



Murray Irrigation Limited (MIL)
2022 Flood Event Drainage System Review
Findings & Recommendations Report



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MIL 2022 Flood Event – Drainage System Review

Findings & Recommendations



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1 Introduction

Murray Irrigation Limited (MIL) is Australia's largest private environmental and irrigation water delivery company. Formed in 1995, MIL is an unlisted, public company with the aim of providing an effective water-delivery system to the Southern Riverina area. MIL irrigators are also its shareholders and include 1,357 farm businesses.

MIL is licensed to operate by the NSW Government and has 823,978 general security entitlements to the NSW Murray Regulated River resource. This represents more than 60 percent of all NSW Murray River general security entitlements.

MIL's head office is based in Deniliquin, and it operates maintenance depots in Deniliquin, Finley and Wakool. The area of operations covers 724,000 ha, servicing 2,124 individual landholdings.

Environmental and irrigation water allocation provision is supported by an array of infrastructure including:

- Supply system: 2,858 km gravity-fed earthen channels
- Supply points: 506 extra-large outlets, 2,636 large outlets, 284 small outlets, 1,258 unmetered pipes
- Drainage system: 1,421 km gravity fed earthen channels.
- Sub-system drainage catchment: 25,000 ha
- Sub-surface drainage system: 115 km pipes, 54 pumps, 2,100 ha evaporation basins
- Accredited escapes: Capacity 3,350ML/day (four escapes)
- Bridges and culverts: 4,000.

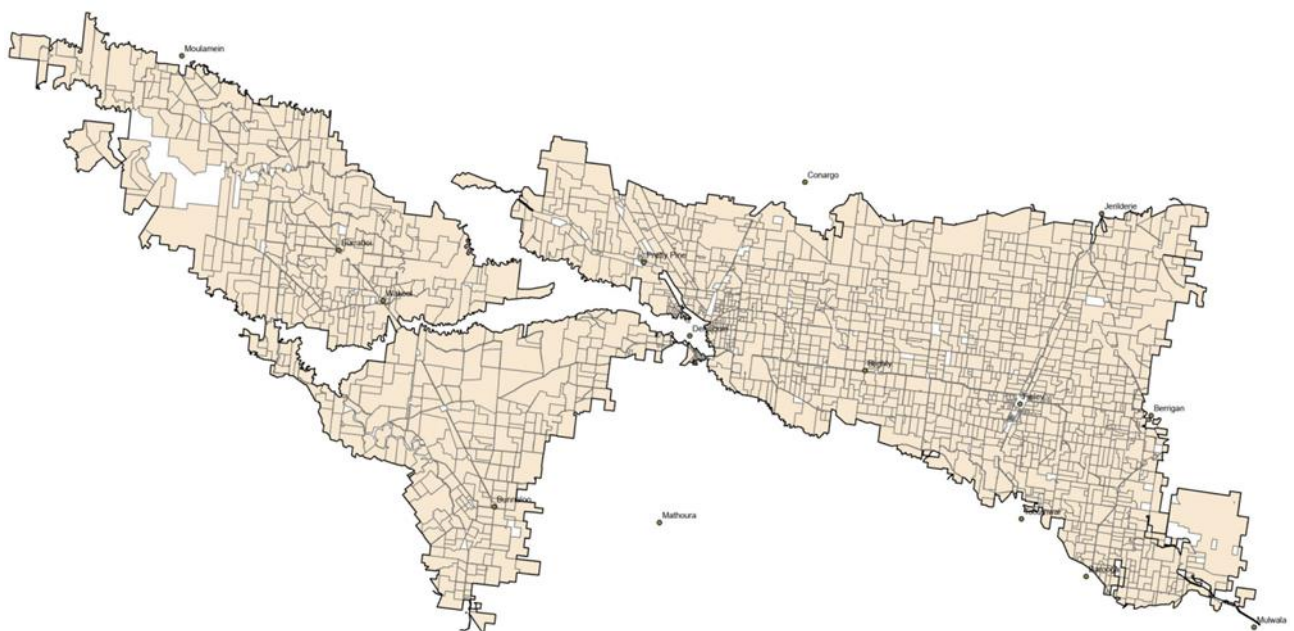


Figure1 Murray Irrigation Operational Area

In October and November 2022, MIL's operational area was impacted by a series of one in 50-year rainfall events, which occurred both locally and across the Southern Riverina / Murray regions generally. This event caused a significant impact to the farming operations of MIL landholders/customers and the company's operations and assets.

