NOTICE OF MEETING

Dear Committee Members

You are requested to attend the following meeting of Council.

WATER AND WASTE STANDING COMMITTEE MEETING OF

ISAAC REGIONAL COUNCIL

TO BE HELD ON

WEDNESDAY, 14 JULY 2021

COMMENCING AT 1.00PM

COUNCIL CHAMBERS, MORANBAH

JEFF STEWART-HARRIS
Chief Executive Officer

GARY MURPHY
Committee Officer
Director Water and Waste

Committee Members:
Cr Simon West (Chair)
Mayor Anne Baker
Cr Greg Austen
Cr Kelly Vea Vea

LOCAL GOVERNMENT ACT 2009

Local Government Regulation 2012
Chapter 8, Part 2 Local Government Meetings and Committees

Division 1A, Requirements for Local Government Meetings Generally

Section 254J Closed meetings

(1) A local government may resolve that all or part of a meeting of the local government be closed to the public.

(2) A committee of a local government may resolve that all or part of a meeting of the committee be closed to the public.

(3) However, a local government or a committee of a local government may make a resolution about a local government meeting under subsection (1) or (2) only if its councillors or members consider it necessary to close the meeting to discuss one or more of the following matters—

(a) the appointment, discipline or dismissal of the chief executive officer;
(b) industrial matters affecting employees;
(c) the local government's budget;
(d) rating concessions;
(e) legal advice obtained by the local government or legal proceedings involving the local government including, for example, legal proceedings that may be taken by or against the local government;
(f) matters that may directly affect the health and safety of an individual or a group of individuals;
(g) negotiations relating to a commercial matter involving the local government for which a public discussion would be likely to prejudice the interests of the local government;
(h) negotiations relating to the taking of land by the local government under the *Acquisition of Land Act 1967*;
(i) a matter the local government is required to keep confidential under a law of, or formal arrangement with, the Commonwealth or a State.

(4) However, a local government or a committee of a local government must not resolve that a part of a local government meeting at which a decision mentioned in section 150ER(2), 150ES(3) or 150EU(2) of the Act will be considered, discussed, voted on or made be closed.

(5) A resolution that a local government meeting be closed must—

(a) state the matter mentioned in subsection (3) that is to be discussed; and
(b) include an overview of what is to be discussed while the meeting is closed.

(6) A local government or a committee of a local government must not make a resolution (other than a procedural resolution) in a local government meeting, or a part of a local government meeting, that is closed.

Conflict of Interest Obligations
Reference is made to Section 150EL of the Local Government Act 2009. Specifically, the obligation of Councillors when they first become aware they have a conflict of interest to make the Chief Executive Officer aware in writing or if in a meeting, ensure they declare immediately.

AGENDA

WATER AND WASTE

STANDING COMMITTEE MEETING

OF ISAAC REGIONAL COUNCIL

TO BE HELD ON

WEDNESDAY 14 JULY 2021

COUNCIL CHAMBERS, MORANBAH

1. OPENING OF THE MEETING
2. APOLOGIES
3. DECLARATION OF CONFLICTS OF INTEREST
4. CONFIRMATION OF MINUTES
5. OFFICER REPORTS
6. INFORMATION BULLETIN REPORT
7. GENERAL BUSINESS
8. CONCLUSION

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WATER AND WASTE STANDING COMMITTEE MEETING OF

ISAAC REGIONAL COUNCIL

HELD ON

WEDNESDAY, 9 JUNE 2021

COMMENCING AT 1.00PM

ISAAC REGIONAL COUNCIL

UNCONFIRMED MINUTES OF THE

WATER AND WASTE

STANDING COMMITTEE MEETING

HELD IN COUNCIL CHAMBERS, MORANBAH

ON WEDNESDAY 9 JUNE 2021

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ISAAC REGIONAL COUNCIL

UNCONFIRMED MINUTES OF THE

WATER AND WASTE

STANDING COMMITTEE MEETING

HELD IN COUNCIL CHAMBERS, MORANBAH

ON WEDNESDAY 9 JUNE 2021 COMMENCING AT 1.00PM

ATTENDANCE

Cr Kelly Vea Vea, Acting Mayor (ex officio and Member)
Cr Greg Austen, Division One
Cr Viv Coleman (alternate member)

