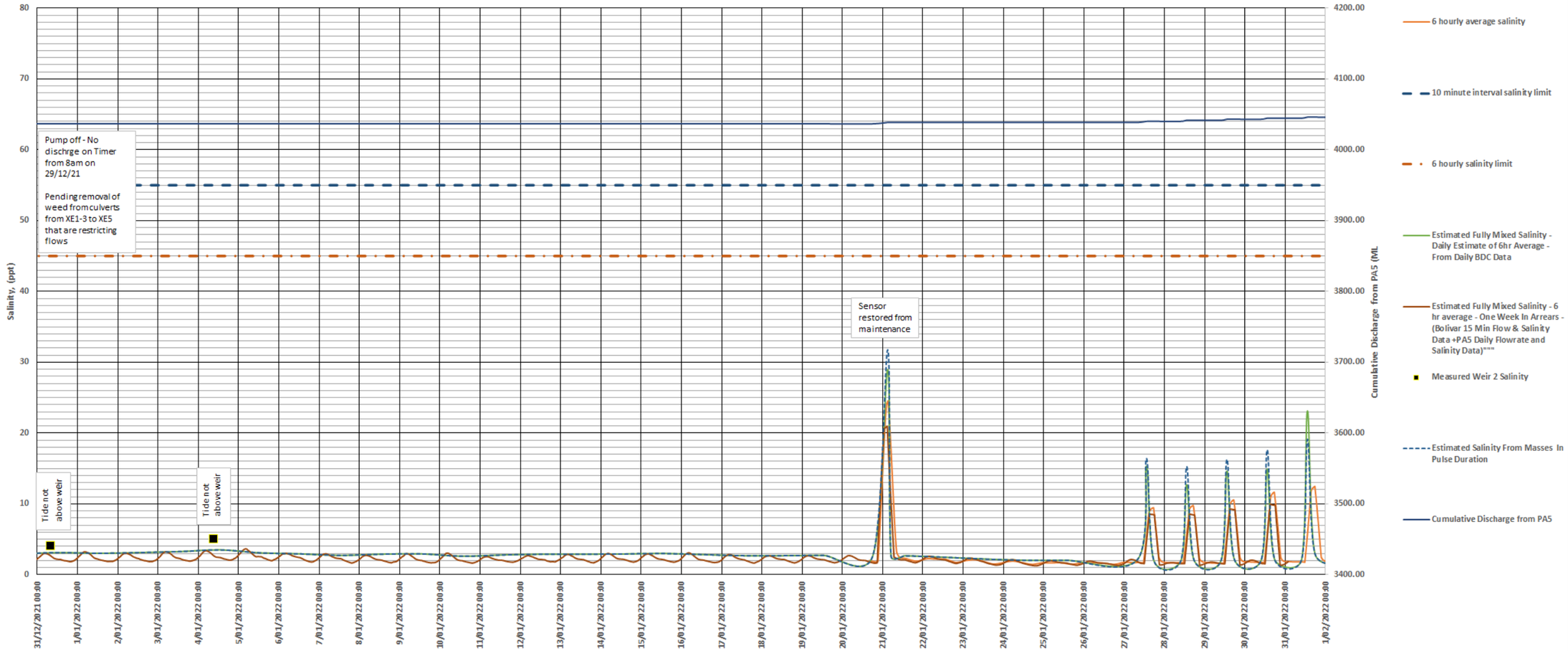
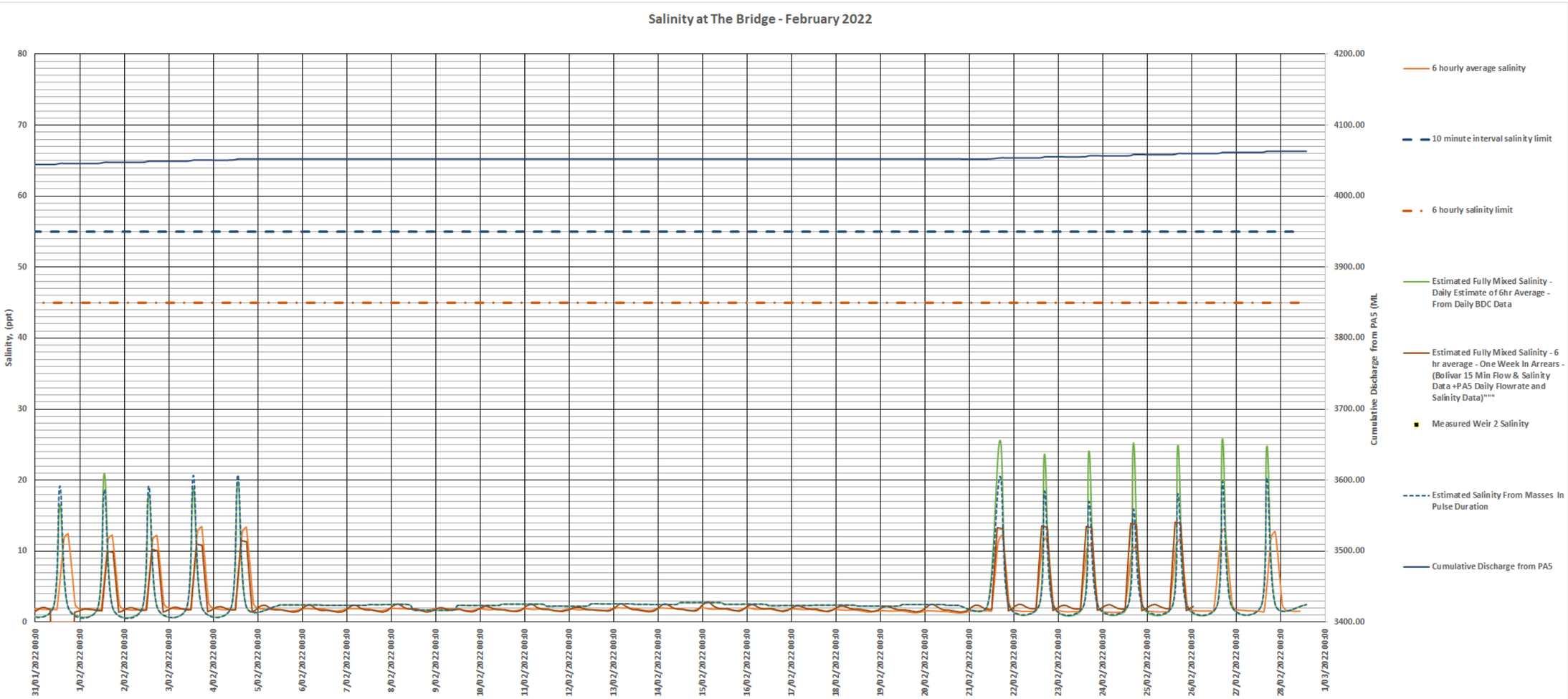
30/11/2021 00:00
1/12/2021 00:00