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1.1 Purpose

In December 2022 MIL senior management commissioned a review to investigate the effectiveness of MIL's drainage system infrastructure and processes in mitigating the impacts of these flood events on the company's stakeholders, customers, employees, and assets.

The objective of the review was to provide MIL, management, staff, landholders, customers, and other stakeholders a holistic overview of what went well, what did not go well and determine what improvements to processes, procedures and planning would be beneficial to mitigate impacts if similar events were to occur in the future.

The purpose of the review was NOT to:

- Provide advice on specific infrastructure design and improvements.
- Assess and make recommendations on feedback from individual landholders in regard to their own specific issues and concerns.

This report provides a summary of the key findings and recommendations that were identified during the investigation process in conducting the review.

1.2 Rain Event Overview

During October and November 2022, there were a number significant rain events that impacted MIL's operational footprint and adjacent areas. However, it should be noted that September rainfall was also approximately double the average across the MIL footprint and surrounding areas (*refer Tables 1 and 2 below*), which would have exacerbated the impact of the follow up rain events in October and November.

Rainfall Data	September (mm)		October (mm)		November (mm)		Annual (mm)	
Weather Station	Mean	2022	Mean	2022	Mean	2022	Mean	2022
Deniliquin Airport AWS	34.7	74.8	40.3	187.0	43.6	77.8	407.0	638.0
Jerilderie Treatment Works	34.6	60.4	39.9	156.2	32.5	166.6	401.4	722.4
Finley Post Office	38.5	64.4	40.2	200.9	34.6	87.6	429.7	747.5
Wakool (Calimo)	34.9	70.4	36.6	224.9	29.3	76.9	382.1	670.5
Source Bureau of Meteorology (BoM) Rainfall Data								

Table 1 Monthly Mean and actual rainfall records across the Murray Irrigation operational area.

In addition to the localised rainfall across the MIL operational footprint, there were also major rainfall events both upstream and downstream that impacted upon MIL's drainage system.

Rainfall Data	September (mm)		October (mm)		November (mm)	
Weather Station	Mean	2022	Mean	2022	Mean	2022
Albury Airport AWS	58.2	144.2	52.3	198.0	43.6	191.8
Narrandera Airport AWS	35.9	75.8	41.3	115.8	27.8	70.8
Balranald (RSL)	29.3	79.8	31.5	184.6	29.2	84.7

Table 2 Monthly Mean and actual rainfall records across the surrounding areas.

2 Findings & Recommendations

The core findings and recommendations of the review are set out in this section of the report, and revolve around:

- MIL Plans & Procedures
- Drainage System Maintenance
- Drainage System Performance
- MIL Response
- Communication
- Stakeholder Feedback

2.1 MIL Plans & Procedures

The following MIL management plans, risk assessments and procedures relevant to strategic planning and emergency responses were provided and reviewed as part of the investigation. These included:

- PLAN-01-05 Crisis Management Plan Rev2.
- WHSE-PLAN-01-13-02 Emergency & Incident Management Plan.
- PROC-01-13 Emergency & Incident Response Procedure Rev2.
- PROC-01-19 Environmental Management.
- Administration Manual Rev D.
- Company Risk Register.

The documents provided were what would be expected to be in place to manage emergency and crisis situations.

There is a potential for ongoing review of the internal processes and procedures that would ensure continual improvement of the MIL management system.

2.1.1 Recommendation/s

MIL should take advantage of the lessons learned, and the MIL/customer feedback, that was obtained, from the 2022 flood event review to conduct and document a thorough risk assessment to identify opportunities for improvement, and to form a framework for an internal review of management plan/s and procedures to enhance the effectiveness of emergency or crisis management including potential future flood events.

This process should include a review of current emergency/crisis management plans and procedures, including the Drainage Application process. It should also ensure that future plans and procedures allocate specific roles, responsibilities and accountabilities.

2.2 Drainage System Maintenance

MIL's drainage system has been designed to drain a 50mm rain event within four days after the event. This is an unregulated system and gates are predominantly used to respond to hydrocarbon/chemical spills.

The drainage system consists of:

- 1,421 km gravity fed earthen channels.
- Sub-system drainage catchment: 25,000 ha.
- Sub-surface drainage system: 115 km pipes, 54 pumps, 2,100 ha evaporation basins.