OFFICERS PRESENT

Mr Jeff Stewart-Harris, Chief Executive Officer
Mr Gary Murphy, Director Water and Waste
Mrs Lisa Tonkin, Manager Business Services
Mr Karl Murdoch, Manager Waste Services
Ms Linda Roberts, Manager Planning and Projects
Mr Stephen Wagner, Manager Operations and Maintenance
Mr Beau Jackson, Manager Brand, Media and Communications
Mrs Tricia Hughes, Coordinator Executive Assistant
Ms Serena Davey, Executive Assistant

1. OPENING

The Chief Executive Officer, Mr Jeff Stewart-Harris welcomed all in attendance in the absence of the Chair and declared the meeting open at 1.03pm.

The Chief Executive Officer called for nominations for the position of Chair for the Water and Waste Standing Committee Meeting for Wednesday 9 June 2021 due to the apology of Cr Simon West.

Cr Greg Austen nominated Acting Mayor Kelly Vea Vea as Chair of the Water and Waste Standing Committee Meeting for Wednesday 9 June 2021. Acting Mayor Vea Vea seconded this nomination.

Resolution No.: W&W0315

Moved: Cr Austen **Seconded:** Cr Vea Vea

That the Water and Waste Standing Committee appoints Acting Mayor Kelly Vea Vea as the Chairperson of the Water and Waste Standing Committee Meeting for Wednesday 9 June 2021.

Carried

Resolution No.: W&W0316

Moved: Cr Vea Vea **Seconded:** Cr Austen

That the Water and Waste Standing Committee accepts Cr Viv Coleman as an alternate member.

Carried

2. APOLOGIES

The Committee received apologies from Mayor Anne Baker and Cr Simon West.

An apology has been received on behalf of Cr Lyn Jones due to a medical condition.

Resolution No.: W&W0317

Moved: Cr Austen **Seconded:** Cr Coleman

That the Water and Waste Standing Committee:

1. **Accepts the apologies received from Mayor Anne Baker and Cr Simon West.**
2. **Accepts the apology received for Cr Lyn Jones due to a medical condition.**

Carried

3. DECLARATION OF CONFLICTS OF INTEREST

No conflicts of interest declared this meeting.

NOTE:
Council acknowledges that Chapter 5B Councillors' Conflicts of Interest of the Local Government Act 2009 does not apply to a Councillor if the matter to be resolved relates to a corporation or association that arises solely because of a nomination or appointment of the councillor by the local government to be a member of the board of the corporation or association.

4. CONFIRMATION OF MINUTES

Confirmation of minutes from Water and Waste Standing Committee Meeting of Isaac Regional Council held at Council Chambers, Moranbah on Wednesday 12 May 2021.

Resolution No.: **W&W0318**

Moved: **Cr Coleman** **Seconded:** **Cr Austen**

That the minutes from the Water and Waste Standing Committee meeting held in Council Chambers, Moranbah on Wednesday 12 May 2021 are confirmed.

Carried

ATTENDANCE

Mr Jeff Stewart-Harris left the meeting room at 1.05pm.

5. OFFICERS REPORTS

5.1 Materials Recycling Facility Recovery Share Arrangement 2021-22

EXECUTIVE SUMMARY

This report seeks endorsement of the proposed 2021-22 Recovery Share Arrangement with the operators of the Materials Recycling Facility currently used by Isaac Regional Council for the disposal of recyclable household waste, in order to receive a share of the Container Deposit Scheme deposits from eligible containers which are collected via Isaac Regional Council's kerbside recycling collection service.