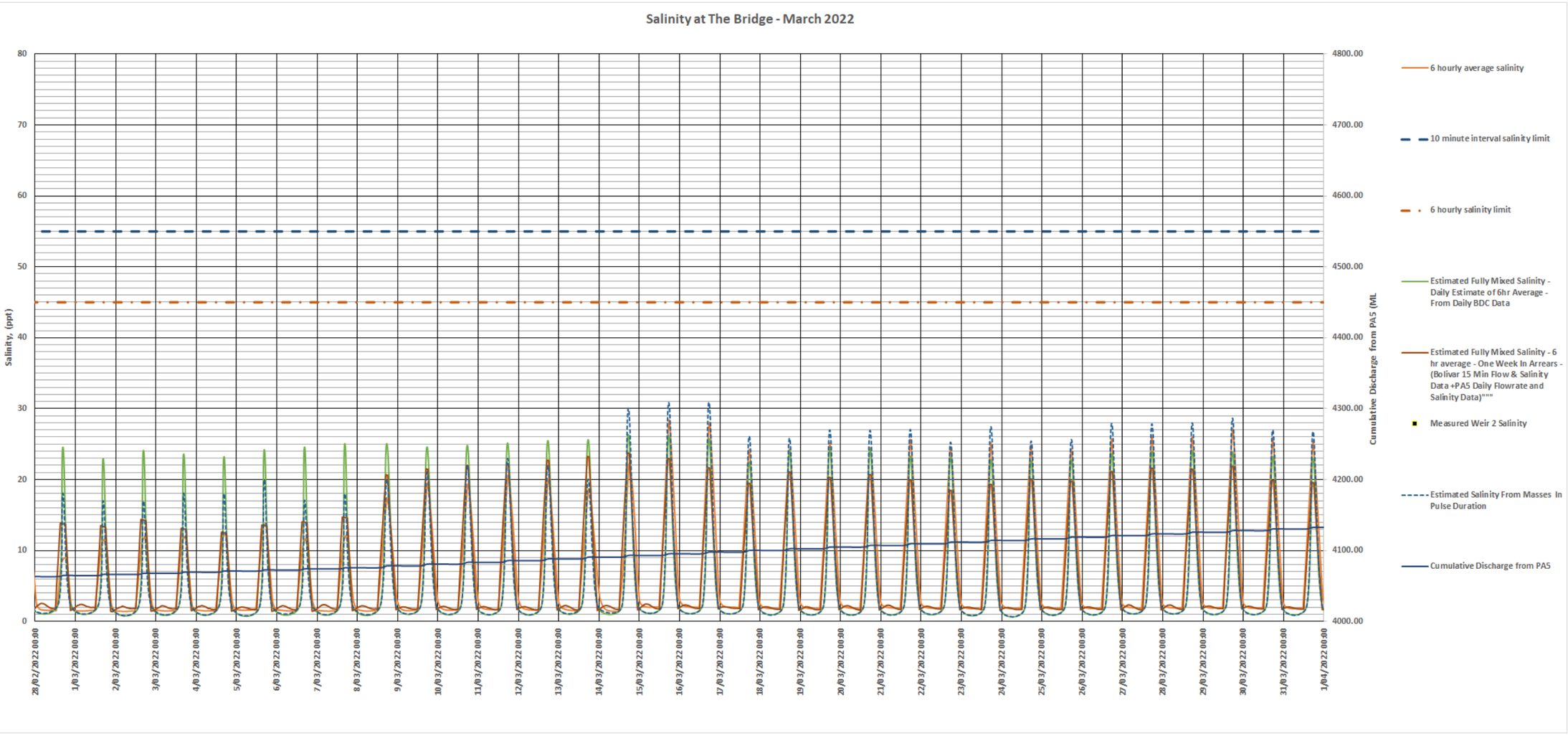
Salinity at The Bridge - December

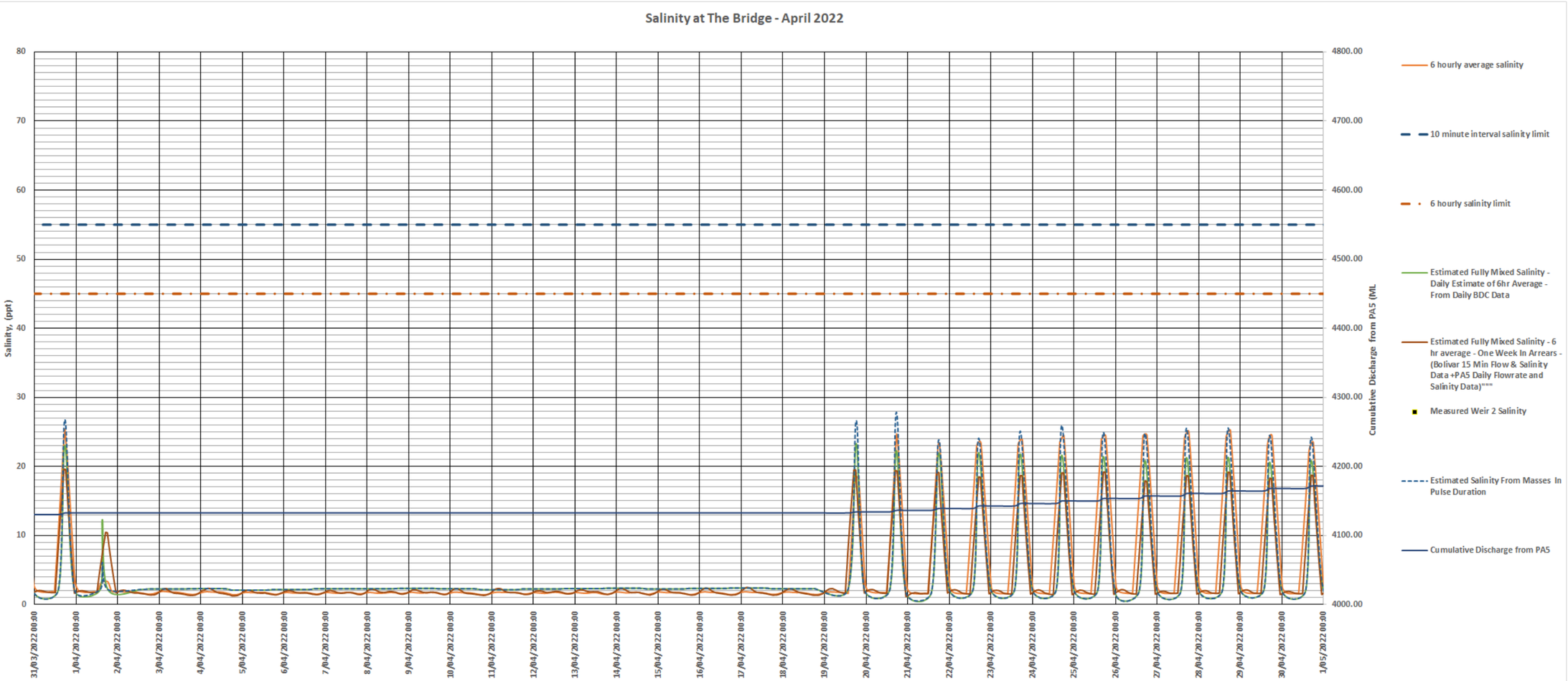


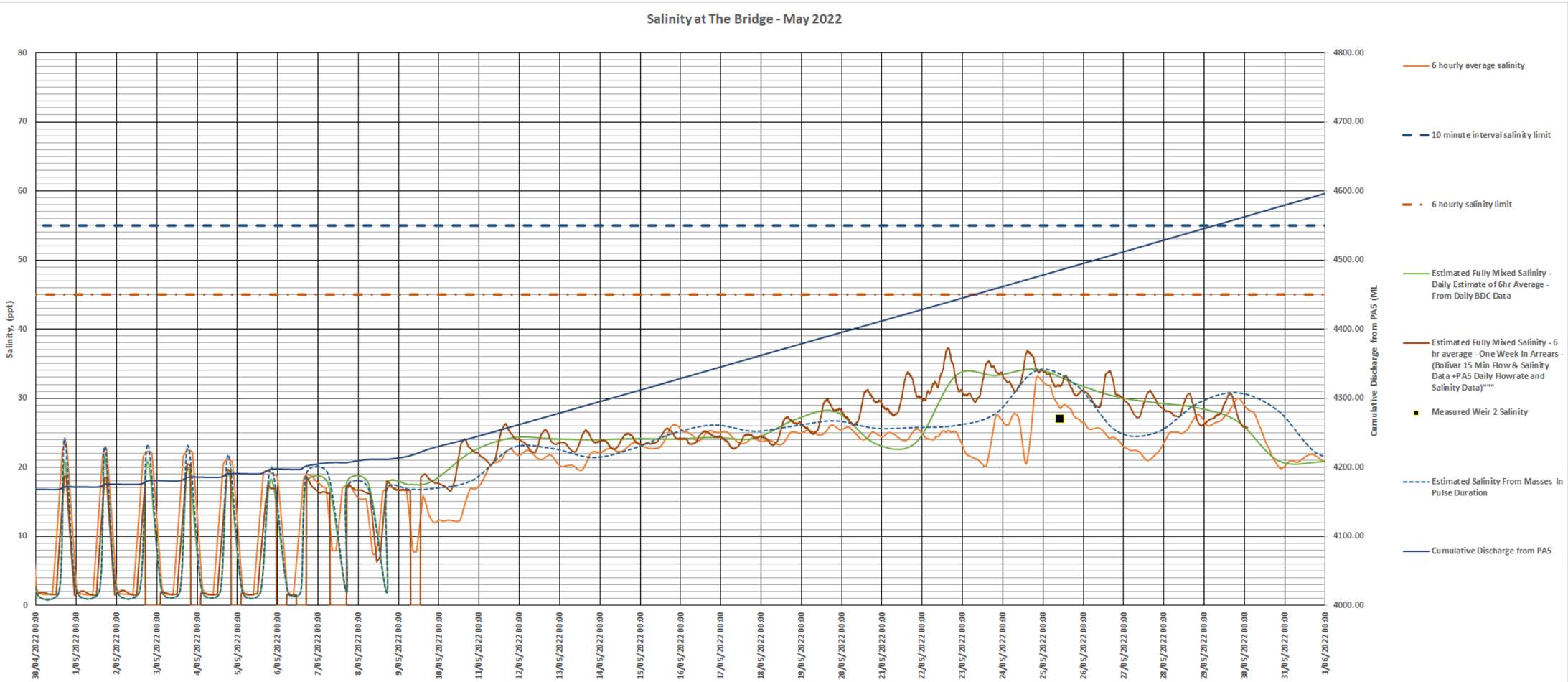
Salinity at The Bridge - January 2022

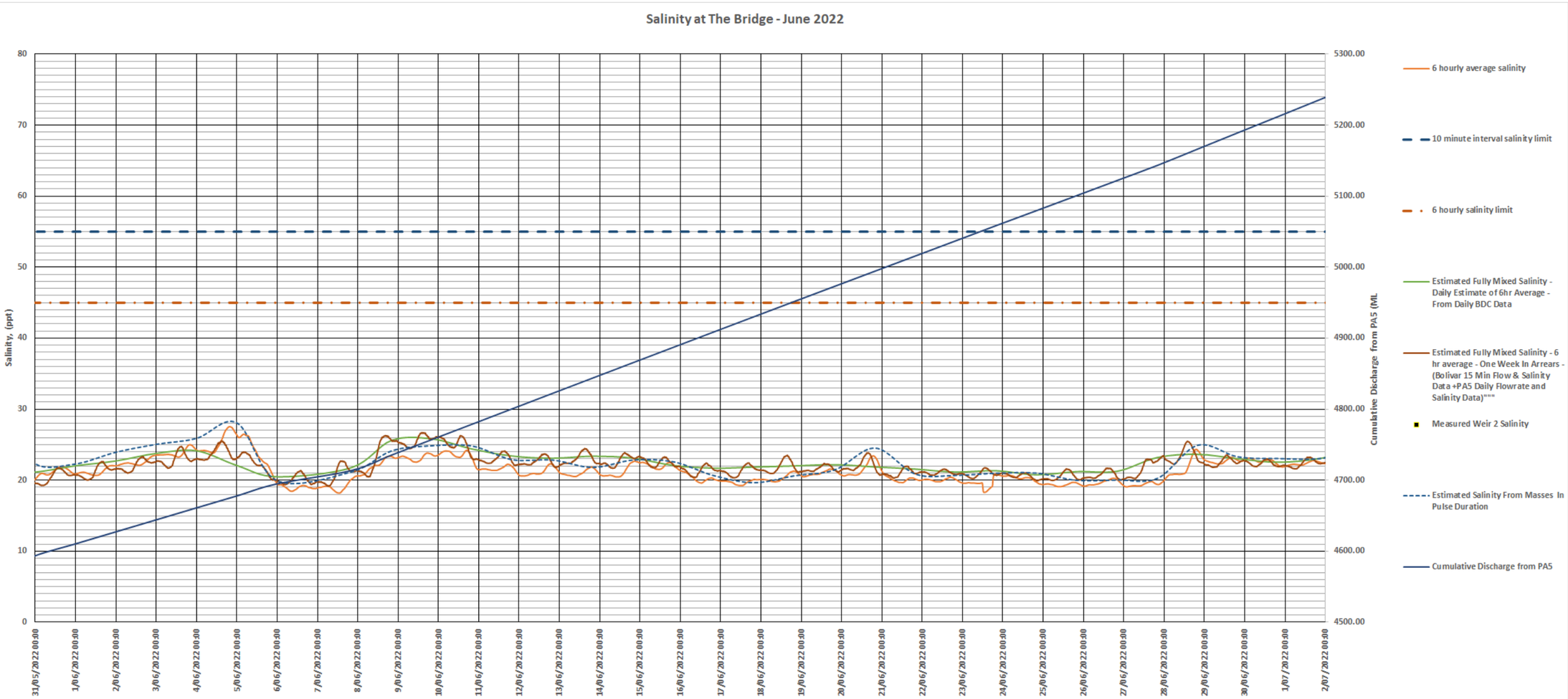


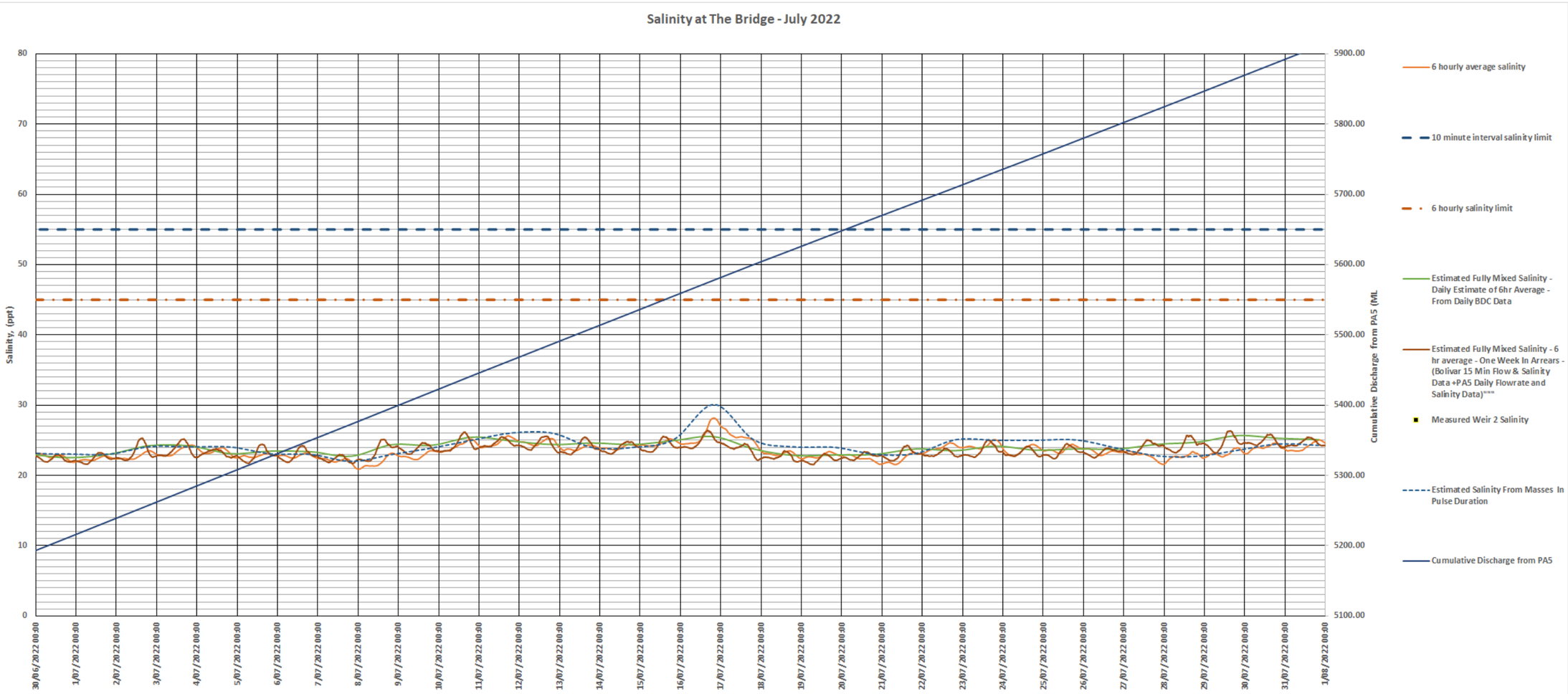

Salinity at The Bridge - February 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
4200.00
4100.00
4000.00
3900.00
3800.00
3700.00
3600.00
3500.00
3400.00
31/01/2022 00:30
1/02/2022 00:30
2/02/2022 00:30
3/02/2022 00:30
4/02/2022 00:30
5/02/2022 00:30
6/02/2022 00:30
7/02/2022 00:30
8/02/2022 00:30
9/02/2022 00:30
10/02/2022 00:30
11/02/2022 00:30
12/02/2022 00:30
13/02/2022 00:30
14/02/2022 00:30
15/02/2022 00:30
16/02/2022 00:30
17/02/2022 00:30
18/02/2022 00:30
19/02/2022 00:30
20/02/2022 00:30
21/02/2022 00:30
22/02/2022 00:30
23/02/2022 00:30
24/02/2022 00:30
25/02/2022 00:30
26/02/2022 00:30
27/02/2022 00:30
28/02/2022 00:30
1/03/2022 00:30
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

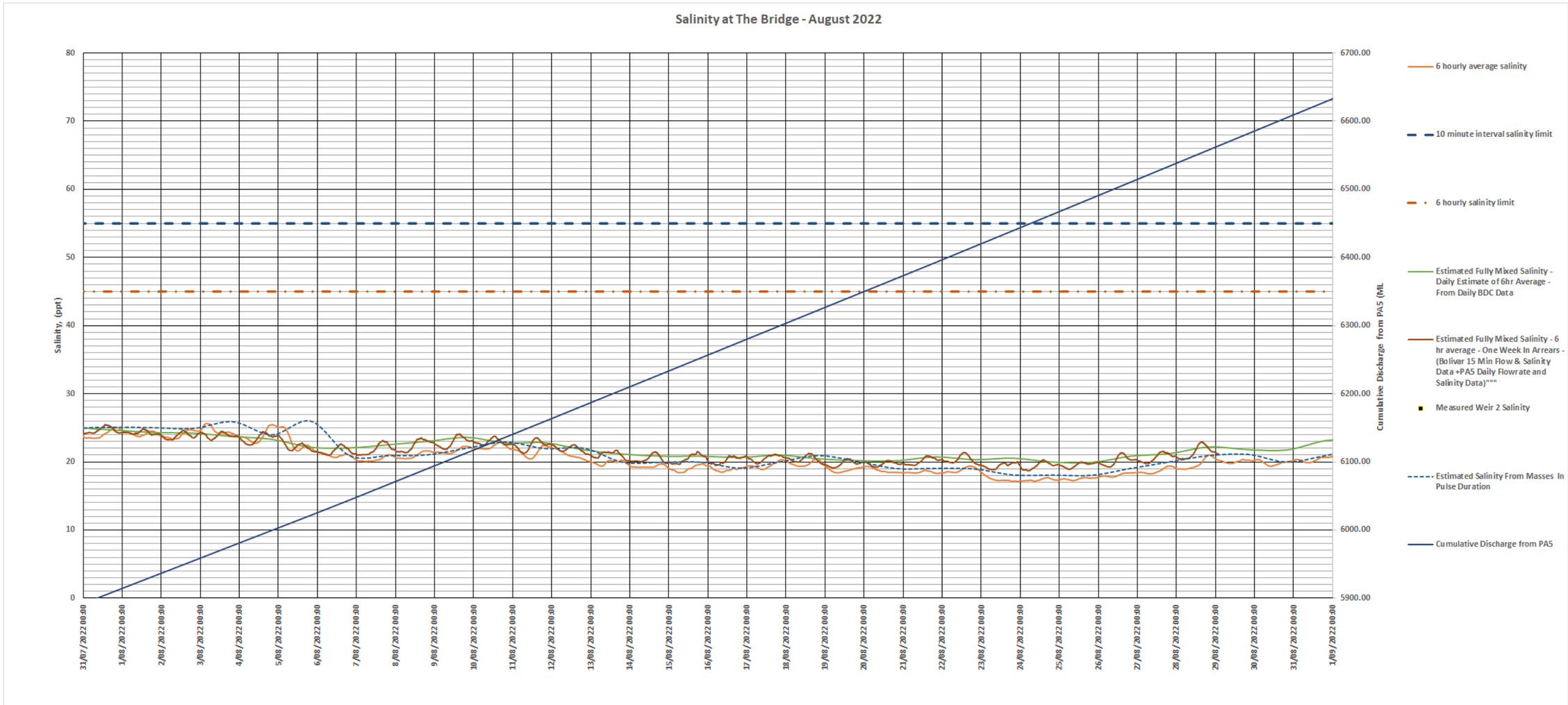

Salinity at The Bridge - March 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
4800.00
4700.00
4600.00
4500.00
4400.00
4300.00
4200.00
4100.00
4000.00
28/02/2022 00:30
1/03/2022 00:30
2/03/2022 00:30
3/03/2022 00:30
4/03/2022 00:30
5/03/2022 00:30
6/03/2022 00:30
7/03/2022 00:30
8/03/2022 00:30
9/03/2022 00:30
10/03/2022 00:30
11/03/2022 00:30
12/03/2022 00:30
13/03/2022 00:30
14/03/2022 00:30
15/03/2022 00:30
16/03/2022 00:30
17/03/2022 00:30
18/03/2022 00:30
19/03/2022 00:30
20/03/2022 00:30
21/03/2022 00:30
22/03/2022 00:30
23/03/2022 00:30
24/03/2022 00:30
25/03/2022 00:30
26/03/2022 00:30
27/03/2022 00:30
28/03/2022 00:30
29/03/2022 00:30
30/03/2022 00:30
31/03/2022 00:30
1/04/2022 00:30
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

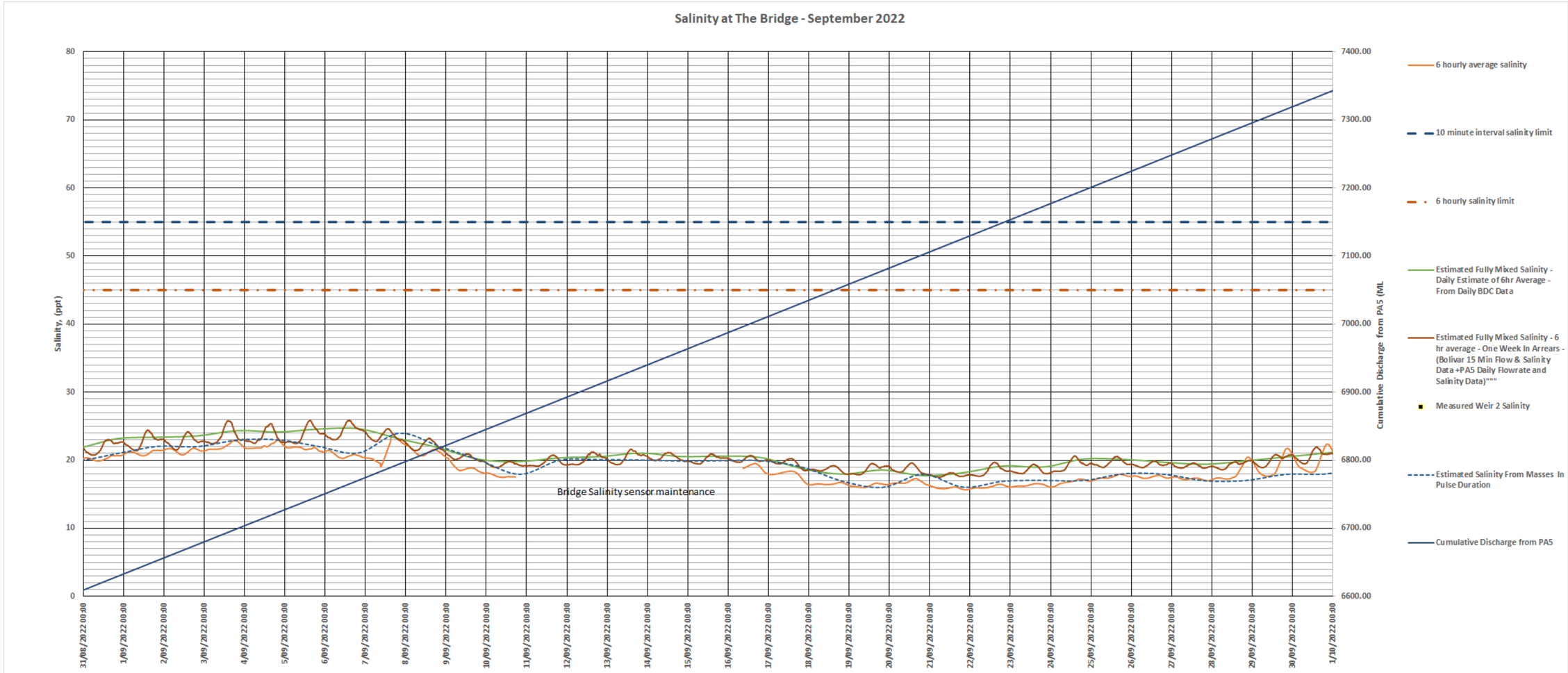

Salinity at The Bridge - April 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
4800.00
4700.00
4600.00
4500.00
4400.00
4300.00
4200.00
4100.00
4000.00
31/03/2022 00:00
1/04/2022 00:00
2/04/2022 00:00
3/04/2022 00:00
4/04/2022 00:00
5/04/2022 00:00
6/04/2022 00:00
7/04/2022 00:00
8/04/2022 00:00
9/04/2022 00:00
10/04/2022 00:00
11/04/2022 00:00
12/04/2022 00:00
13/04/2022 00:00
14/04/2022 00:00
15/04/2022 00:00
16/04/2022 00:00
17/04/2022 00:00
18/04/2022 00:00
19/04/2022 00:00
20/04/2022 00:00
21/04/2022 00:00
22/04/2022 00:00
23/04/2022 00:00
24/04/2022 00:00
25/04/2022 00:00
26/04/2022 00:00
27/04/2022 00:00
28/04/2022 00:00
29/04/2022 00:00
30/04/2022 00:00
1/05/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

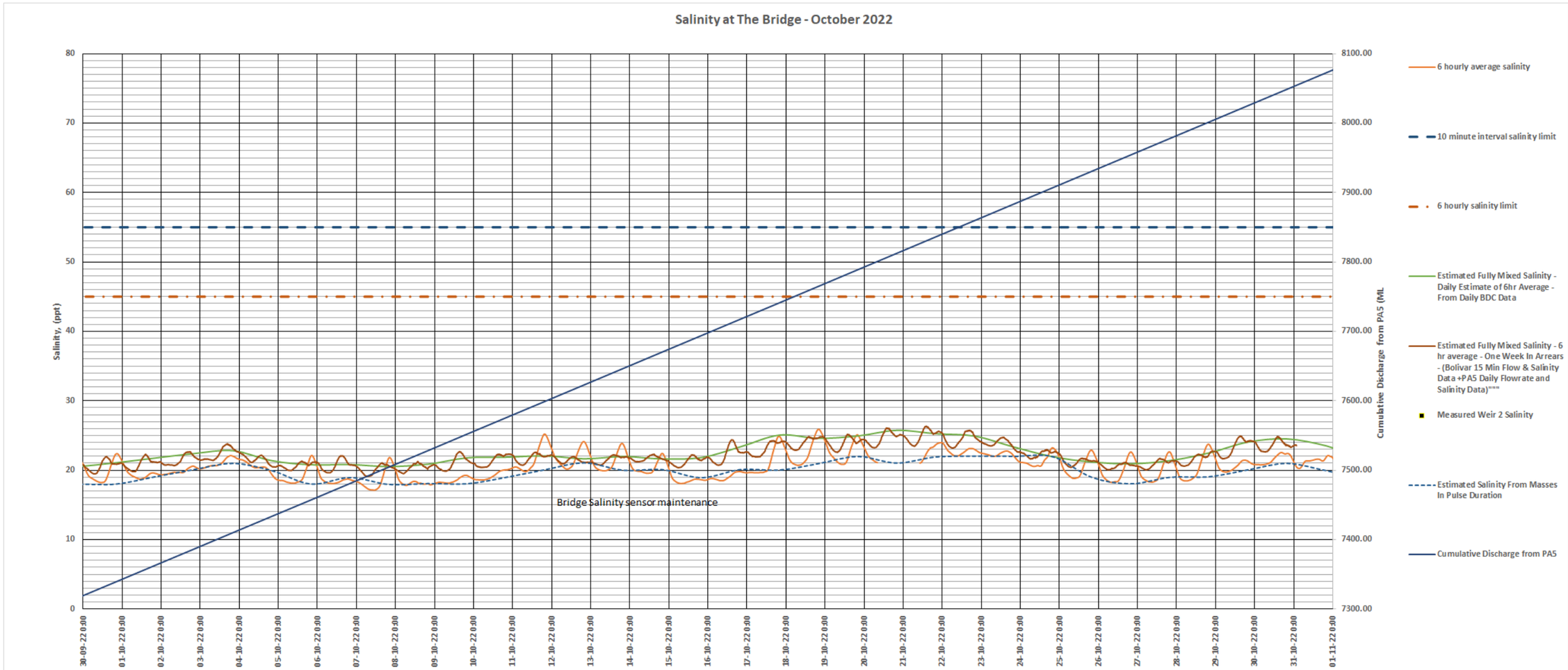

Salinity at The Bridge - May 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
4800.00
4700.00
4600.00
4500.00
4400.00
4300.00
4200.00
4100.00
4000.00
30/04/2022 00:00
1/05/2022 00:00
2/05/2022 00:00
3/05/2022 00:00
4/05/2022 00:00
5/05/2022 00:00
6/05/2022 00:00
7/05/2022 00:00
8/05/2022 00:00
9/05/2022 00:00
10/05/2022 00:00
11/05/2022 00:00
12/05/2022 00:00
13/05/2022 00:00
14/05/2022 00:00
15/05/2022 00:00
16/05/2022 00:00
17/05/2022 00:00
18/05/2022 00:00
19/05/2022 00:00
20/05/2022 00:00
21/05/2022 00:00
22/05/2022 00:00
23/05/2022 00:00
24/05/2022 00:00
25/05/2022 00:00
26/05/2022 00:00
27/05/2022 00:00
28/05/2022 00:00
29/05/2022 00:00
30/05/2022 00:00
31/05/2022 00:00
1/06/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

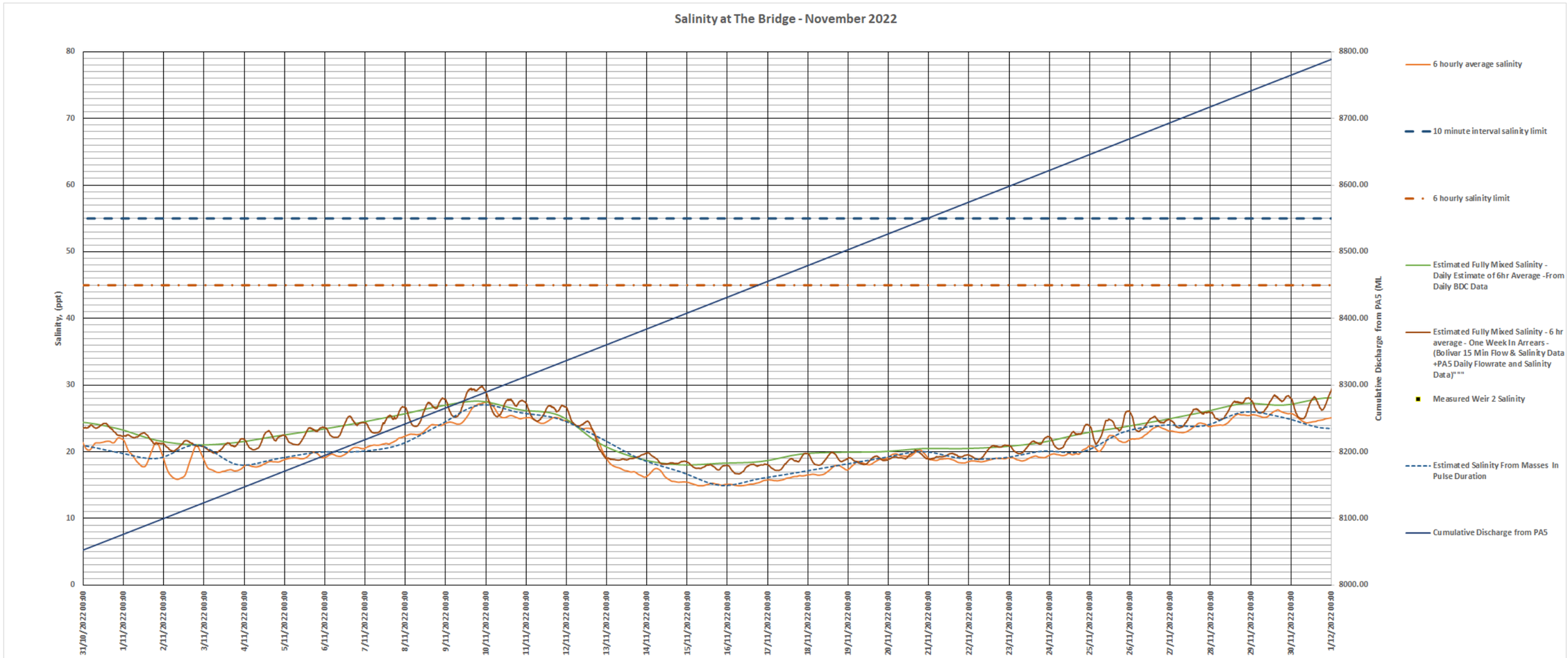

Salinity at The Bridge - June 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
5300.00
5200.00
5100.00
5000.00
4900.00
4800.00
4700.00
4600.00
4500.00
31/05/2022 00:00
1/06/2022 00:00
2/06/2022 00:00
3/06/2022 00:00
4/06/2022 00:00
5/06/2022 00:00
6/06/2022 00:00
7/06/2022 00:00
8/06/2022 00:00
9/06/2022 00:00
10/06/2022 00:00
11/06/2022 00:00
12/06/2022 00:00
13/06/2022 00:00
14/06/2022 00:00
15/06/2022 00:00
16/06/2022 00:00
17/06/2022 00:00
18/06/2022 00:00
19/06/2022 00:00
20/06/2022 00:00
21/06/2022 00:00
22/06/2022 00:00
23/06/2022 00:00
24/06/2022 00:00
25/06/2022 00:00
26/06/2022 00:00
27/06/2022 00:00
28/06/2022 00:00
29/06/2022 00:00
30/06/2022 00:00
1/07/2022 00:00
2/07/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