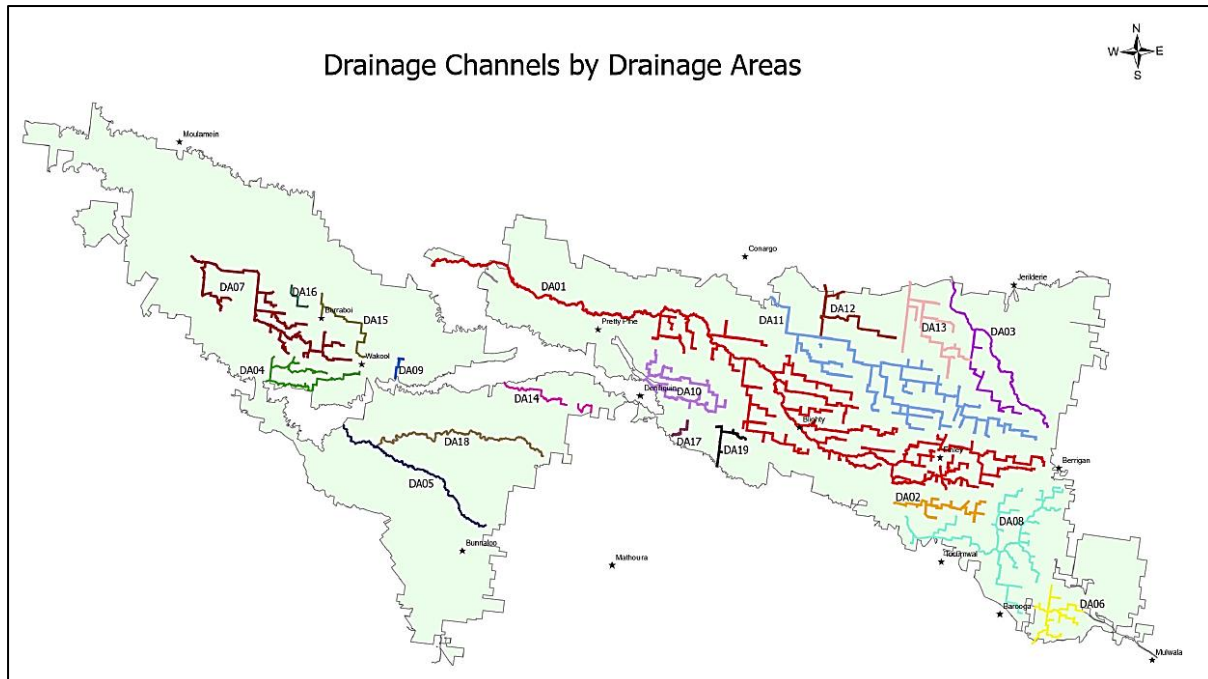


Figure 2 MIL Drainage System

There was a significant amount of feedback received regarding the efficacy of the maintenance of the drainage system, as well as the funding structure for maintenance works.

The maintenance issues related predominantly to areas such as:

- Clearing of vegetation and debris from the drainage channels.
- Maintenance and repair of infrastructure.
- Maintenance of access tracks.

The drainage system itself is scheduled for annual inspection over a four-week period, generally in the first quarter of each year. Work orders are generally created from field services inspections or landholder requests throughout the year.

When a request is made, it is entered into a register and a work order is created and prioritised for action by the area supervisors.

The Work Order Register, which consists of separate sheets for each Drainage Asset (DA), was reviewed and showed completed and planned drainage system work orders for various DAs. These included:

- Removal of established and dead trees.
- Grading access tracks.
- Replacing screw lifts on slides.
- Slashing and removal of weeds from drainage channels.
- Repair of broken inlet pipes.
- Installation of fencing.
- Collecting water samples.

An example of the DA work order register showed in the Figure 3 below and shows that both preventative and reactive maintenance was being conducted.