OFFICER'S RECOMMENDATION

That the Committee recommends that Council:

1. ***Approve the entering of an agreement with Re.Cycle Operations (Mackay) Pty Ltd to enable Council to receive 50 per cent of the 10-cent refund on each qualifying container under the Container Refund Scheme for a further twelve month period.***
2. ***Authorise the Chief Executive Officer to negotiate, execute and vary the agreement as required.***

Resolution No.: **W&W0319**

Moved: **Cr Coleman** **Seconded:** **Cr Austen**

That the Committee recommends that Council:

1. **Approve the entering of an agreement with Re.Cycle Operations (Mackay) Pty Ltd to enable Council to receive 50 per cent of the 10-cent refund on each qualifying container under the Container Refund Scheme for a further twelve month period.**
2. **Authorise the Chief Executive Officer to negotiate, execute and vary the agreement as required.**

Carried

5.2 Waste Management Facilities - Container Refund Points

EXECUTIVE SUMMARY

This report provides Council with a proposal to establish container drop-off points within certain Isaac Regional Council Waste Management Facilities to support the state government's Container Refund Scheme – Containers for Change – within the Isaac region.

OFFICER'S RECOMMENDATION

That the Committee recommends that Council:

1. ***Support the establishment of three Container Drop Off Points within the Isaac region at Greenhill, Carmila and St Lawrence Waste Management Facilities to support the State Government's Container Refund Scheme – Containers for Change.***

Resolution No.: **W&W0320**

Moved: **Cr Coleman** **Seconded:** **Cr Austen**

That the Committee recommends that Council:

1. **Support the establishment of three Container Drop Off Points within the Isaac region at Greenhill, Carmila and St Lawrence Waste Management Facilities to support the State Government's Container Refund Scheme – Containers for Change.**

Carried

5.3 Waste Management Facilities - Public Holidays

EXECUTIVE SUMMARY

This report provides Council with a review of the current policy on closing of Waste Management Facilities on public holidays and recommends no change to the current policy.

OFFICER'S RECOMMENDATION

That the Committee recommends that Council:

1. ***Make no changes to the current closures to Waste Management Facilities during public holidays.***

Resolution No.: **W&W0321**

Moved: **Cr Austen** **Seconded:** **Cr Coleman**

That the Committee recommends that Council:

1. **Make no changes to the current closures to Waste Management Facilities during public holidays.**
2. **Requests that a review of the Waste Management Facilities Operating Hours is undertaken and reported to Council in 2022 as reflected in Action 3.6 of the approved Isaac Waste Management Strategy 2020 - 2025.**

Carried

5.4 Water and Sewerage Utility Charges - Guiding Principles

EXECUTIVE SUMMARY

The purpose of this report is to confirm the Guiding Principles which will be used as the basis for upcoming Water and Sewerage Utility Charge reviews and amendments. Council's previous consideration applied the Guiding Principles to Sewerage only.

OFFICER'S RECOMMENDATION

That the Committee recommends to Council to:

1. Endorse eight (8) Guiding Principles as the basis to underpin upcoming Water and Sewerage Utility Charge reviews.

Resolution No.: W&W0322

Moved: Cr Austen Seconded: Cr Coleman

That the Committee recommends to Council to:

1. Endorse eight (8) Guiding Principles as the basis to underpin upcoming Water and Sewerage Utility Charge reviews.

Carried

ATTENDANCE

Ms Liza Perrett, Manager Governance and Corporate Services entered the meeting room at 1.28pm and left at 1.33pm.
Ms Liza Perrett entered the meeting room at 1.46pm.
Mr Jeff Stewart-Harris entered the meeting room at 1.47pm.

6. INFORMATION BULLETIN REPORTS

6.1 Water and Waste Information Bulletin – June 2021

EXECUTIVE SUMMARY

The Water and Waste Directorate Information Bulletin for June 2021 is provided for review.

OFFICER'S RECOMMENDATION

That the Committee:

1. Note the Water and Waste Directorate Information Bulletin for June 2021.

Resolution No.: W&W0323

Moved: Cr Austen Seconded: Cr Coleman

That the Committee:

1. Note the Water and Waste Directorate Information Bulletin for June 2021.

Carried

7. GENERAL BUSINESS

7.1 WATER AND WASTE – EMERGING RISKS

The Acting Mayor requested that Council is updated on the Emerging Risks highlighted to the Committee in the June Information Bulletin.