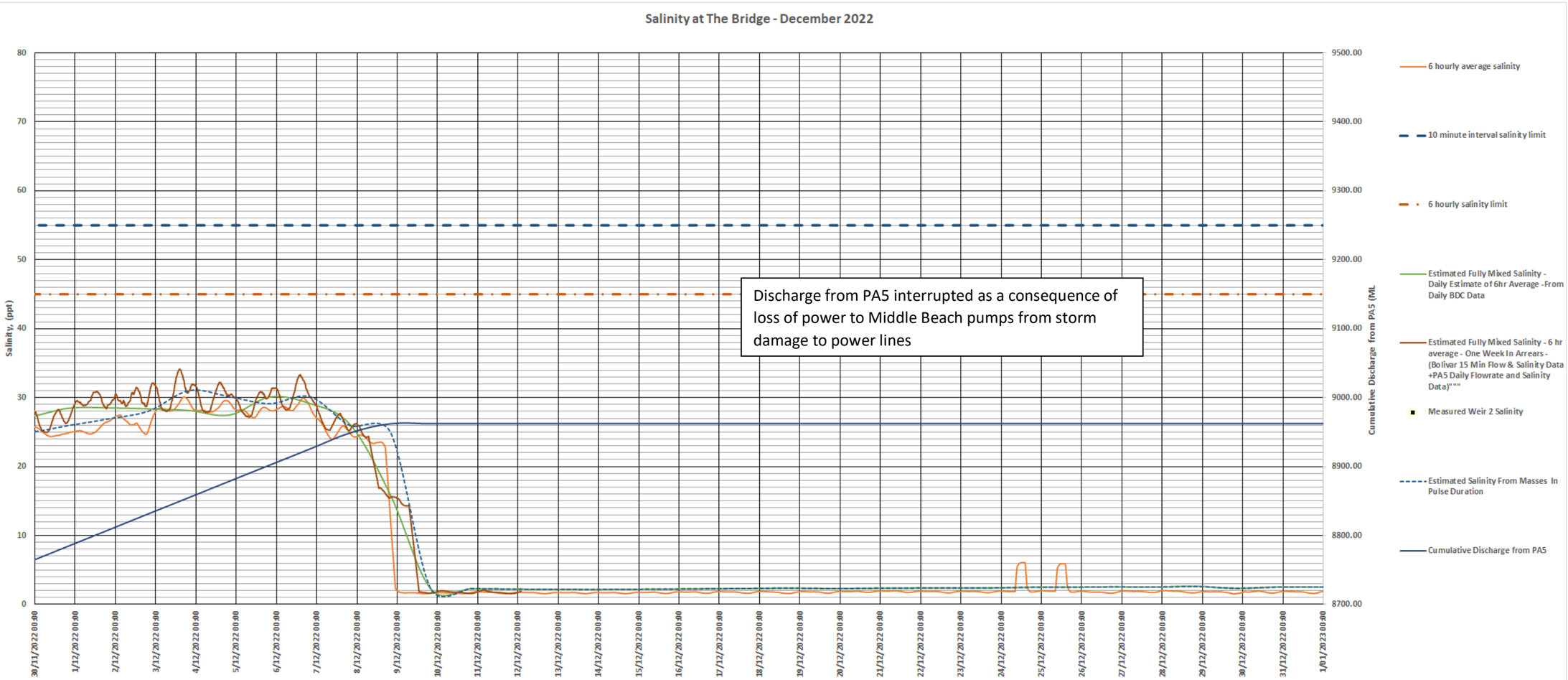

Salinity at The Bridge - July 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
5900.00
5800.00
5700.00
5600.00
5500.00
5400.00
5300.00
5200.00
5100.00
30/06/2022 00:00
1/07/2022 00:00
2/07/2022 00:00
3/07/2022 00:00
4/07/2022 00:00
5/07/2022 00:00
6/07/2022 00:00
7/07/2022 00:00
8/07/2022 00:00
9/07/2022 00:00
10/07/2022 00:00
11/07/2022 00:00
12/07/2022 00:00
13/07/2022 00:00
14/07/2022 00:00
15/07/2022 00:00
16/07/2022 00:00
17/07/2022 00:00
18/07/2022 00:00
19/07/2022 00:00
20/07/2022 00:00
21/07/2022 00:00
22/07/2022 00:00
23/07/2022 00:00
24/07/2022 00:00
25/07/2022 00:00
26/07/2022 00:00
27/07/2022 00:00
28/07/2022 00:00
29/07/2022 00:00
30/07/2022 00:00
31/07/2022 00:00
1/08/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

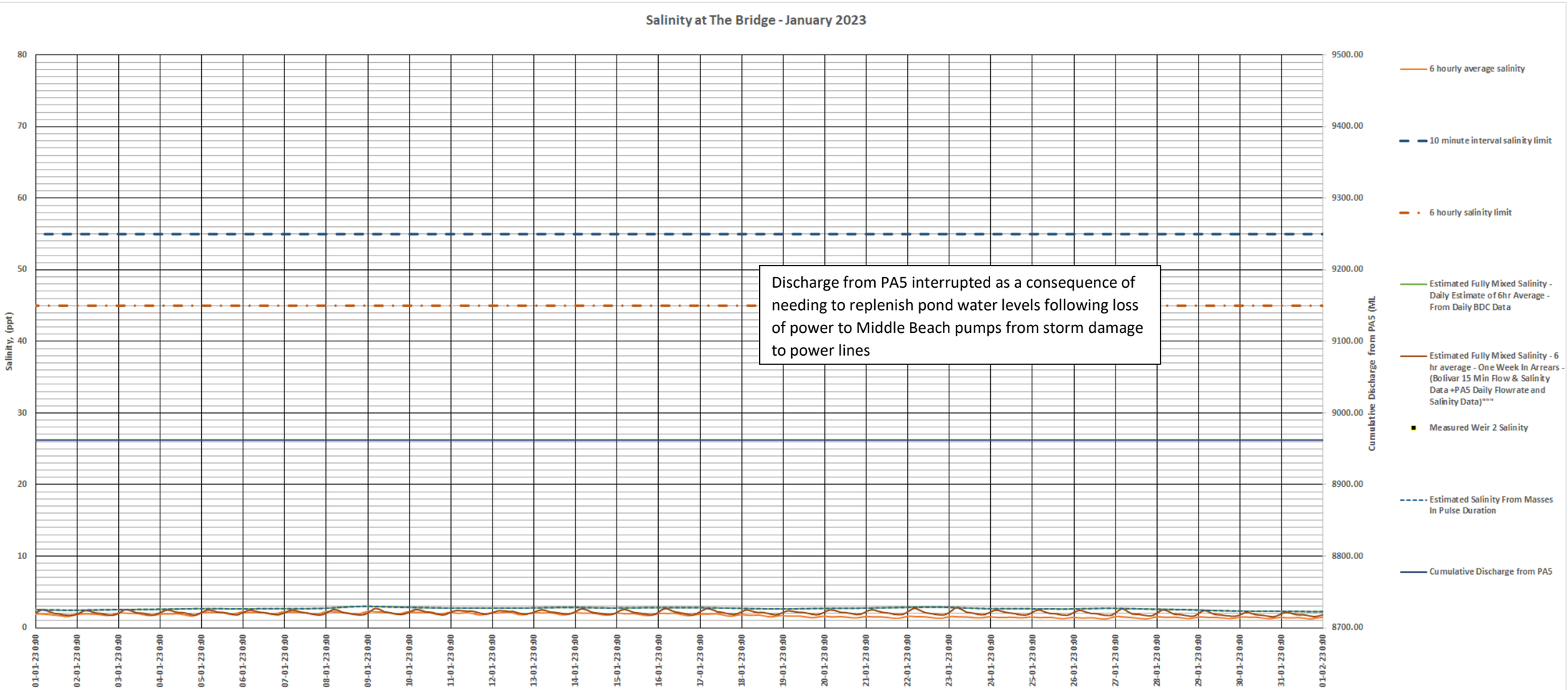

Salinity at The Bridge - August 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
6700.00
6600.00
6500.00
6400.00
6300.00
6200.00
6100.00
6000.00
5900.00
31/07/2022 00:00
1/08/2022 00:00
2/08/2022 00:00
3/08/2022 00:00
4/08/2022 00:00
5/08/2022 00:00
6/08/2022 00:00
7/08/2022 00:00
8/08/2022 00:00
9/08/2022 00:00
10/08/2022 00:00
11/08/2022 00:00
12/08/2022 00:00
13/08/2022 00:00
14/08/2022 00:00
15/08/2022 00:00
16/08/2022 00:00
17/08/2022 00:00
18/08/2022 00:00
19/08/2022 00:00
20/08/2022 00:00
21/08/2022 00:00
22/08/2022 00:00
23/08/2022 00:00
24/08/2022 00:00
25/08/2022 00:00
26/08/2022 00:00
27/08/2022 00:00
28/08/2022 00:00
29/08/2022 00:00
30/08/2022 00:00
31/08/2022 00:00
1/09/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

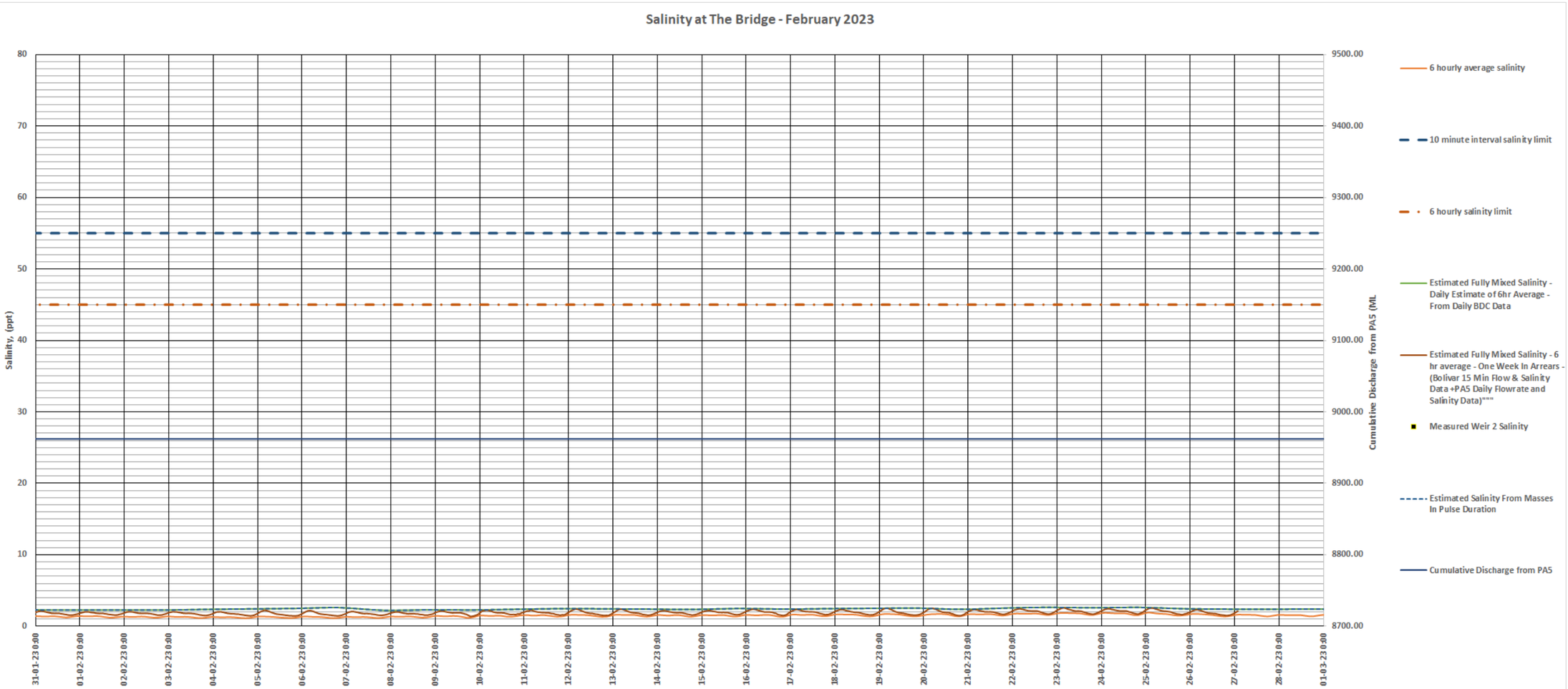

Salinity at The Bridge - September 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
Bridge Salinity sensor maintenance
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

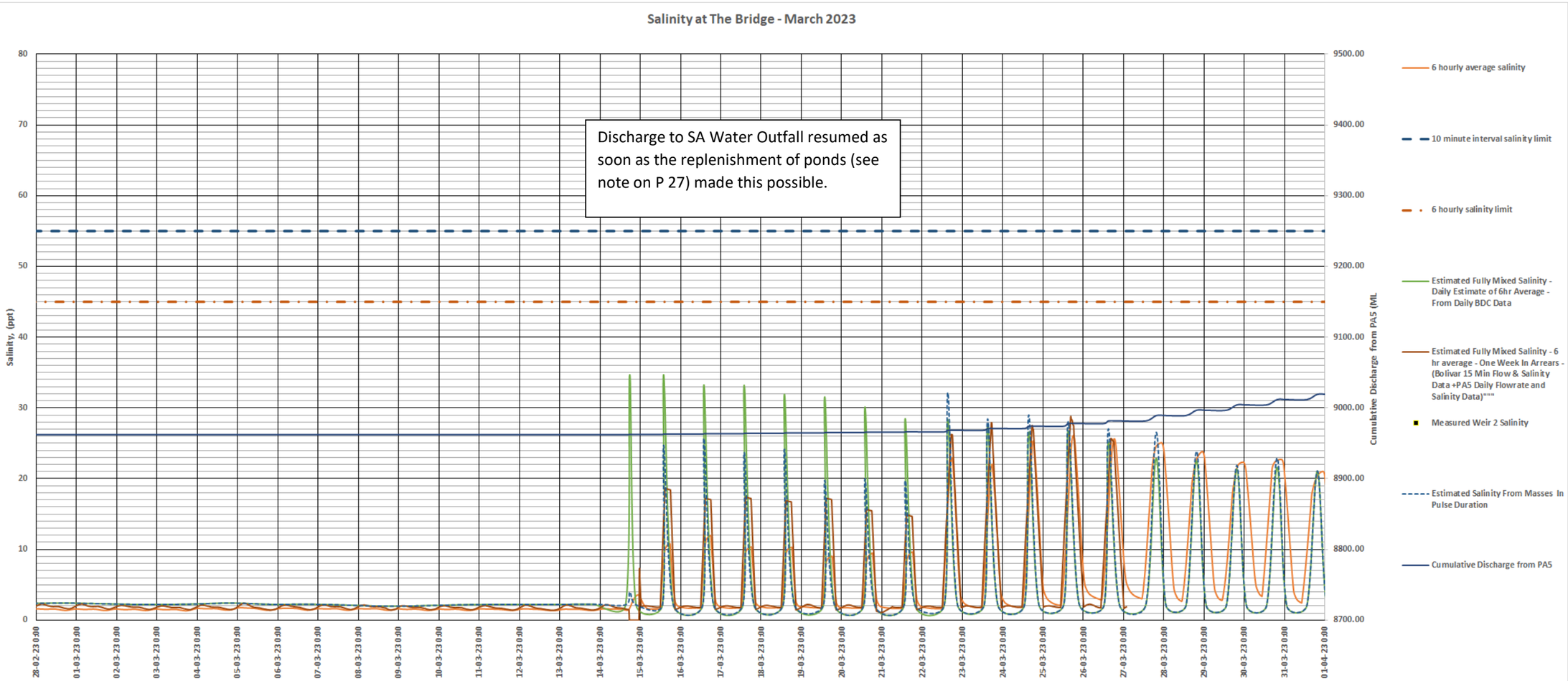

Salinity at The Bridge - October 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
8100.00
8000.00
7900.00
7800.00
7700.00
7600.00
7500.00
7400.00
7300.00
Bridge Salinity sensor maintenance
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5
30-09-22 0:00
01-10-22 0:00
02-10-22 0:00
03-10-22 0:00
04-10-22 0:00
05-10-22 0:00
06-10-22 0:00
07-10-22 0:00
08-10-22 0:00
09-10-22 0:00
10-10-22 0:00
11-10-22 0:00
12-10-22 0:00
13-10-22 0:00
14-10-22 0:00
15-10-22 0:00
16-10-22 0:00
17-10-22 0:00
18-10-22 0:00
19-10-22 0:00
20-10-22 0:00
21-10-22 0:00
22-10-22 0:00
23-10-22 0:00
24-10-22 0:00
25-10-22 0:00
26-10-22 0:00
27-10-22 0:00
28-10-22 0:00
29-10-22 0:00
30-10-22 0:00
31-10-22 0:00
01-11-22 0:00