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Work Ord	Plant	Plant Description	Schedul	Status	Ty	Work Description	Finish Date	Prior	Re	Section
144934	100056	CROS_SW11567_BOXMAIN_OA	7-Mar-22	Complete	CM	Grade LHB top and bottom of drain between access bri	8-Mar-22	5	FS	WK-CIVIL
144939	101931	CROS_SW11878_ULUPMAIN_OA	7-Mar-22	Complete	CM	GRADER- Grade travel track on drain	9-Mar-22	5	FS	WK-CIVIL
145143	DCULUPNA	DC_ULU_DA01	14-Mar-22	Complete	CM	Spray drain bed, saplings, boxthorns, etc	15-Mar-22	5	FS	WK-WEEDS
145313	100149	CROS_SW11622_BOXMAIN_OA	21-Mar-22	Complete	CM	PREWORKS WW22- Push up clay on the box creek	3-Apr-22	5	DS	WK-CIVIL
145612	DCBOXCK	DC_BOXCRK_DA01	4-Apr-22	Complete	CM	Spray drain bed, all suckers,boxthorns,cumbungi,etc	1-Apr-22	5	FS	WK-WEEDS
145629	DCBOXCK	DC_BOXCRK_DA01	4-Apr-22	Complete	CM	Spray drain bed, all suckers,boxthorns,cumbungi,etc	20-May-22	5	DS	WK-WEEDS
147802	103763	DRI_BOXCRK08_DA01	2-May-22	Complete	CM	PIPE-Pipe blocked	4-May-22	5	FS	WK-CIVIL
147803	102996	DRI_BOXCRK08_DA01	2-May-22	Complete	CM	INLET-Inlet blocked	5-May-22	5	FS	WK-CIVIL
147804	102823	CROS_SW11548_BOXMAIN_OA	2-May-22	Complete	CM	CULVERT-U/S side of culvert partially blocked	5-May-22	5	FS	IC-CIVIL
147806	103783	DRI_BOXCRK18_DA01	2-May-22	Complete	CM	PIPE-Pipe blocked	2-May-22	5	FS	WK-CIVIL
147807	102845	SVPH_SW11538_BOXC17_OA11	2-May-22	Complete	CM	PIPE-Pipe blocked	1-May-22	5	FS	WK-CIVIL
147808	102862	DRI_BOXCRK17_DA01	2-May-22	Complete	CM	INLET-Inlet blocked	2-May-22	5	FS	WK-CIVIL
147809	102858	CROS_SW11151_BOXC17_OA11	2-May-22	Complete	CM	PIPE-u/s pipe blocked	1-May-22	5	FS	WK-CIVIL
148539	102148	CROS_SW11890_TABLEDRAIN_O	22-Aug-22	Complete	CA	WW22-Civil-Replace Headwall replace head wall, Mille	25-Aug-22	5	FS	WK-CIVIL
149064	103763	DRI_BOXCRK08_DA01	30-May-22	Complete	CM	Clean Road culvert, (Dennis Jukes)	15-Jul-22	2	FS	WK-CIVIL
150444	102108	CROS_SW11981_ULUPMAIN_OA	30-Jun-22	Complete	CM	WW22-Desilt pipe	8-Jul-22	5	FS	IC-CIVIL
150457	100642	CROS_SW11223_BIR06_OA18	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	18-Jun-22	5	DS	IC-CIVIL
150672	210991	CROS_SW11233_MUN04_OA19	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	17-Jun-22	5	DS	IC-CIVIL
150804	411285	CROS_SW11859_TABLEDRAIN_O	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	30-Jun-22	5	FS	IC-CIVIL
150805	411287	CROS_SW11858_TABLEDRAIN_O	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	30-Jun-22	5	FS	IC-CIVIL
150806	102480	ESC_PL00_BIR01ESC_OA18	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	9-Jun-22	5	DS	IC-CIVIL
150840	334971	ESC_PL00_BIR13ESC_OA18	20-Jul-22	Complete	PM	WW22- Level 1 Civil structure inspection	17-Jun-22	5	DS	IC-CIVIL
150887	100056	CROS_SW11567_BOXMAIN_OA	6-Jun-22	Complete	CM	Supply 4 14ft gates and 4 end assembly's to Andrew Va	26-Aug-22	5	FS	WK-CIVIL
152176	DCBOXCK	DC_BOXCRK_DA01	18-Jul-22	Complete	CM	SPRAY- continue on the box creek	22-Jul-22	5	DS	WK-WEEDS
155378	105642	ESC_SW25755_MOONWEST_OA	12-Sep-22	Complete	CM	Replace worn out end assembly	12-Sep-22	2	DS	WK-CIVIL
155783	100056	CROS_SW11567_BOXMAIN_OA	2-Oct-22	Complete	R	Repair Bridge access, large Holes, clean scuppers out,	2-Oct-22	2	FS	WK-CIVIL
155830	102110	DRI_ULUEXT_DA01	4-Oct-22	Complete	CM	Seals need to be replaced and Headwall pulling	4-Oct-22	5	FS	IC-CIVIL
155997	102851	DRI_BOXCRK17_DA01	13-Oct-22	Complete	R	Scott Jewell called and is unable to drain from	13-Oct-22	4	FS	IC-CIVIL
156046	102829	DRI_BOXCRK17A_DA01	15-Oct-22	Complete	R	DC Box Creek 17A (SW11535) low bank is flooding	15-Oct-22	2	DS	IC-GATES
156117	100643	DRI_MAWS_DA01	18-Oct-22	Complete	R	Richard called as Drainage channel (DC Maws	19-Oct-22	5	DS	WK-CIVIL
156119	334985	DRI_BOXCRK_DA01	19-Oct-22	Complete	R	Q650 DC Box Creek flooding threatening house which	19-Oct-22	2	DS	WK-CIVIL
156163	102503	CROS_SW11244_MOON01_OA18	20-Oct-22	Complete	R	Drop off clay for Temp block bank	20-Oct-22	5	DS	WK-CIVIL
156246	102758	DRI_BOXCRK05_DA01	26-Oct-22	Complete	OR	Please inspect DC Box Creek 5 for non-compliance	26-Oct-22	1	FS	WK-GATES
157734	102751	CROS_SW11153_TABLEDRAIN_O	26-Oct-22	Complete	R	Andrew Hateley called and indicated the water	31-Oct-22	5	DS	IC-GATES
157853	102872	OFL_BOXCRK16_DA01	3-Nov-22	Complete	R	Box Creek 16 ALT off take is closed please open	3-Nov-22	5	FS	WK-CIVIL

Figure 3 DA01 (Box Creek) Work Order Register

Feedback received in relation to the funding and expenditure of the drainage system indicated there was concern over a lack of transparency regarding where drainage fees were going and what was being spent on drainage maintenance. There was a feeling among customers that they were not getting value for money.

A review of the available data in regards to drainage system expenditure and revenue from drainage fees clearly shows that expenditure far exceeds and revenue received.

The Opex budget for the infrastructure department for this operating period is \$10.5M. This includes all supply channel and drainage system maintenance. The maintenance for both systems is carried out under a strategy of both preventative and reactive maintenance tasks designed to maintain the standards of design.

Figure 4 below shows the total drainage maintenance expenditure of \$1,583,446.39 over a period of 21 months, from January 2020 to October 2022. This figure pro rata is approximately \$905k annually.

DrainageChannels	DA04 - \$14,215.17	DA09 - \$122.00	DA14 - \$1,164.62	DA19 - \$1,930.00
DA01 - \$853,020.66	DA05 - \$81,975.74	DA10 - \$12,633.69	DA15 - \$1,073.00	Area Of Operations
DA02 - \$446,771	DA06 - \$20,895.82	DA11 - \$83,213.90	DA16 - \$1,526.50	★ Towns
DA03 - \$343,997.22	DA07 - \$27,362.63	DA12 - \$2,156.00	DA17 - \$6,220.88	
	DA08 - \$63,708.49	DA13 - \$63,762.36	DA18 - \$0.00	

Figure 4 Drainage Maintenance Expenditure Jan 2020 - October 2022

MIL collects annual drainage fees as shown in Table 3 below for FY22. In theory, this would be the amount allocated to drainage maintenance. This fee is collected as part of general revenue.

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ANNUAL DRAINAGE FEE FY22		
Code	Description	Amount
DRAIN-FIX-B1	Fixed Drainage Fee for B1 LH	\$0.00
DRAIN-FIX-B2	Fixed Drainage Fee for B2 LH	\$0.00
DRAIN-FIX-B3	Fixed Drainage Fee for B3 LH	\$0.00
DRAIN-FIX-D1	Fixed Drainage Fee for D1 LH	\$0.00
DRAIN-FIX-H1	Fixed Drainage Fee for H1 LH	\$0.00
DRAIN-FIX-M1	Fixed Drainage Fee for M1 LH	\$0.00
DRAIN-FIX-D4	Fixed Drainage Fee for D4 LH	\$0.00
DRAIN-FIX-W1	Fixed Drainage Fee for W1 LH	\$12,420.68
DRAIN-FIX-W2	Fixed Drainage Fee for W2 LH	\$13,569.75
DRAIN-FIX-W3	Fixed Drainage Fee for W3 LH	\$2,526.48
DRAIN-FIX-W4	Fixed Drainage Fee for W4 LH	\$6,250.73
DRAIN-FIX-W5	Fixed Drainage Fee for W5 LH	\$3850.66
DRAIN-FIX-W6	Fixed Drainage Fee for W6 LH	\$0.00
DRAIN-VAR-B1	Variable Drainage Fee for B1 LH	\$9,891.72
DRAIN-VAR-B2	Variable Drainage Fee for B2 LH	\$94,081.50
DRAIN-VAR-B3	Variable Drainage Fee for B3 LH	\$0.00
DRAIN-VAR-D1	Variable Drainage Fee for D1 LH	\$0.00
DRAIN-VAR-H1	Variable Drainage Fee for H1 LH	\$0.00
DRAIN-VAR-M1	Variable Drainage Fee for M1 LH	\$0.00
DRAIN-VAR-W1	Variable Drainage Fee for W1 LH	\$16,957.57
DRAIN-VAR-W2	Variable Drainage Fee for W2 LH	\$45,019.75
DRAIN-VAR-W3	Variable Drainage Fee for W3 LH	\$25,677.00
DRAIN-VAR-W4	Variable Drainage Fee for W4 LH	\$8,162.70
DRAIN-VAR-W5	Variable Drainage Fee for W5 LH	\$11,078.58
DRAIN-VAR-W6	Variable Drainage Fee for W6 LH	\$35,755.02
TOTAL FY22		\$285,242.13