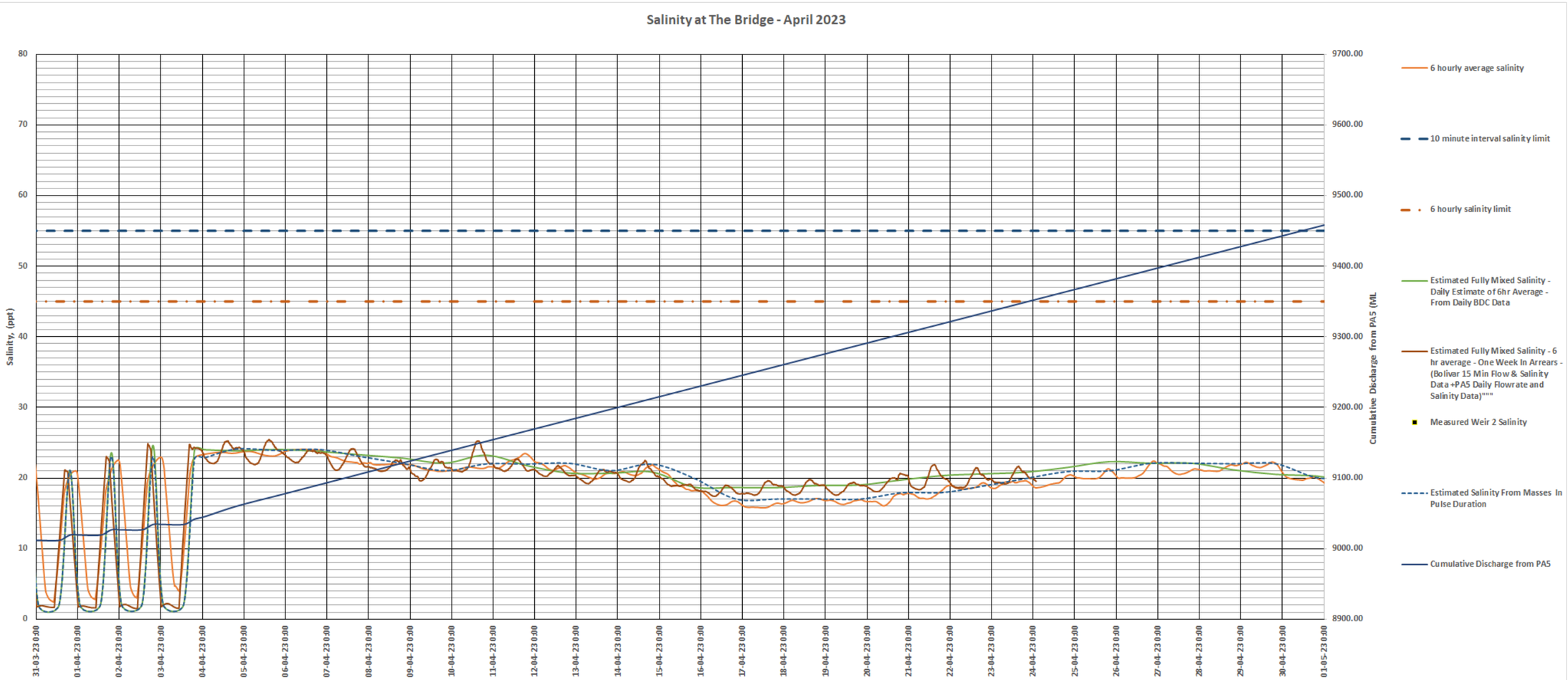

Salinity at The Bridge - November 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
8800.00
8700.00
8600.00
8500.00
8400.00
8300.00
8200.00
8100.00
8000.00
31/10/2022 00:00
1/11/2022 00:00
2/11/2022 00:00
3/11/2022 00:00
4/11/2022 00:00
5/11/2022 00:00
6/11/2022 00:00
7/11/2022 00:00
8/11/2022 00:00
9/11/2022 00:00
10/11/2022 00:00
11/11/2022 00:00
12/11/2022 00:00
13/11/2022 00:00
14/11/2022 00:00
15/11/2022 00:00
16/11/2022 00:00
17/11/2022 00:00
18/11/2022 00:00
19/11/2022 00:00
20/11/2022 00:00
21/11/2022 00:00
22/11/2022 00:00
23/11/2022 00:00
24/11/2022 00:00
25/11/2022 00:00
26/11/2022 00:00
27/11/2022 00:00
28/11/2022 00:00
29/11/2022 00:00
30/11/2022 00:00
1/12/2022 00:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average -From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

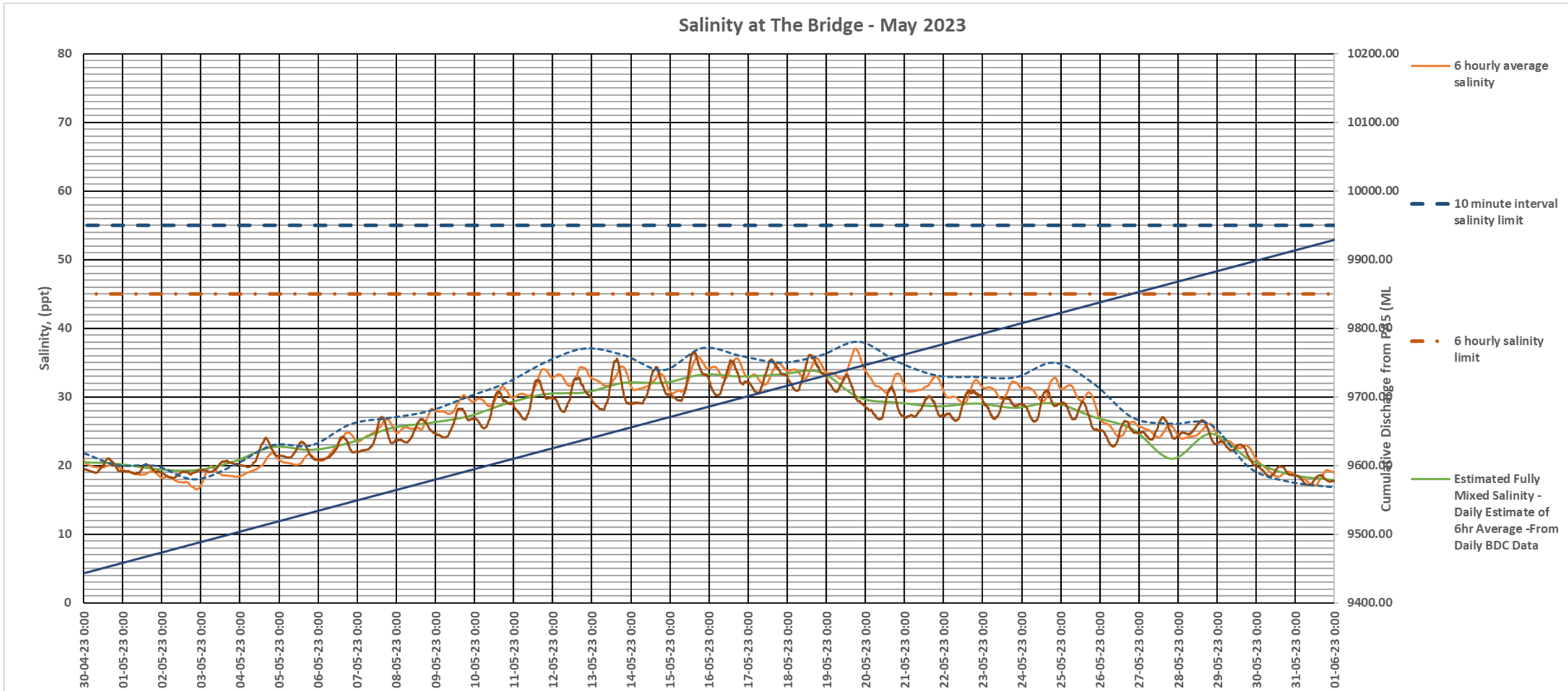

Salinity at The Bridge - December 2022
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
Discharge from PA5 interrupted as a consequence of loss of power to Middle Beach pumps from storm damage to power lines
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average -From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

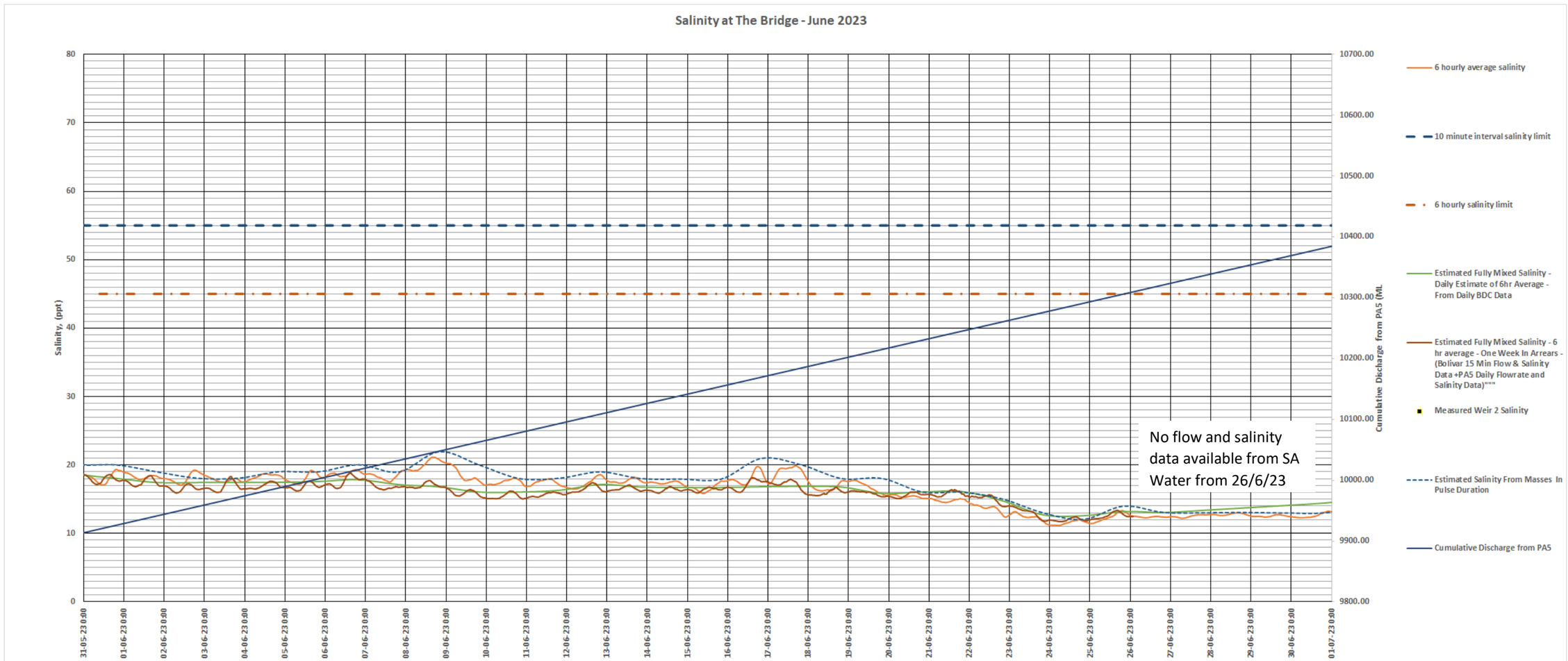

Salinity at The Bridge - January 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
Discharge from PA5 interrupted as a consequence of needing to replenish pond water levels following loss of power to Middle Beach pumps from storm damage to power lines
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5


Salinity at The Bridge - February 2023
Salinity, (ppt)
80
70
60
50
40
30
20
10
0
Cumulative Discharge from PA5 (ML
9500.00
9400.00
9300.00
9200.00
9100.00
9000.00
8900.00
8800.00
8700.00
31-01-23 0:00
01-02-23 0:00
02-02-23 0:00
03-02-23 0:00
04-02-23 0:00
05-02-23 0:00
06-02-23 0:00
07-02-23 0:00
08-02-23 0:00
09-02-23 0:00
10-02-23 0:00
11-02-23 0:00
12-02-23 0:00
13-02-23 0:00
14-02-23 0:00
15-02-23 0:00
16-02-23 0:00
17-02-23 0:00
18-02-23 0:00
19-02-23 0:00
20-02-23 0:00
21-02-23 0:00
22-02-23 0:00
23-02-23 0:00
24-02-23 0:00
25-02-23 0:00
26-02-23 0:00
27-02-23 0:00
28-02-23 0:00
01-03-23 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

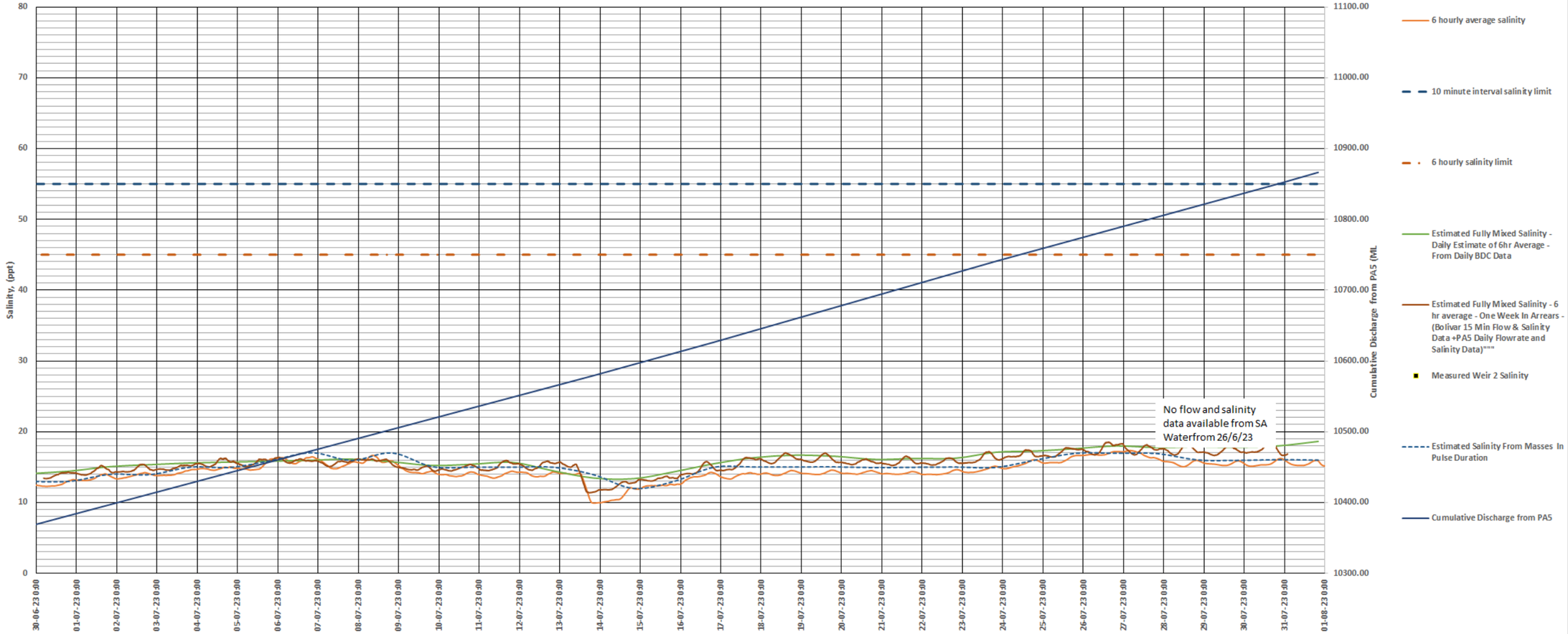

Salinity at The Bridge - March 2023
Discharge to SA Water Outfall resumed as soon as the replenishment of ponds (see note on P 27) made this possible.
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

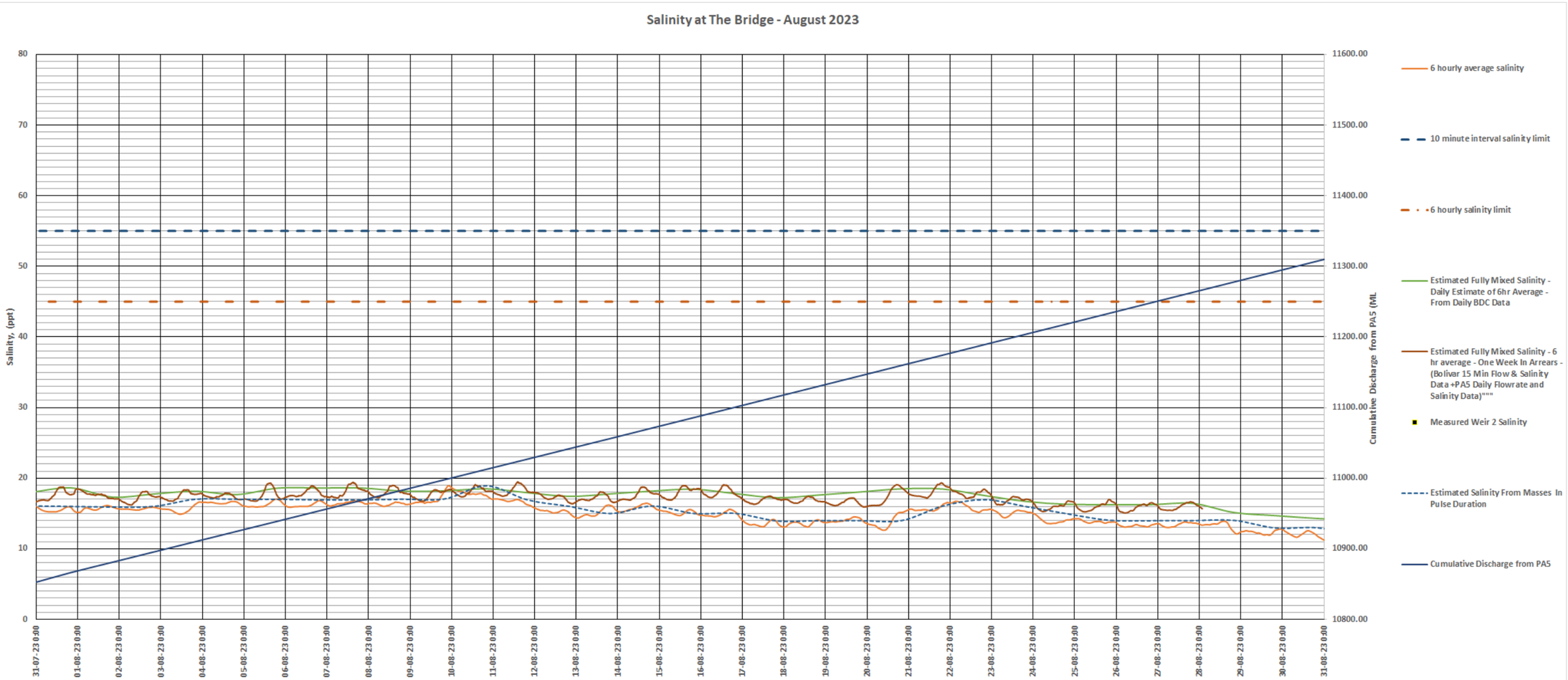

Salinity at The Bridge - April 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
9700.00
9600.00
9500.00
9400.00
9300.00
9200.00
9100.00
9000.00
8900.00
31-03-23 0:00
01-04-23 0:00
02-04-23 0:00
03-04-23 0:00
04-04-23 0:00
05-04-23 0:00
06-04-23 0:00
07-04-23 0:00
08-04-23 0:00
09-04-23 0:00
10-04-23 0:00
11-04-23 0:00
12-04-23 0:00
13-04-23 0:00
14-04-23 0:00
15-04-23 0:00
16-04-23 0:00
17-04-23 0:00
18-04-23 0:00
19-04-23 0:00
20-04-23 0:00
21-04-23 0:00
22-04-23 0:00
23-04-23 0:00
24-04-23 0:00
25-04-23 0:00
26-04-23 0:00
27-04-23 0:00
28-04-23 0:00
29-04-23 0:00
30-04-23 0:00
01-05-23 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

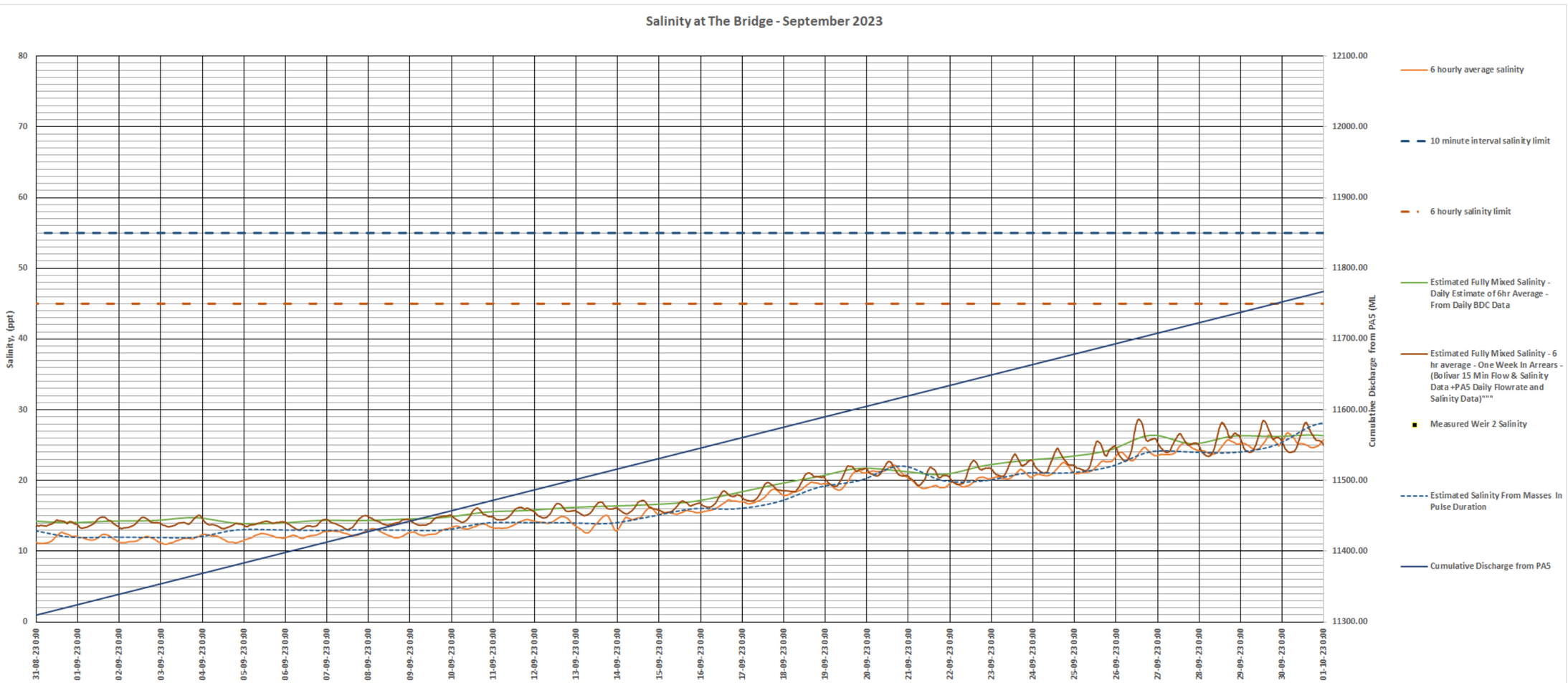

Salinity at The Bridge - May 2023
Salinity, (ppt)
Cumulative Discharge from PS5 (ML
80
70
60
50
40
30
20
10
0
10200.00
10100.00
10000.00
9900.00
9800.00
9700.00
9600.00
9500.00
9400.00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average -From Daily BDC Data
30-04-23 0:00
01-05-23 0:00
02-05-23 0:00
03-05-23 0:00
04-05-23 0:00
05-05-23 0:00
06-05-23 0:00
07-05-23 0:00
08-05-23 0:00
09-05-23 0:00
10-05-23 0:00
11-05-23 0:00
12-05-23 0:00
13-05-23 0:00
14-05-23 0:00
15-05-23 0:00
16-05-23 0:00
17-05-23 0:00
18-05-23 0:00
19-05-23 0:00
20-05-23 0:00
21-05-23 0:00
22-05-23 0:00
23-05-23 0:00
24-05-23 0:00
25-05-23 0:00
26-05-23 0:00
27-05-23 0:00
28-05-23 0:00
29-05-23 0:00
30-05-23 0:00
31-05-23 0:00
01-06-23 0:00

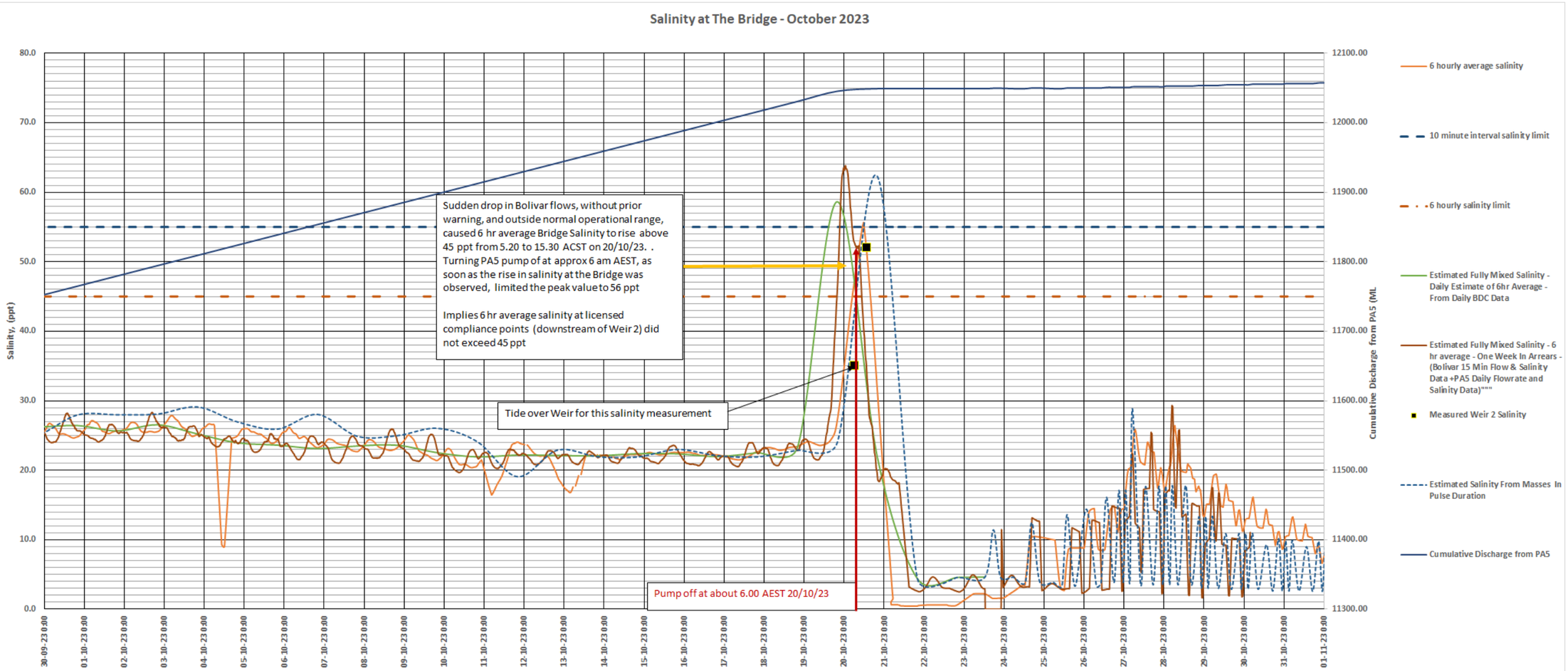

Salinity at The Bridge - June 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
10700.00
10600.00
10500.00
10400.00
10300.00
10200.00
10100.00
10000.00
9900.00
9800.00
31-05-23 0:00
01-06-23 0:00
02-06-23 0:00
03-06-23 0:00
04-06-23 0:00
05-06-23 0:00
06-06-23 0:00
07-06-23 0:00
08-06-23 0:00
09-06-23 0:00
10-06-23 0:00
11-06-23 0:00
12-06-23 0:00
13-06-23 0:00
14-06-23 0:00
15-06-23 0:00
16-06-23 0:00
17-06-23 0:00
18-06-23 0:00
19-06-23 0:00
20-06-23 0:00
21-06-23 0:00
22-06-23 0:00
23-06-23 0:00
24-06-23 0:00
25-06-23 0:00
26-06-23 0:00
27-06-23 0:00
28-06-23 0:00
29-06-23 0:00
30-06-23 0:00
01-07-23 0:00
No flow and salinity data available from SA Water from 26/6/23
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

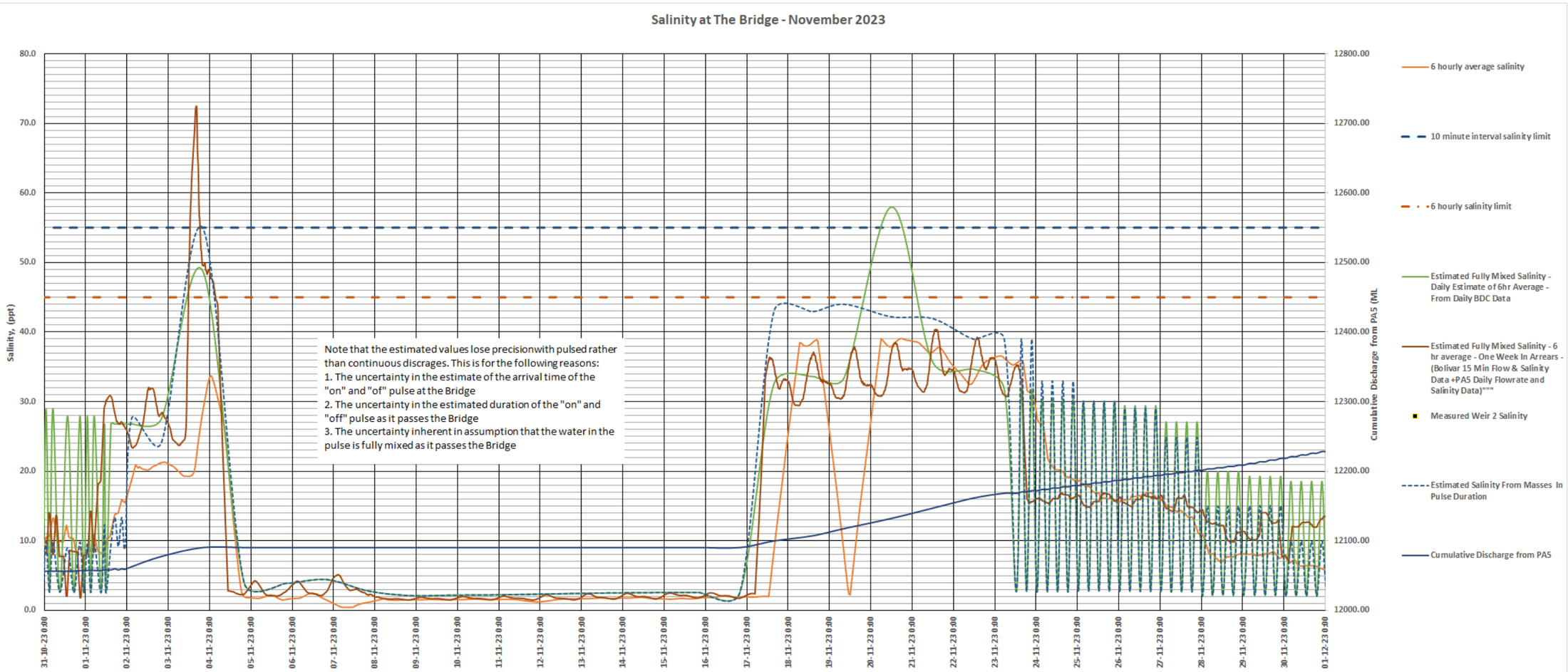
Salinity at The Bridge - July 2023

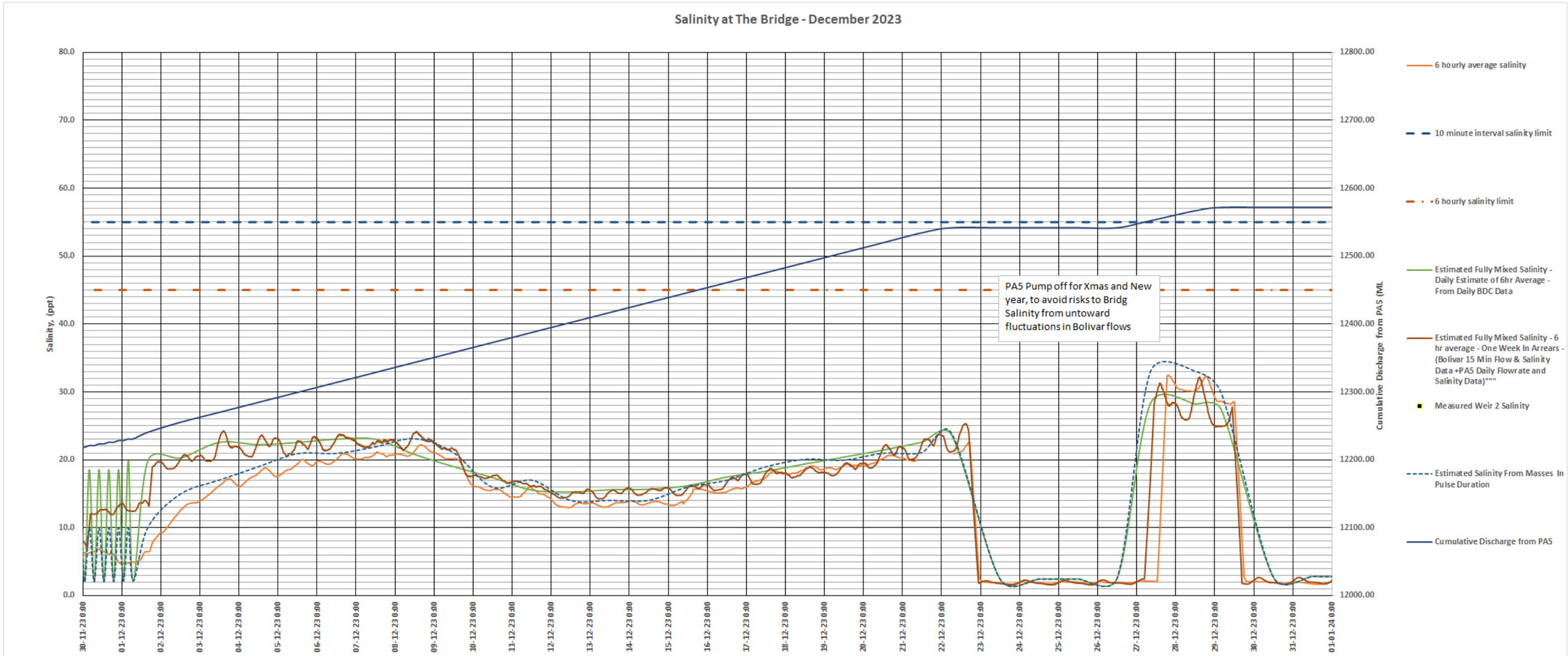



Salinity at The Bridge - August 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
11600.00
11500.00
11400.00
11300.00
11200.00
11100.00
11000.00
10900.00
10800.00
31-07-23 0:00
01-08-23 0:00
02-08-23 0:00
03-08-23 0:00
04-08-23 0:00
05-08-23 0:00
06-08-23 0:00
07-08-23 0:00
08-08-23 0:00
09-08-23 0:00
10-08-23 0:00
11-08-23 0:00
12-08-23 0:00
13-08-23 0:00
14-08-23 0:00
15-08-23 0:00
16-08-23 0:00
17-08-23 0:00
18-08-23 0:00
19-08-23 0:00
20-08-23 0:00
21-08-23 0:00
22-08-23 0:00
23-08-23 0:00
24-08-23 0:00
25-08-23 0:00
26-08-23 0:00
27-08-23 0:00
28-08-23 0:00
29-08-23 0:00
30-08-23 0:00
31-08-23 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

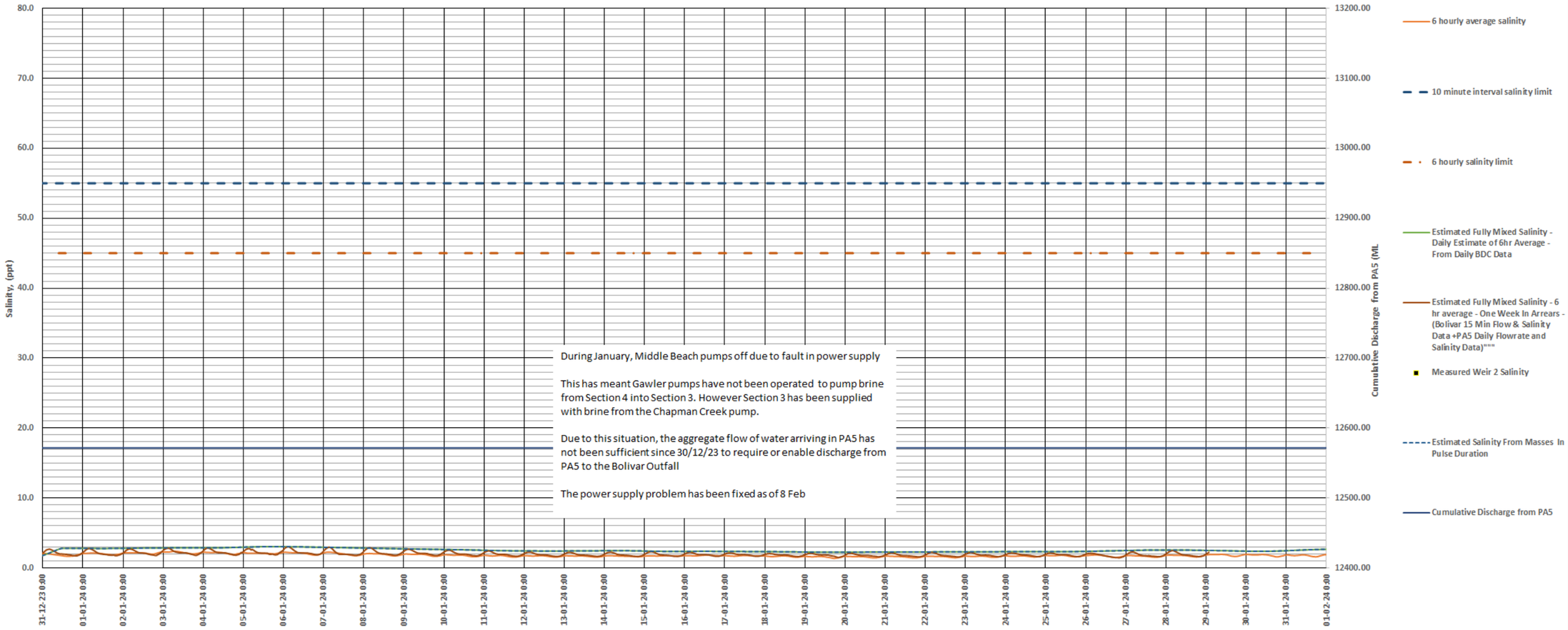

Salinity at The Bridge - September 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80
70
60
50
40
30
20
10
0
12100.00
12000.00
11900.00
11800.00
11700.00
11600.00
11500.00
11400.00
11300.00
31-08-23 0:00
01-09-23 0:00
02-09-23 0:00
03-09-23 0:00
04-09-23 0:00
05-09-23 0:00
06-09-23 0:00
07-09-23 0:00
08-09-23 0:00
09-09-23 0:00
10-09-23 0:00
11-09-23 0:00
12-09-23 0:00
13-09-23 0:00
14-09-23 0:00
15-09-23 0:00
16-09-23 0:00
17-09-23 0:00
18-09-23 0:00
19-09-23 0:00
20-09-23 0:00
21-09-23 0:00
22-09-23 0:00
23-09-23 0:00
24-09-23 0:00
25-09-23 0:00
26-09-23 0:00
27-09-23 0:00
28-09-23 0:00
29-09-23 0:00
30-09-23 0:00
01-10-23 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5


Salinity at The Bridge - October 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
Sudden drop in Bolivar flows, without prior warning, and outside normal operational range, caused 6 hr average Bridge Salinity to rise above 45 ppt from 5.20 to 15.30 ACST on 20/10/23. . Turning PA5 pump of at approx 6 am AEST, as soon as the rise in salinity at the Bridge was observed, limited the peak value to 56 ppt
Implies 6 hr average salinity at licensed compliance points (downstream of Weir 2) did not exceed 45 ppt
Tide over Weir for this salinity measurement
Pump off at about 6.00 AEST 20/10/23
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