Table 3 Annual Drainage Fee Revenue FY22 (Source Murray Irrigation)

2.2.1 Recommendation/s

Consideration could be given to developing an ongoing maintenance program, as is conducted for supply infrastructure, to provide more transparency in drainage maintenance planning.

A thorough inspection of the drainage system could be carried out to identify potential critical areas of concern in the event of similar flooding events occurring in the future.

MIL customers/landholders who have direct and recent experience in the areas where maintenance issues have been identified should be involved with inspection and planning processes.

2.3 Drainage System Performance

As the MIL drainage system is designed to drain a 50mm rain event within four days after the event, with a drain capacity of 50 megs, it could be said that, fundamentally, the drainage system did operate

as designed. This is supported by the amount of discharge of storm/drainage water into the external river and wetland systems.

Due to the amount of rain that fell within MIL's operational area during the significant rain events, combined with the ingress of water from outside of that area and the flooding of downstream rivers, creeks, and wetland areas, the drainage system was bound to back up to a certain extent.

However, as identified in customer and MIL staff feedback and site inspections conducted by the reviewer, there may have been specific design aspects of infrastructure that hampered the ability of the system to drain effectively at some locations.

There were some infrastructure issues identified that would not be the sole responsibility of MIL to address. In these incidents, third parties e.g. local government, Water NSW etc. should be engaged to work together to obtain a resolution.

There is an opportunity to utilise system automation to provide assistance in managing the drainage system in the event of future flooding and other events. System Automation could be utilised to:

- Provide system visibility on the capacity of escapes to control the release of water.
- Installing level sensors to assist in identifying drain capacities and management.
- Upgrade Flood Isolation Regulators so that they can be controlled from the office when required, therefore avoiding the need for techs to drive into areas that are inaccessible.

2.3.1 Recommendations

Consideration could be given to conduct a review of drainage system infrastructure to identify any potential design issues and developing an action plan on rectifying all identified issues.

Consideration could be given to conducting an assessment of the System Automation to determine opportunities that may exist for the improvement of drainage system maintenance.

MIL customers/landholders who have been directly impacted by the identified infrastructure design issues in their areas should be involved with review and planning processes.

2.4 Murray Irrigation Flood Response

MIL's flood mitigation processes were outlined and communicated in the company's Operational Update dated 20th October 2022, which stated the following:

"What is Murray Irrigation doing to help mitigate risk?"

To help reduce as much damage as possible to all customers being affected, we are undertaking flood mitigation operations including:

- *Allowing customers who have applied and have been granted permission to pump back into the supply system where it is safe to do so.*
- *Managing applications for the drainage system to ensure we are not impacting downstream customers.*
- *Increasing our field monitoring of the drainage system to ensure only those granted permission are draining into the system.*
- *Identifying and stopping unauthorised draining into drains or channels.*
- *Identifying and clearing blocked drains.*
- *Managing flood mitigation structures, which allow flood water through supply channels to follow natural water courses.*
- *Using current demand to lower channel heights, without exacerbating the flood situation.*

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- *Procuring extra pumping resources.*
- *Allocating more staff to assist with managing and monitoring flood risk.”*

Drainage Application Process

MIL has both legislative and operational responsibilities that require the necessity for an application to drain process (refer Administration Manual 4.1) to be implemented. The application process allows MIL to:

- Prevent pollution from entering or being discharged from our channels.
- Monitor drain capacity, which could be impacted due to regional flooding in natural waterways.
- Assess the risk associated with the discharge on downstream properties and infrastructure.