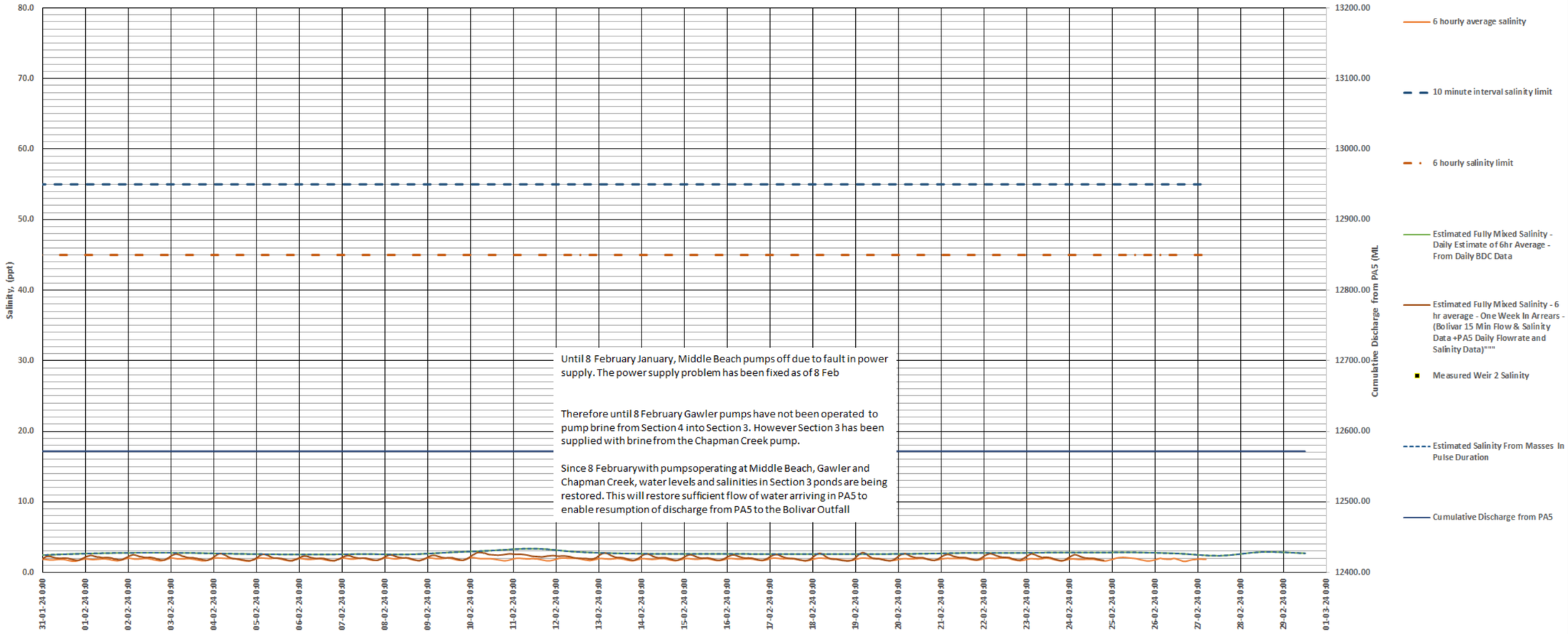

Salinity at The Bridge - November 2023
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12800.00
12700.00
12600.00
12500.00
12400.00
12300.00
12200.00
12100.00
12000.00
Note that the estimated values lose precisionwith pulsed rather than continuous discrages. This is for the following reasons:
1. The uncertainty in the estimate of the arrival time of the "on" and "of" pulse at the Bridge
2. The uncertainty in the estimated duration of the "on" and "off" pulse as it passes the Bridge
3. The uncertainty inherent in assumption that the water in the pulse is fully mixed as it passes the Bridge
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5
31-10-23 0:00
01-11-23 0:00
02-11-23 0:00
03-11-23 0:00
04-11-23 0:00
05-11-23 0:00
06-11-23 0:00
07-11-23 0:00
08-11-23 0:00
09-11-23 0:00
10-11-23 0:00
11-11-23 0:00
12-11-23 0:00
13-11-23 0:00
14-11-23 0:00
15-11-23 0:00
16-11-23 0:00
17-11-23 0:00
18-11-23 0:00
19-11-23 0:00
20-11-23 0:00
21-11-23 0:00
22-11-23 0:00
23-11-23 0:00
24-11-23 0:00
25-11-23 0:00
26-11-23 0:00
27-11-23 0:00
28-11-23 0:00
29-11-23 0:00
30-11-23 0:00
01-12-23 0:00


Salinity at The Bridge - December 2023
Salinity (ppt)
Cumulative Discharge from PA5 (ML
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12800.00
12700.00
12600.00
12500.00
12400.00
12300.00
12200.00
12100.00
12000.00
PA5 Pump off for Xmas and New year, to avoid risks to Bridg Salinity from untoward fluctuations in Bolivar flows
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5
30-11-23 0:00
01-12-23 0:00
02-12-23 0:00
03-12-23 0:00
04-12-23 0:00
05-12-23 0:00
06-12-23 0:00
07-12-23 0:00
08-12-23 0:00
09-12-23 0:00
10-12-23 0:00
11-12-23 0:00
12-12-23 0:00
13-12-23 0:00
14-12-23 0:00
15-12-23 0:00
16-12-23 0:00
17-12-23 0:00
18-12-23 0:00
19-12-23 0:00
20-12-23 0:00
21-12-23 0:00
22-12-23 0:00
23-12-23 0:00
24-12-23 0:00
25-12-23 0:00
26-12-23 0:00
27-12-23 0:00
28-12-23 0:00
29-12-23 0:00
30-12-23 0:00
31-12-23 0:00
01-01-24 0:00

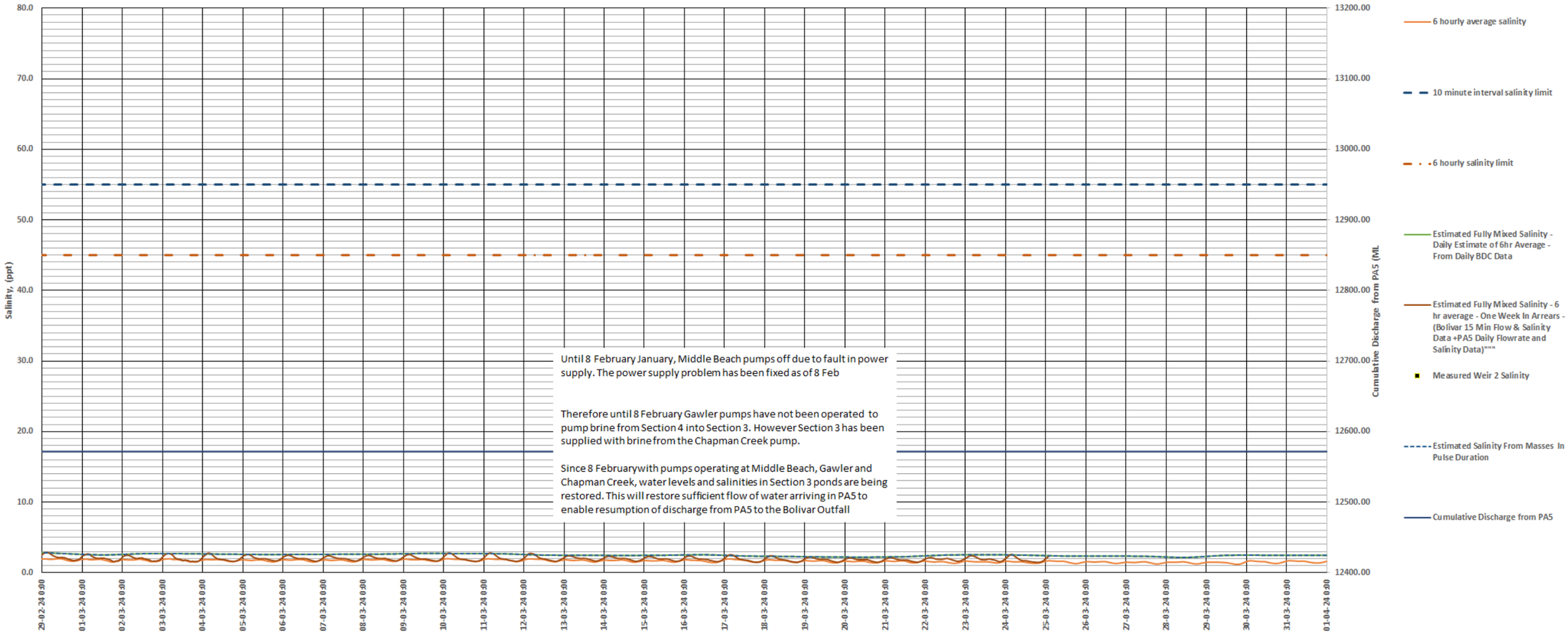
Salinity at The Bridge - January 2024

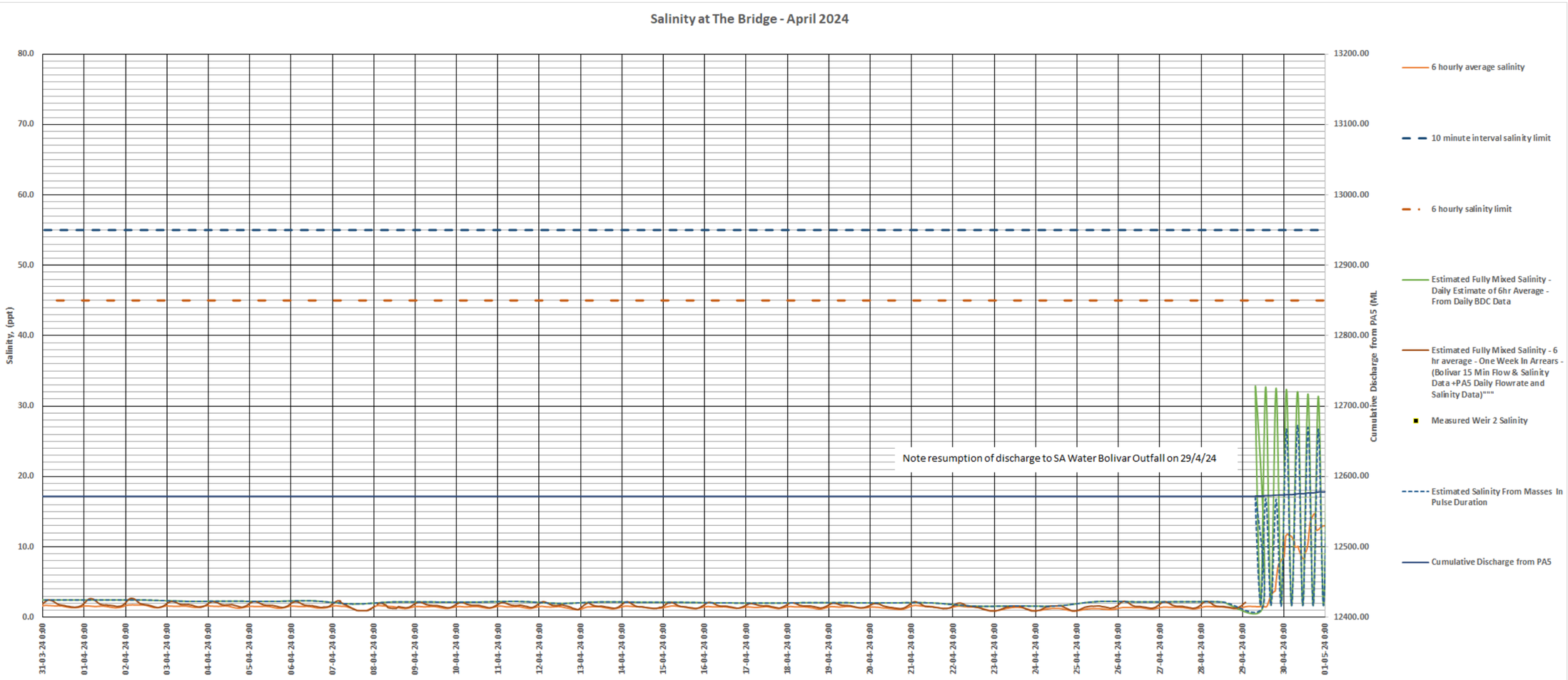


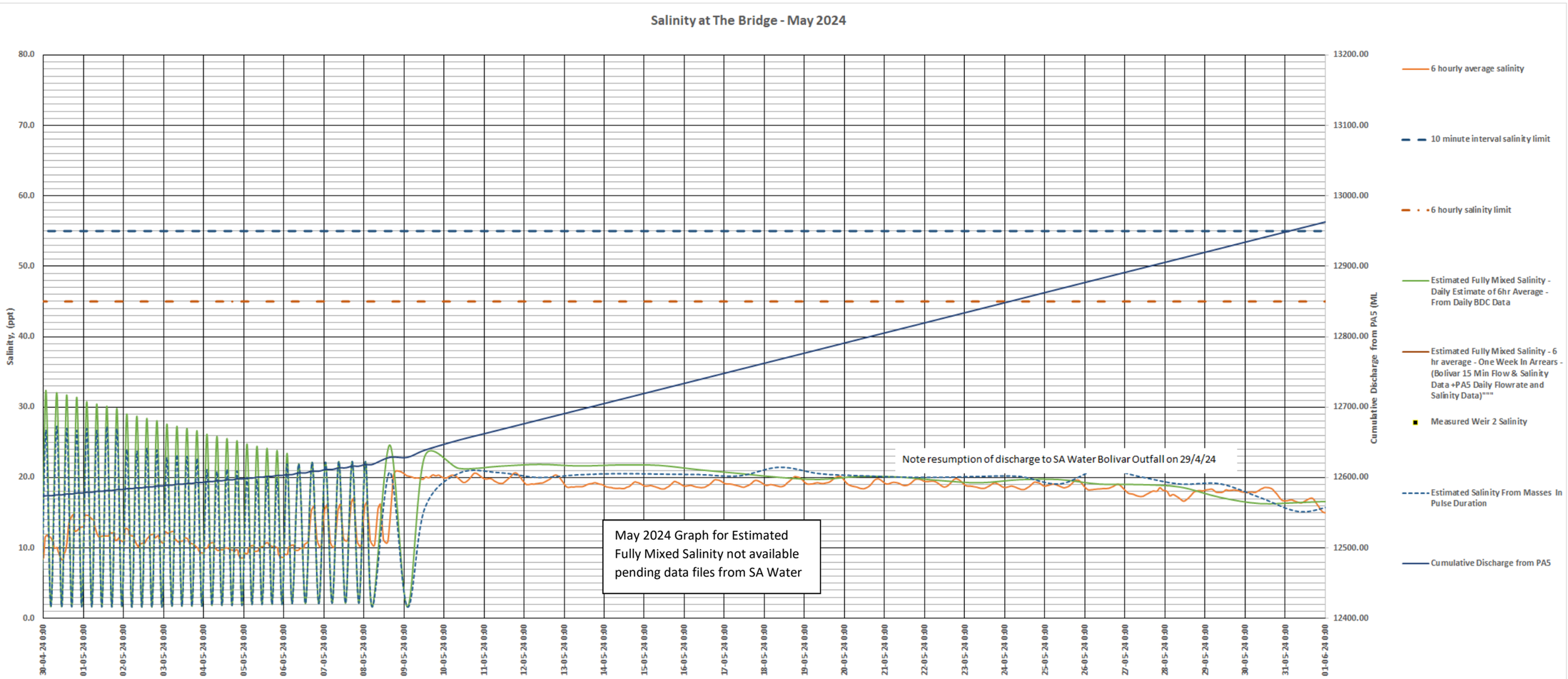
Salinity at The Bridge - February 2024

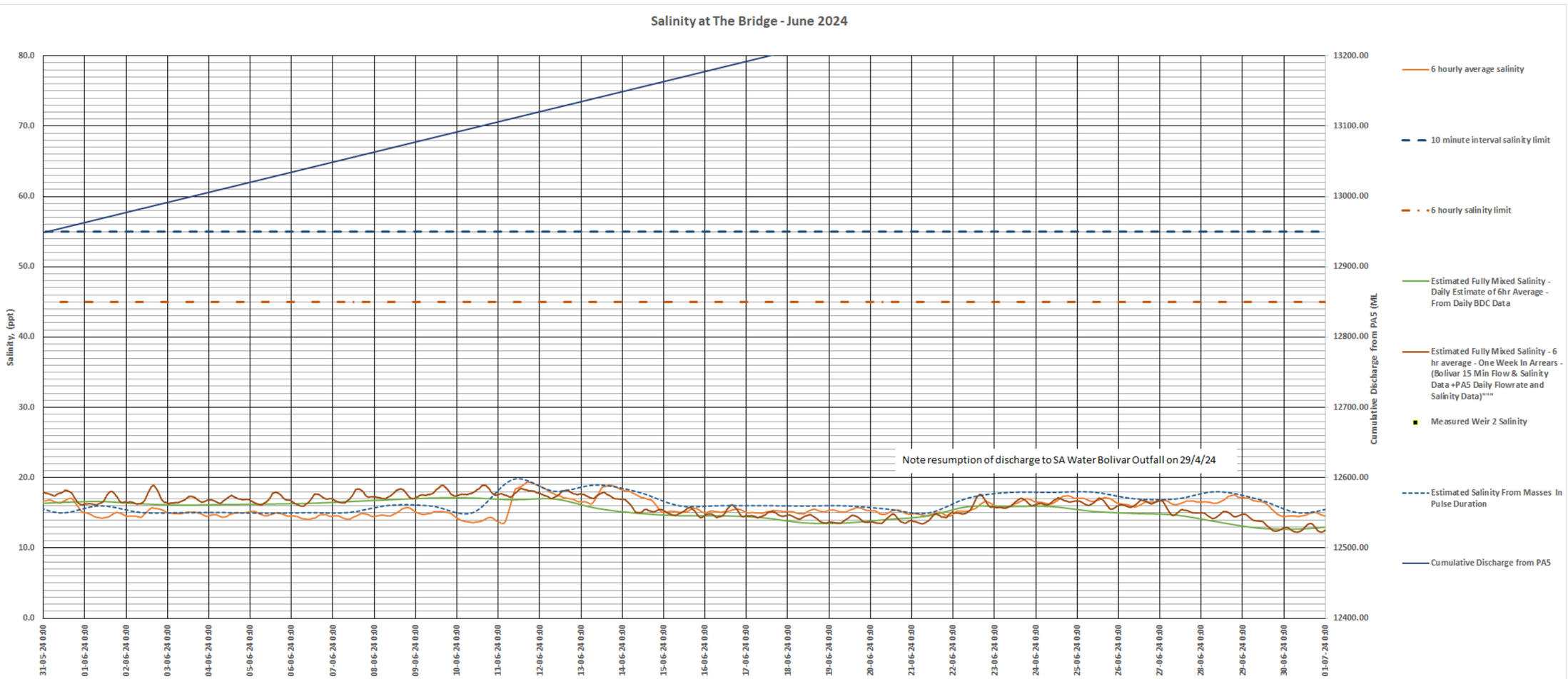


Salinity at The Bridge - March 2024

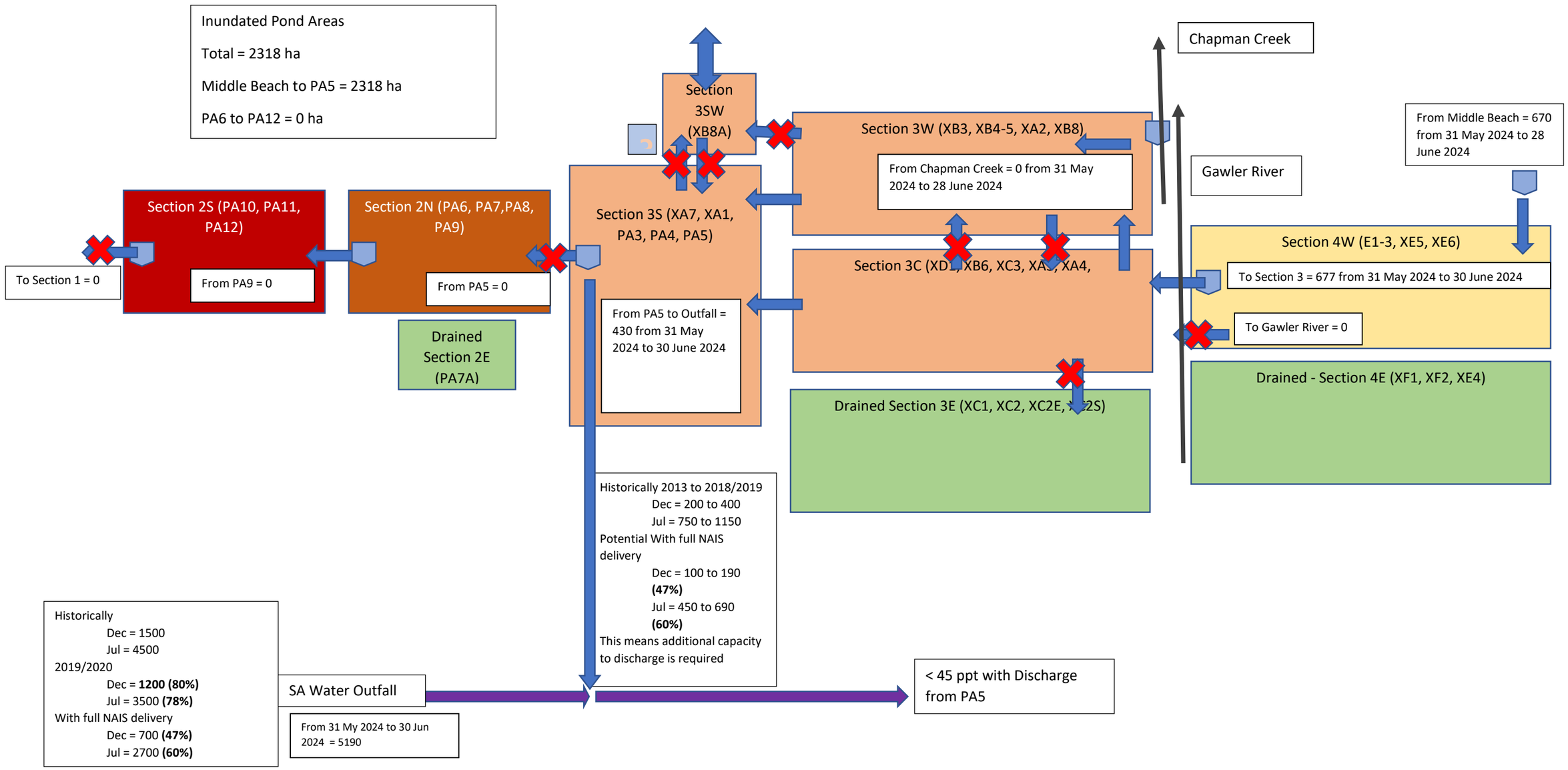



Salinity at The Bridge - April 2024
Salinity, (ppt)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Cumulative Discharge from PA5 (ML
13200.00
13100.00
13000.00
12900.00
12800.00
12700.00
12600.00
12500.00
12400.00
Note resumption of discharge to SA Water Bolivar Outfall on 29/4/24
31-03-24 0:00
01-04-24 0:00
02-04-24 0:00
03-04-24 0:00
04-04-24 0:00
05-04-24 0:00
06-04-24 0:00
07-04-24 0:00
08-04-24 0:00
09-04-24 0:00
10-04-24 0:00
11-04-24 0:00
12-04-24 0:00
13-04-24 0:00
14-04-24 0:00
15-04-24 0:00
16-04-24 0:00
17-04-24 0:00
18-04-24 0:00
19-04-24 0:00
20-04-24 0:00
21-04-24 0:00
22-04-24 0:00
23-04-24 0:00
24-04-24 0:00
25-04-24 0:00
26-04-24 0:00
27-04-24 0:00
28-04-24 0:00
29-04-24 0:00
30-04-24 0:00
01-05-24 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5


Salinity at The Bridge - May 2024
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
13200.00
13100.00
13000.00
12900.00
12800.00
12700.00
12600.00
12500.00
12400.00
30-04-24 0:00
01-05-24 0:00
02-05-24 0:00
03-05-24 0:00
04-05-24 0:00
05-05-24 0:00
06-05-24 0:00
07-05-24 0:00
08-05-24 0:00
09-05-24 0:00
10-05-24 0:00
11-05-24 0:00
12-05-24 0:00
13-05-24 0:00
14-05-24 0:00
15-05-24 0:00
16-05-24 0:00
17-05-24 0:00
18-05-24 0:00
19-05-24 0:00
20-05-24 0:00
21-05-24 0:00
22-05-24 0:00
23-05-24 0:00
24-05-24 0:00
25-05-24 0:00
26-05-24 0:00
27-05-24 0:00
28-05-24 0:00
29-05-24 0:00
30-05-24 0:00
31-05-24 0:00
01-06-24 0:00
Note resumption of discharge to SA Water Bolivar Outfall on 29/4/24
May 2024 Graph for Estimated Fully Mixed Salinity not available pending data files from SA Water
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5


Salinity at The Bridge - June 2024
Salinity, (ppt)
Cumulative Discharge from PA5 (ML
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
13200.00
13100.00
13000.00
12900.00
12800.00
12700.00
12600.00
12500.00
12400.00
Note resumption of discharge to SA Water Bolivar Outfall on 29/4/24
31-05-24 0:00
01-06-24 0:00
02-06-24 0:00
03-06-24 0:00
04-06-24 0:00
05-06-24 0:00
06-06-24 0:00
07-06-24 0:00
08-06-24 0:00
09-06-24 0:00
10-06-24 0:00
11-06-24 0:00
12-06-24 0:00
13-06-24 0:00
14-06-24 0:00
15-06-24 0:00
16-06-24 0:00
17-06-24 0:00
18-06-24 0:00
19-06-24 0:00
20-06-24 0:00
21-06-24 0:00
22-06-24 0:00
23-06-24 0:00
24-06-24 0:00
25-06-24 0:00
26-06-24 0:00
27-06-24 0:00
28-06-24 0:00
29-06-24 0:00
30-06-24 0:00
01-07-24 0:00
6 hourly average salinity
10 minute interval salinity limit
6 hourly salinity limit
Estimated Fully Mixed Salinity - Daily Estimate of 6hr Average - From Daily BDC Data
Estimated Fully Mixed Salinity - 6 hr average - One Week In Arrears - (Bolivar 15 Min Flow & Salinity Data +PA5 Daily Flowrate and Salinity Data)"""
Measured Weir 2 Salinity
Estimated Salinity From Masses In Pulse Duration
Cumulative Discharge from PA5

Entrainment & Discharge Flows (ML) – 4 May 2024 to 31 May 2024



Water Management Goals with Discharge only to Outfall = a) Maintain water levels within historic ranges; b) reduce salinity (specific gravity) well below historic levels in winter in order to; c) maintain salinity (specific gravity) as close as possible to but below historic levels in summer. This for environmental reasons

Water Management Strategy =

- Winter: Entrain and Discharge as much as necessary to reduce salinities to provide capacity for salinities to increase in summer when discharge is constrained. This means salinities fluctuate much more winter to summer than would be permissible with salt production
- Summer: Entrain and discharge as much as is needed in Section 4 to keep salinity at XE 6 as low as possible; Entrain at Chapman Creek to keep salinity at XB3 as low as possible; When flow in SA Water outfall or other discharge constraints reduce the discharge from PA5 too far, 1st stop flow from XB8, then XC3, to preserve flow through XA3, XA4. Note that with too low a discharge from PA5, the salinity in PA5 rises and gypsum precipitates in the PA5 pump, and pipeline and flow control valves / orifice plate. This means than lower than historic holding pattern discharges from PA5 cannot be tolerated

Appendix G – Water Bores

BORE WATER USE vs LICENCE ALLOCATIONS - JULY 202

		Water Meter Readings									Monthly Us	
Month		1	3	4	5	6		7	8 (New Meter Readings)		1	3
2023	June	399,949	197,377	1,470,408	501,139	914,269		2,813,244	26,273			
2023	July	399,949	197,377	1,470,408	501,139	936,274		2,813,244	26,273	new meter	-	-
2023	August	399,949	197,377	1,470,408	501,139	961,402		2,813,244	26,829	3,222	-	-
2023	September	399,949	197,377	1,470,408	501,139	985,632		2,813,244		9,765	-	-
2023	October	399,949	197,377	1,470,408	501,139	1,000,000	10,778	2,813,244		16,322	-	-
2023	November	399,949	197,377	1,470,408	501,139		35,953	2,813,244		23,444	-	-
2023	December	399,949	197,377	1,470,408	501,139		61,423	2,813,244		32,311	-	-
2024	January	399,949	197,377	1,470,408	501,139		92,743	2,813,244		41,138	-	-
2024	February	399,949	197,377	1,470,408	501,139		128,451	2,813,244		49,857	-	-
2024	March	399,949	197,377	1,470,408	501,139		162,613	2,813,244		58,033	-	-
2024	April	399,949	197,377	1,470,408	501,139		201,706	2,813,244		67,878	-	-
2024	May	399,949	197,377	1,470,408	501,139		248,289	2,813,244		79,271	-	-
2024	June	399,949	197,377	1,470,408	501,139		283,734	2,813,244		82,495	-	-

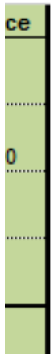
Table 1: Licenced Wells and Water Allocations

Local name	Well unit number	Well depth	Well area	Aquifer	Type	Allocation and Licen
A Row Number 1 bore	6628 - 19184	156 metres	NAP	T1	submersible	T1 combined allocation
G Row Number 3 bore	6628 - 14027	153 metres	NAP	T1	submersible	1,177,255 kilolitres Water Licence 21179
D Row Number 4 bore	6628 - 4356	119 metres	NAP	T1	shaft	
E Row Number 5 bore	6628 - 13020	149 metres	NAP	T1	submersible	
Front Gate						T1

Number 6 bore	6628 - 13170	165 metres	DC	T1	submersible	combined allocation
Storm Pit Number 7 bore	6628 - 18042	162 metres	DC	T1	submersible	850,255 kilolitres Water Licence 21178
Champans Ck T3 bore	6528 - 2005	364 metres	NAP	T3	submersible	T3 allocation 1,200,000 kilolitres Water Licence 21179

3-JUNE 2024

e Bores 1-5, 8 (kL = m3)			Combined allocation 1,177,255 kL		Monthly Use Bores 6-7 (kL)		Combined allocation 850,000 kL	
4	5	8	Cumulative Use Bores 1, 3, 4, 5, 8 (kL)	**Remaining from Allocation (kL)**	6	7	Cumulative Use Bores 6 - 7 (kL)	**Remaining from Allocation (kL)**
				1,177,255				**850,000**
-	-	-	-	**1,177,255**	22,005	-	22,005	**827,995**
-	-	3,778	3,778	**1,173,477**	25,128	-	47,133	**802,867**
-	-	6,543	10,321	**1,166,934**	24,230	-	71,363	**778,637**
-	-	6,557	16,878	**1,160,377**	25,146	-	96,509	**753,491**
-	-	7,122	24,000	**1,153,255**	25,175	-	121,684	**728,316**
-	-	8,867	32,867	**1,144,388**	25,470	-	147,154	**702,846**
-	-	8,827	41,694	**1,135,561**	31,320	-	178,474	**671,526**
-	-	8,719	50,413	**1,126,842**	35,708	-	214,182	**635,818**
-	-	8,176	58,589	**1,118,666**	34,162	-	248,344	**601,656**
-	-	9,845	68,434	**1,108,821**	39,093	-	287,437	**562,563**
-	-	11,393	79,827	**1,097,428**	46,583	-	334,020	**515,980**
-	-	3,224	83,051	**1,094,204**	35,445	-	369,465	**480,535**



Note: The above table includes extraction from Bore 8. This draws from the T1 aquifer. Even including this bore, the Use does not exceed the allocation


allocation
8
0

Appendix H –Filling in G & H Rows

See Section 2 in the following report

Buckland Dry Creek Pty Ltd

PEPR compliance reporting, 12 months to 30 June 2024

Report author:	David Kingston, Engineering Manager, CPEng, FIEAust
Company:	Buckland Dry Creek Pty Ltd
Address:	412 Hanson Road North, Dry Creek
Phone:	08 8244 8156
Report date:	27 September 2024
Report version:	1.0

1. Introduction

This document summarises a range of activities undertaken by Buckland Dry Creek Pty Ltd (BDC) at the Dry Creek Saltfields across the reporting period of 1 July 2023 and 30 June 2024. It is prepared in accordance with the requirements of the site's PEPR/MOP Ref:470606.

2. Section 1 filling works

Overview

BDC is proposing to develop eastern portions of private mine PM248 for future urban land development. Salt crystallisers F row, G row and H row are being progressively filled in accordance with bulk earthworks plans that set out construction and environmental management controls. Filling works continued in accordance with the Bulk Earthworks Plans for F & G Rows. Care and maintenance of the completely filled H Row continued across the period.

Fill importation

Filling of F row with ballast commenced just prior to the start of the reporting period, and by the end of the reporting period was about 98% complete, with just some small fringe areas along the eastern and northern boundaries of F Row still requiring ballast. Across the period, some 220,000 tonnes of ballast was imported from ARR and laid across F row.

Between 1 July 2023 and 30 June 2024, some 45,000 tonnes of waste soil meeting EPA waste fill criteria was delivered to Saltfields from 14 different off-site sources, with about 80% to G row and 20% to F row. Selection of either F Row or G row for receipt of waste soil was dependent of operational constraints such as degree of saturation of ground after rain, incoming soil type (e.g. sandy clay, clay) and availability of site crews. Soil from each of the offsite sources was verified by BDC's Auditor as complying with the EPA waste fill criteria prior to importation to site.

Relevant details of waste soil are set out in **Figure 1** and **Figure 2**.

Fill placement

For F Row, ballast was placed and compacted in a south to north direction. Waste soil was stockpiled in the southeastern corner of F Row, with some portions of the stockpiles pushed out and compacted during the reporting period. **Figure 3** shows the crystalliser at the start and end of the reporting period.

For G Row, as was indicated in the previous 12 month compliance report, focus was applied to placing fill along the eastern portion of G Row, in order to accommodate future land development requirements. Some stockpiles were placed in the southwestern corner of G row but not pushed out or compacted by the end of the reporting period. **Figure 4** shows the crystalliser at the start and end of the reporting period.

The southern and central portion of the stacking bay between G & H rows was cleaned out early in the reporting period with material stockpiled and ready to move to other parts of Section 1.

Fill compaction

Compaction was achieved using standard earthmoving machinery including compactors, dozers, graders, and drum rollers. Where necessary, water carts were used to raise moisture content of supplied fill and to manage dust during windy days. Fill was compacted in 200mm thick layers over the ballast, with each layer tested in accordance with AS3798.

Environmental investigations

During the reporting period, some soil and groundwater investigations were undertaken in G row and H row in the reporting period, and while compilation and reporting of the findings is yet to occur, the Auditor has been kept up to date on the progress of these investigations.

The completion report for H row is nearing finalisation and will be submitted to the Auditor for review in the latter part of 2024, with expectation that the audit will be finalised by the end of 2024.

Filling updates to DEM

For the 2023-24 period, BDC submitted the following filling progress reports to DEM:

Report date	Period covering
10 Oct 2023	Oct 22 – Aug 23 (incl. data from previous reporting period)
13 Sep 2024	Sep 23 – Jun 24

Filling findings

BDC makes the following observations regarding the filling of F row and G row during the reporting period:

- The fill source sites have been determined by BDC and verified by the Auditor as being suitable sources of waste soil.
- The compaction of fill has met the BEP specification and therefore complies with AS3798.
- Vertical settlement of the crystalliser bed has remained stable.

BDC is satisfied that the earthworks undertaken in F row and G row in the 12 months to 30 June 2024 complies with the BEPs and is sufficient to support the future land use.

3. Field management

Asset maintenance

There were several significant power outages to Section 3 and 4 in late 2023 and early 2024, resulting in the loss of sea water pumping from Middle Beach and Chapman's Creek for a number of weeks. Following power line repairs, resumption of pumping at Middle Beach and Chapmans Creek occurred in February and restoration of normal operating conditions and pond levels in Section 2 to 4 ponds was achieved by about April 2024. These events were reported to DEM in a **report dated 20 March 2024**.

Minor road and track maintenance works were performed from time to time in some areas across the field, and included actions such as filling in potholes, grading tracks and trimming back overhanging trees and shrubs along tracks.

Regular monitoring of the condition of the bund between ponds XB8 and XB8A occurred across the reporting period, with a number of written updates provided to DEM on the outcomes of monitoring. In addition, BDC decided to undertake bund improvement works in June 2024 and this included placement of sandbags along low and vulnerable portions of the bund wall. This work was outlined to DEM in a **report dated 28 June 2024**.

Incidents

Across the reporting period there were a number of night-time break-ins and attempted break-ins at the Dry Creek office and surrounding lands. Usually, access to the site was gained by cutting holes in the chain-wire fencing either along the North-South Motorway or near the bicycle track between the North-South Motorway and Salisbury Highway. BDC made repairs to external fencing and maintained security cameras in high-value asset areas such as the Dry Creek workshop and office.

Complaints

There were no public complaints raised regarding any aspect of the field in the reporting period.

Dust and surface waste management

BDC continued active management of the field across the period. For filling works in Section 1, truck movements were adjusted to accommodate dust or mud-related restrictions during dry and wet periods. Dust on site was controlled to good effect with the water cart, both on haul roads and on the fill pad. BDC deployed a full-time picker to collect any rubbish or unsuitable material in the waste soil as well as any blowing rubbish gathering along or near site boundaries.

Section 1 works compound

No further progress was made on the relocation of the site compound from its current position near the northern end of H row to the south-western corner of G row. Completed works consist of a hardstand area and perimeter fencing and a new water quickfill tank. Power is still to be connected to the compound and sheds and facilities remain at the H row compound.

4. Attachments

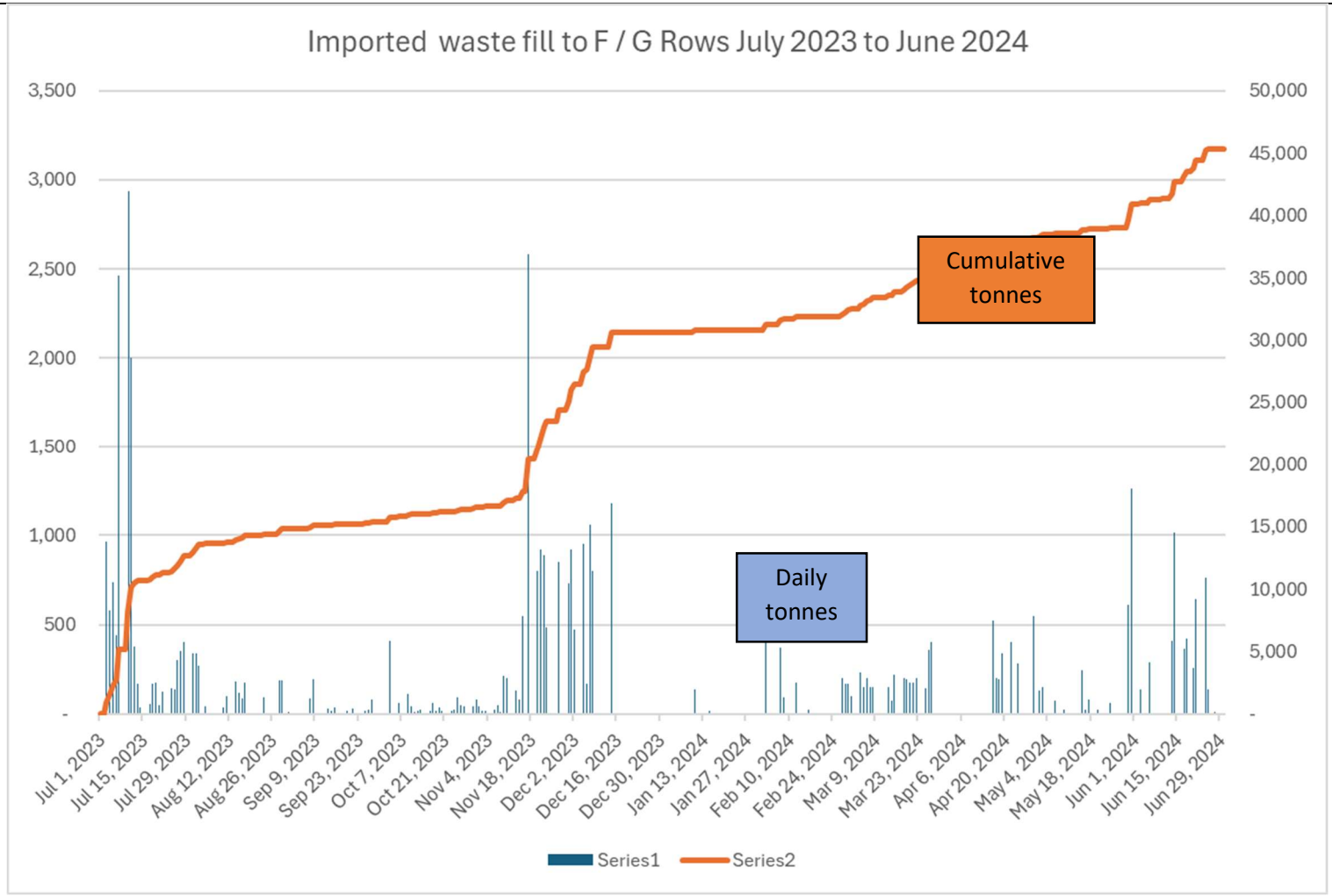


Figure 1: Daily importation of waste soil from ARR to F / G rows

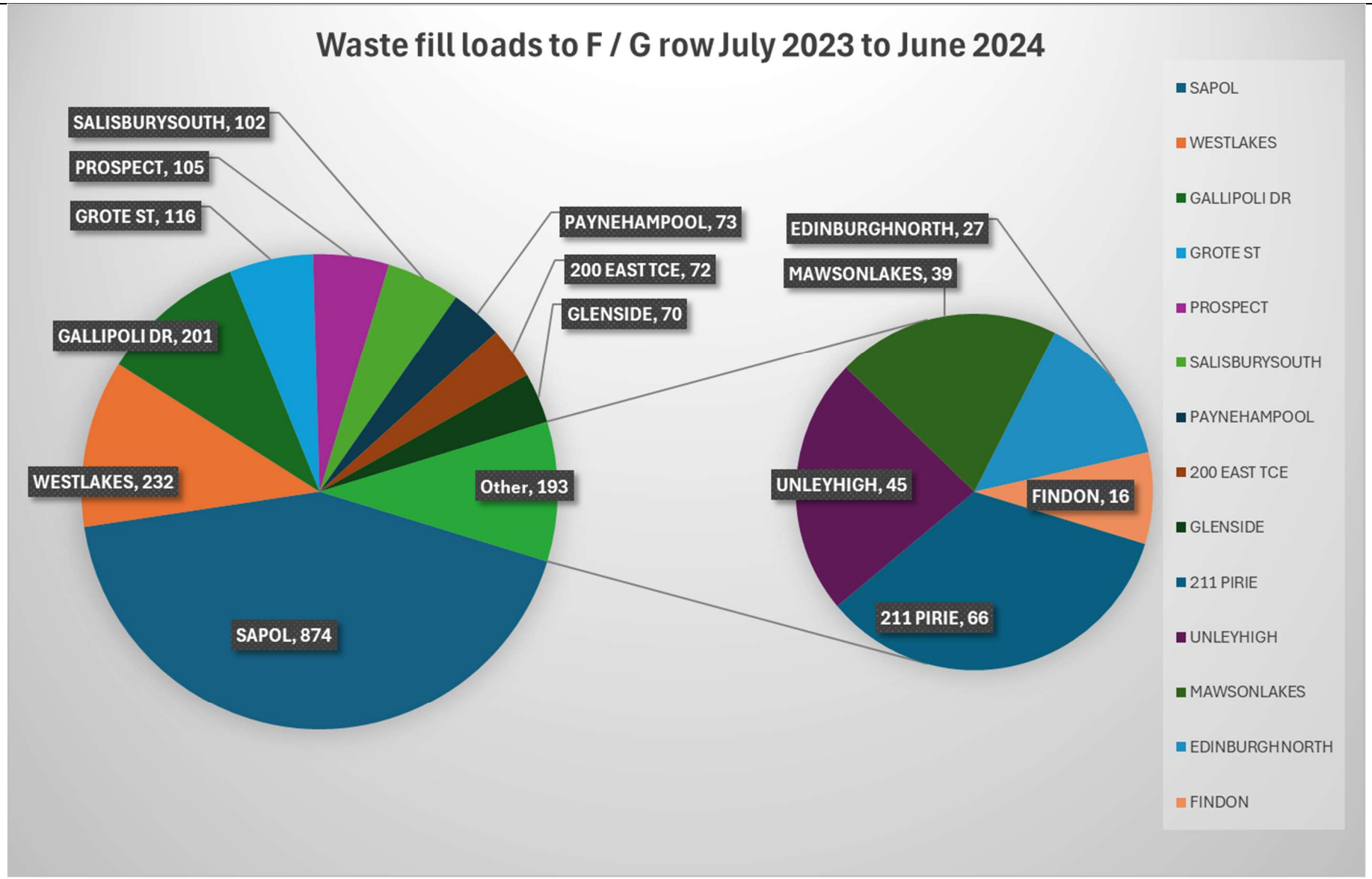


Figure 2: Source of waste soil delivered to Saltfields (both F & G rows)