Applications are made using the Discharge Water into Drainage or Supply System. All applications received are entered into a register which records:

- Name and Landholding Number
- Name of Supply or Drainage Channel
- Channel type being discharged into (drainage or supply)
- Reason for discharge request
- Commencement and end dates, duration (days)
- Method of Drainage – (pump, drainage inlet)
- Approximate volume
- Chemicals applied
- Status – (approved, rejected, finished).

Assessment for drainage approval is conducted by Customer Operations and takes into account the following in reaching a decision:

- Method of discharge
- Channel capacity (supply or drainage)
- Downstream impacts
- Works being undertaken
- Timing
- Impacts on Murray Irrigation licenses, (i.e. Environmental).

MIL received 365 applications to pump back into the system: 109 into the supply channel and 256 into the drainage channel.

- 53% of applications to pump back into the supply channel were approved.
- 77% of applications to pump back into the drainage system were approved.
- Only 6% were rejected (the remainder were pending or postponed).

Channel Type	Applications	Rejected	Approved	Pending
Supply	109	46	58	5
Drainage	256	17	199	14

Table 4 Drainage Application Status (Source - Customer Operations Monthly Activity Report Oct 2022)

There were some reports from landholders who experienced difficulty in the drainage application process and getting approval. However, the data shown in *Table 4* above demonstrates that the process was generally effective. While ongoing communication with landholders who did have issues should

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continue, it is noted that each circumstance is different and the impact on third parties must be considered in the approval process.

This process was put in place during the event, however inconsistency with the implementation was reported. This included examples where landholders received contradictory instructions regarding approval, which exacerbated the frustration with the process.

Drainage Application Non-Compliance

Field monitoring of the drainage system was conducted to ensure only those granted permission were draining into the system. Unauthorised customers were stopped from doing so.

The Customer Operations Monthly Activity Report Oct 2022 recorded that 22 cases of non-compliant activities had been reported and were currently under investigation. These non-compliant activities included pumping into drainage channels without authorisation, pumping into supply channels without authorisation, physically cutting into drainage and supply channel banks and restricting access to MIL personnel carrying out maintenance or compliance inspections.

2.4.1 Recommendations

A review of the drainage application process could be conducted to ensure consistency of implementation.

2.5 Communication

Communication from MIL to customers/landholders during and after the event took several different forms such as:

- Murray Irrigation publications
- Customer service communication
- Customer feedback.

Murray Irrigation Publications.

MIL publications used to communicate information on the status of the flood event, the response, and customer requirements included:

- Talking Water
- Operational Updates
- Customer Updates.

The Talking Water issue dated 4th October 2022 initially addressed the potential impact of rain events:

“Drainage system and rain events

- *With more rain events expected, there is a possibility our drainage system may be needed.*
- *Please check your slide into the drainage network is in to prevent stormwater flowing into your property and damaging crops.*
- *Reminder that approval is required for discharge into the drainage system.*
- *Maintenance works to slash, and spray have been held up due to wet weather, so please take care of overgrowth when driving around our channels and structures.”*

MIL flood mitigation processes were outlined and communicated in the Operational Update dated 20th October 2022, which stated the following.

“What is Murray Irrigation doing to help mitigate risk?

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To help reduce as much damage as possible to all customers being affected, we are undertaking flood mitigation operations including:

- *Allowing customers who have applied and have been granted permission to pump back into the supply system where it is safe to do so.*
- *Managing applications for the drainage system to ensure we are not impacting downstream customers.*
- *Increasing our field monitoring of the drainage system to ensure only those granted permission are draining into the system.*
- *Identifying and stopping unauthorised draining into drains or channels.*
- *Identifying and clearing blocked drains.*
- *Managing flood mitigation structures, which allow flood water through supply channels to follow natural water courses.*
- *Using current demand to lower channel heights, without exacerbating the flood situation.*
- *Procuring extra pumping resources.*
- *Allocating more staff to assist with managing and monitoring flood risk.”*

This type of information continued prior to, during and following the rain and flooding events, including requests for feedback leading up to the commencement of the drainage review.

This part of the communication process appeared to remain consistent throughout the event, with MIL providing appropriate information on mitigation processes and general status reports.

MIL's email/online communication processes appeared to remain consistent throughout the event, providing appropriate information on mitigation processes and general status reports. These communication processes, in the main, appear to be effective. However, ongoing monitoring of feedback should be maintained to ensure continual improvement and relevance.