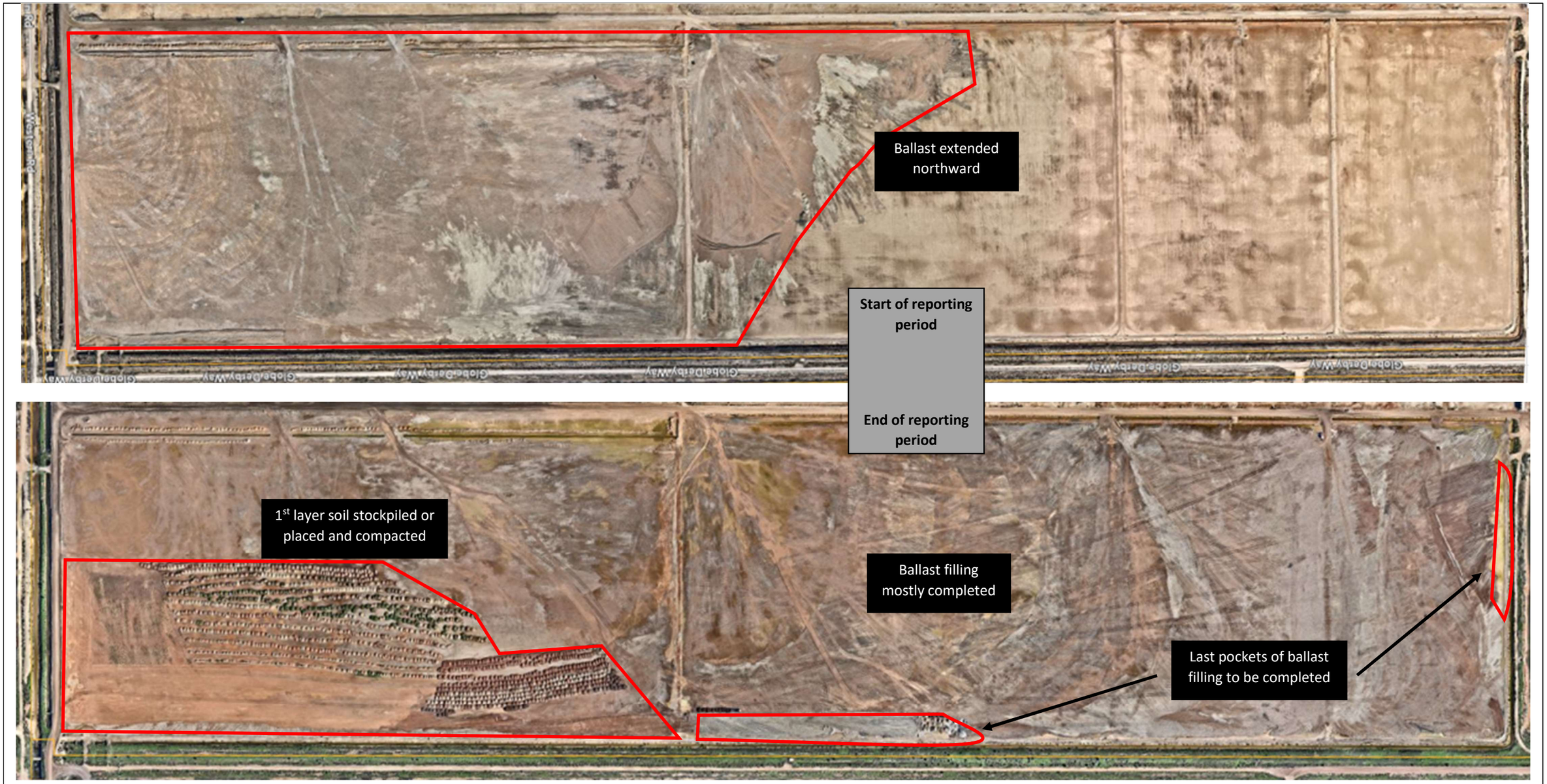


Figure 3: Filling status of F row at start and end of reporting period

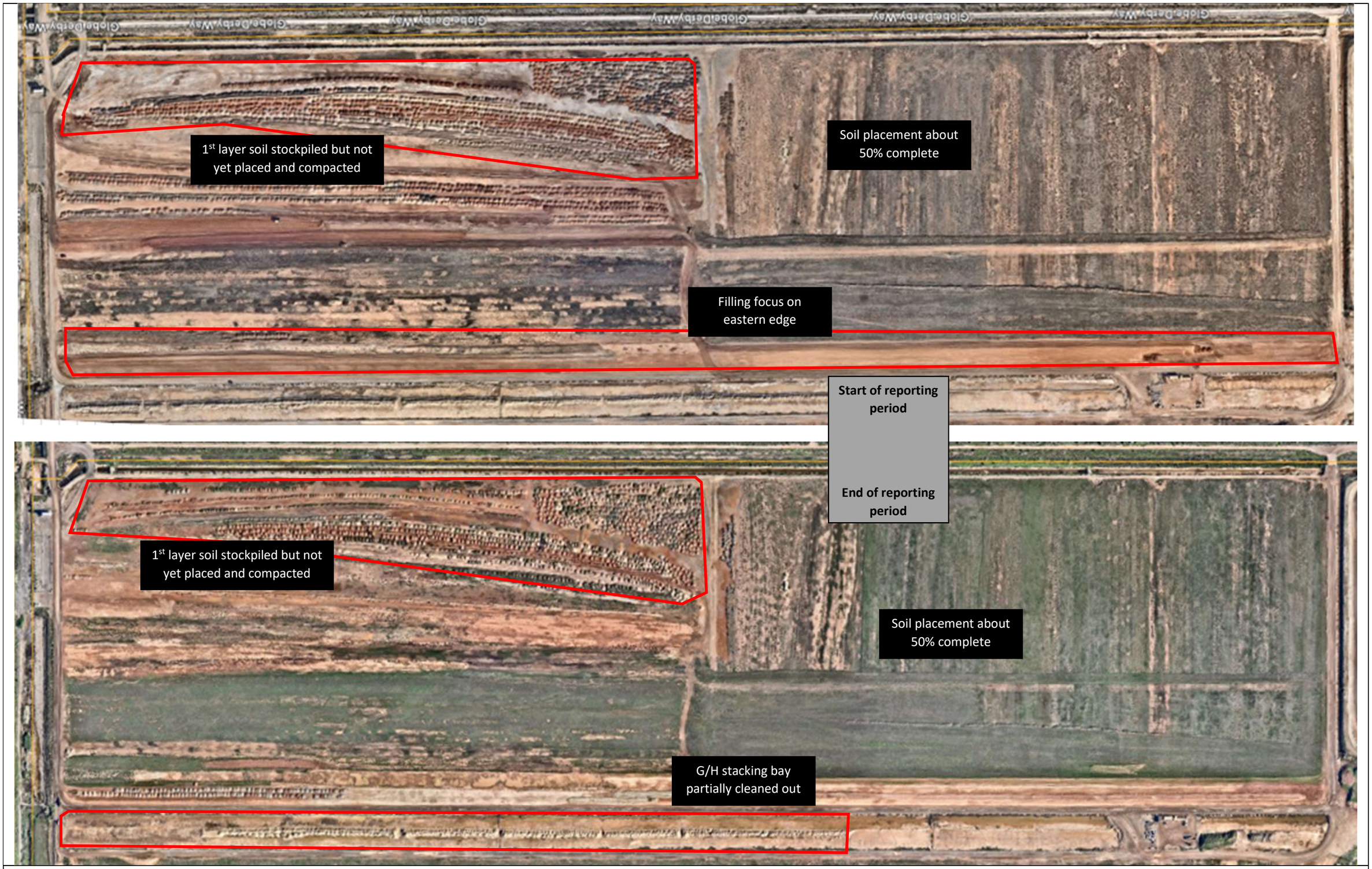


Figure 4: Filling status of G row at start and end of reporting period

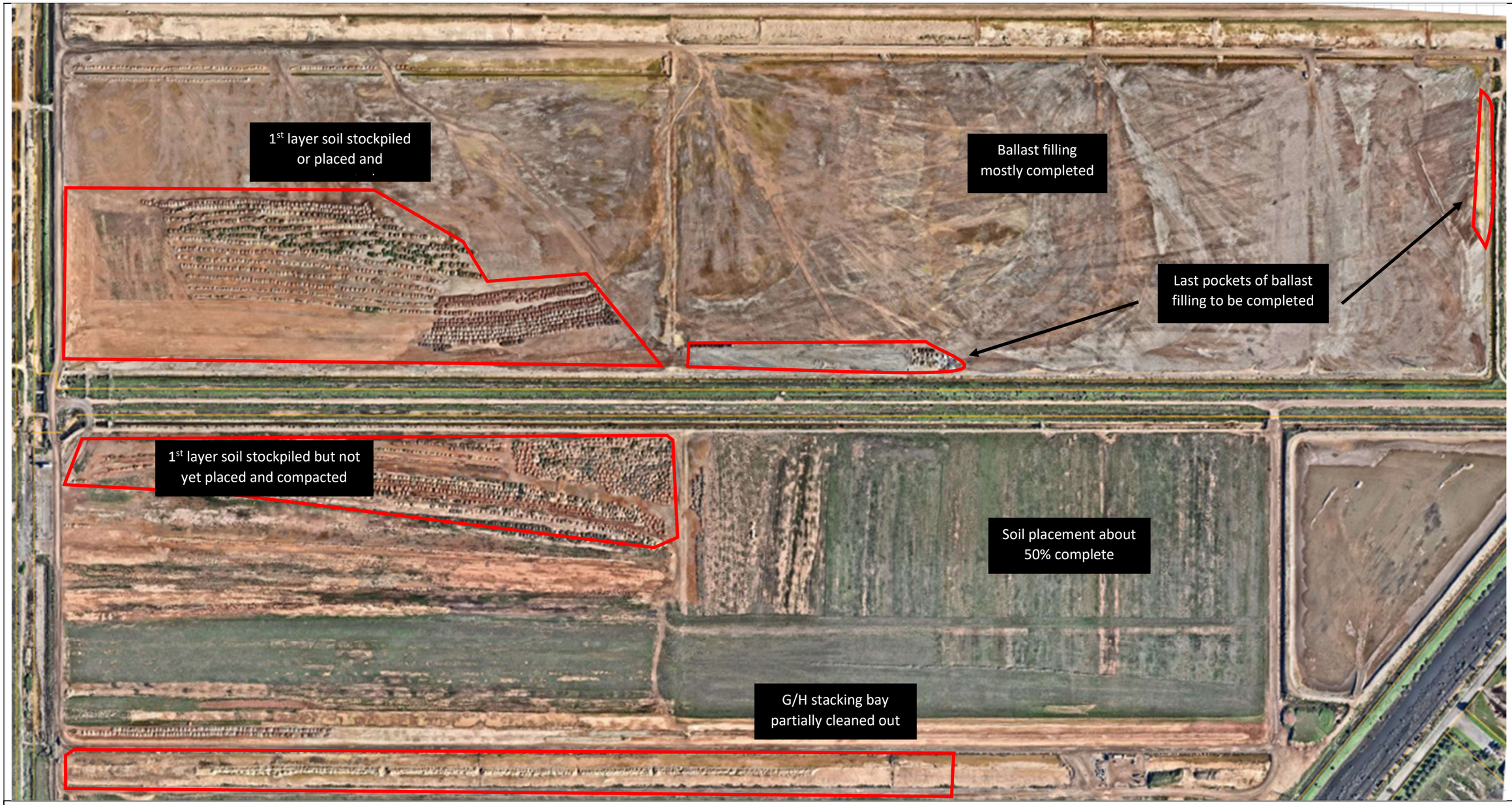


Figure 1: F Row and G row layout at end June 2024

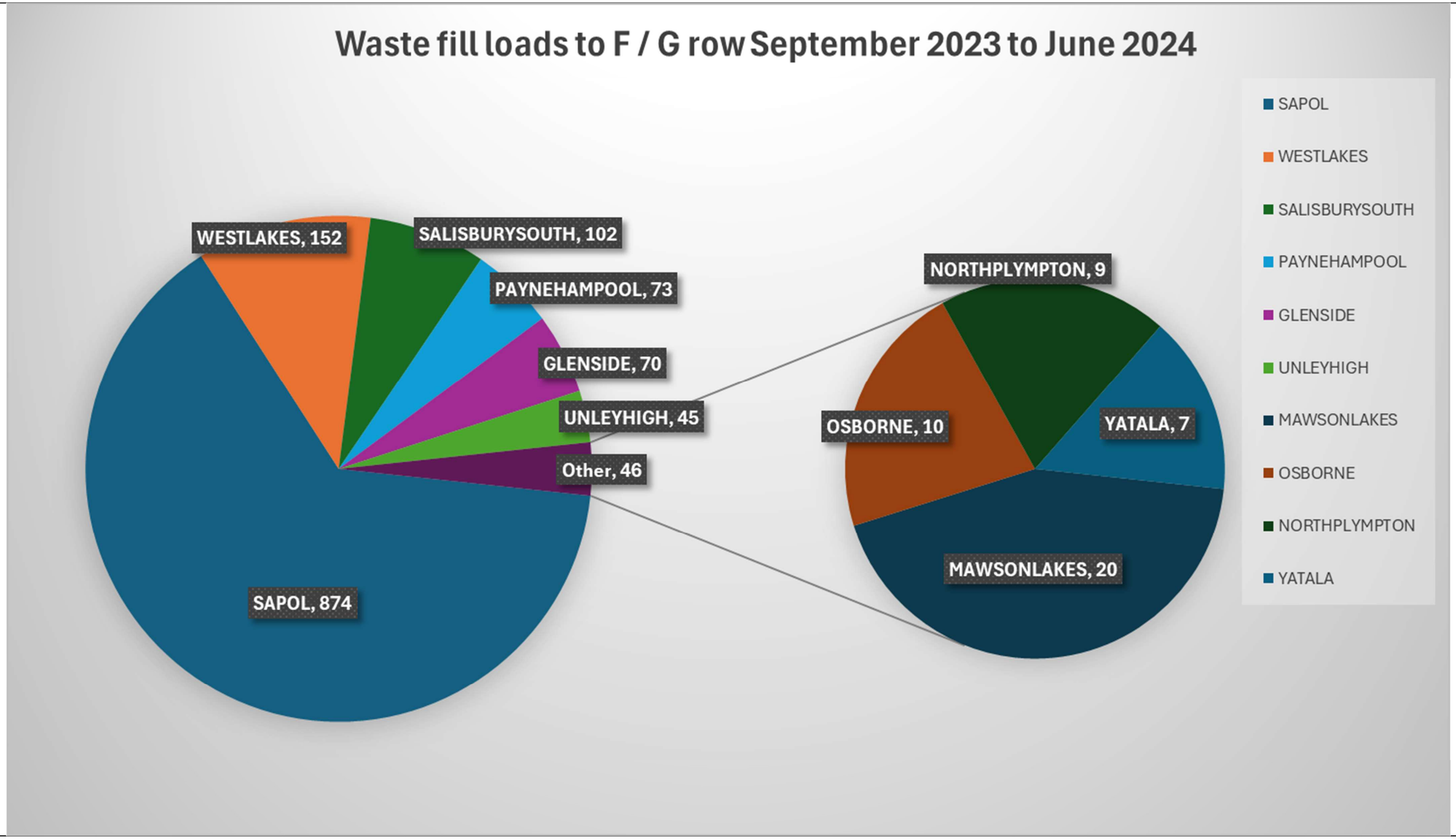


Figure 2: Waste soil truck movements from external sites, September 2023 to June 2024

Progress Report: filling and compaction work (September 23 to June 24)

Report author: David Kingston, Engineering Manager
Report date: 13 September 2024

Filling works

This report sets out a summary of the bulk filling activities at F Row and G row and the environmental status of imported waste soil for the September 2023 to June 2024 period.

For this period, ballast was only placed on F Row, waste soil was placed on both F row and G Row with an approximate 80% / 20% split (respective), and there was no filling activity on H Row.

Imported waste soil was brought to site and laid out and compacted in 200mm layers. Looking broadly at the filling program, around 29,761 t of soil was imported from 10 separate sites. The slower speed of works indicated in previous progress reports continued through this period. Around 115,000 t of ballast was imported from Adelaide Resource Recovery and all was placed in F Row.

During the period, the vast majority of filling work in G row occurred across the eastern portion.

A graphical representation of the filling status is provided in **Figure 1**.

Compaction testing of filled areas

Compaction tests were performed in accordance with the specification by our NATA-accredited geotechnical testing laboratory on-site at the Saltfields. Compaction certificates provided by the laboratory were held on file and results conveyed to the site crews to indicate pass/fail and whether or not a change in compaction method was required depending on the properties of the soil tested. The review of geotechnical data is undertaken by our Engineering Manager, a qualified civil engineer.

Environmental status of imported waste soil

All external soil brought to site was tested for environmental contaminants prior to importation. Environmental reports relating to the classification of the imported soil were reviewed and accepted by the auditor. A chart showing overall fill importation for the reporting period is provided in **Figure 2**. The auditor conducted an independent review of this Progress Report and has advised his findings in writing in **Attachment 2**.

Assessment to support Site Audit

BDC continues to work closely with the Auditor on preparing documentation to support the Auditor's site contamination audit report (SCAR) for H row and anticipates its completion by the end of 2024. The Audit for G row will occur at a later date once filling for G row is completed.

Site management

BDC continued active management of the site across the period with truck movements adjusted to accommodate seasonal changes such as blowing dust or mud-tracking on roads during dry and wet periods. Dust on site was controlled to good effect with the water cart, both on haul roads and on the fill pad. BDC continued with surface picking on a 3-day per week basis to collect any rubbish or unsuitable material in the ballast, waste soil as well as any blowing rubbish gathering along or near site boundaries.

There have been no complaints from the public or government officers about the presence of blowing plastic or other foreign materials at or near the site in the reporting period.

Attachments

1 – Figures

Figure 1 – Extent of filled area – F Row + G row

Figure 2 – Chart, Fill Sources

2 – Site Contamination Auditor letter of endorsement of environmental summary of imported fill