2.5.1 Recommendation/s

When developing communication and/or operational procedures, ensure that roles, responsibilities, accountabilities and authorities are clearly defined, and training to be conducted by all relevant personnel in those procedures.

2.6 Customer / Landholder Feedback

Feedback from customers and landholders was received through emails to MIL Customer Support, through emails directly to the reviewer, and through personal interviews, face to face meetings, site inspections and phone meetings.

The following sections provide a snapshot of the feedback provided by customers and landholders.

Communication

- Communication within MIL was very poor at times and often contradictory.
- Visibility of MIL Senior Management was almost non-existent during the event.
- Several comments of “NIL or Non Existent” made in Customer Feedback Form.
- Told not to use community drains which resulted in a significant loss of crops.
- Recommendations
 - Better management and communication for use of community drains.

Drainage Infrastructure

- Drainage Maintenance

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- The inefficiency of the doors/gates that are located where the Box Creek runs into the Edward River (MIL's computer system said they were open, but were closed or obstructed by timber).
- Landholders have to pay annual fees for the right to use the drainage system, however when we actually need to use the drain we are unable to because the water cannot escape sufficiently.
- The main Berriquin Escape Creek was very dirty with weeds which restricted the water flow.
- Drainage Design
 - Box Creek Drainage system was compromised with too many drainage points feeding in, with little or no regulation or meters to indicate creek depth.
 - It takes a significant flooding event for every farmer to need to use the drainage system, yet when that happens we are not able to because the system is not designed to handle such flows. The drains flow into already flooding creeks etc. meaning the floods have to recede before we can properly use the system.
 - Serious consideration needs to be given as to how to reconfigure the drains so that they can actually be used when required, otherwise there is little point having such major infrastructure for a system that may be used once every 10-20 years, nor paying annual fees for something we have limited access to.
 - The bank height of the Southern No 2 Escape Channel which flows into Shaw Creek is lower than the Tulla Levee. This is a longstanding issue with sandbagging required during a previous flood event.
- Recommendations
 - A measuring system along the Box Creek at certain points to monitor the flow and control the inflow and make this information available to stakeholders.
 - Review of the drainage infrastructure assets and fix.

Internal Processes

- Drainage Application Process
 - Landholders receiving contradictory information on approval status and permission to pump from within the same department.
 - There were many landholders pumping without prior approval, however the way people were or were not allowed to pump was sometimes a bit illogical and not based on what was actually happening at the site.
 - Not being allowed to pump because a MIL staff member wanted the drainage channel checked first but due to the circumstances of the flood event this took considerable time when the landholder would have been able to check and report on the heights.
 - The first in first call with the applications to pump, then the others would have to wait did not appear to address the specific circumstances and flow on impacts of the applicant.
 - MIL would not allow the other farmers to equally share-pump but at a reduced rate, so as not to exceed the drain capacity.
 - When MIL closed the Berriquin Escape Creek to drainage for two weeks some landholders shut the outlets but other users did not. MIL didn't appear to investigate and punish those doing the wrong thing.
 - Some of the MIL planning staff were very good in contacting you to check if you needed to pump for longer. A pumping date was put on the Drainage Application form which stated how long you intended to pump for, and once that expiry date was approaching MIL would often ring and check to see if you wanted to extend the date.
- Recommendations

MIL 2022 Flood Event – Drainage System Review

Findings & Recommendations

- A more efficient process in seeking permission to drain water off farms, a digital app rather than filling in forms.
- There needs to be a total overhaul as to how they allocate the use of the drains so that it's fair for all.
- MIL should investigate and punish those doing the wrong thing.

Murray Irrigation Response

- MIL and its staff were in a very difficult situation, in which they had to deal with things that were outside of their control. They were getting blamed for channels overflowing etc. however they were not able to reduce the river and/or creek inflows which resulted in the overflows.
- MIL was trying to mitigate the flooding to those landholdings lower down the system. Those upstream were sometimes selfish and inconsiderate of those downstream, and were willing to flood others so that they were not. MIL had to deal with such conditions and try to appease all parties while maintaining some level of control within the system.
- Not sufficient pumping equipment available for community drains and drain outlets poorly maintained.

2.6.1 Recommendations

Continually monitor customer feedback and ensure a process is in place for timely, accurate and relevant responses by authorised MIL staff.

Review communication processes to ensure a consistent approach to communication is achieved through out MIL operations.