ACTION: DIRECTOR WATER AND WASTE

7.2 DISPOSAL OF WASTE IN COMMERCIAL OR PRIVATE VEHICLES

Cr Austen asked for clarification on a recent interaction at a Waste Facility where a customer in a cattle truck taking three residential household wheelie bins to the Clermont Waste Facility was advised by Council Waste Staff that if he went through the facility in the Cattle Truck he would be charged to dispose of the wheelie bin waste however if her travels to the facility in a private ute with the three wheelie bins he would not be charged.

The Manager Waste Services provided an overview of the charging system relating to Commercial vehicles and the State Legislation surrounding this.

8. CONCLUSION

There being no further business, the Chair declared the meeting closed at 1.58pm.

These minutes were confirmed by the Committee at the Water and Waste Standing Committee Meeting held in Moranbah on Wednesday 14 July 2021.

…….....
CHAIR

….. / ….. / ……..
DATE

MEETING DETAILS	**Water and Waste Standing Committee** Wednesday 14 July 2021
AUTHOR	Karl Murdoch
AUTHOR POSITION	Manager Waste Services

5.1 WASTE AMNESTY DAY TRIAL UNDER THE ILLEGAL DUMPING MANAGEMENT AND INTERVENTION PLAN (THE PILOT PLAN)

EXECUTIVE SUMMARY

The purpose of this report is to provide the outcomes of the trial Domestic Waste Amnesty Days delivered in May 2021 in accordance with the Illegal Dumping Management and Intervention Plan (the Pilot Plan). The report also considers fees for waste items compared to reassessed processing costs.

OFFICER'S RECOMMENDATION

That the Committee recommend that Council:

1. ***Receive and note the outcomes of the Waste Amnesty Days Trial.***
2. ***Endorse the proposed actions as presented in the report and present a further report to Council as required.***

BACKGROUND

Council adopted the Illegal Dumping Management and Intervention Plan (the Pilot Plan) in August 2020. The purpose of the twelve-month Pilot Plan is to reduce the incidence and impact of illegal dumping in the Isaac region by implementing a considered, proactive approach to bring about behaviour change.

The Pilot Plan outlines five key intervention mechanisms and associated actions to be implemented over twelve months. Specifically the intervention mechanism, "4: *reduce provocations: not giving reasons for people to dump*", sets out a key action deliverable of a trial Waste Amnesty Day, to offer residents free domestic waste disposal at selected waste transfer stations with a goal of increasing communities' access to responsible waste disposal options.

Accordingly, Domestic Waste Amnesty Days with some specific eligibility criteria were planned and delivered in May 2021 in Waste Management Facilities at Clermont, Dysart, Moranbah, Nebo, Middlemount, Glenden, St Lawrence, Carmila and Greenhill.

Advertised within the region as "Dump Days," these events took place on the following Saturdays in order to avoid public holidays and school holidays:

- Clermont, Dysart – Saturday 8 May 2021
- Moranbah, Nebo – Saturday 15 May 2021

- Middlemount, Glenden – Saturday 22 May 2021
- St Lawrence, Carmila, Greenhill – Saturday 29 May 2021

Within the context of a Project Brief and Communications Plan, officers also adopted some conditions around limits to amounts and types of waste permitted, as follows:

Eligibility criteria

- Residents of Isaac region who identify themselves with a valid driver's license and a current utility bill
- Up to two (2) loads per resident per event

Disposal rules at the Waste Management Facility

- Cover loads when travelling to drop off their waste
- All loads are subject to inspection at the waste management facility
- Show proof of residency to waste management officer (driver's license with picture id or utility bill)

Items accepted – domestic customers only

- Tyres (car, motorcycle and 4 x 4 / ute tyres only), (maximum of 4 tyres)
- Fridges / Freezers (non-commercial)
- Air conditioners (non-commercial)
- Mattresses (maximum 2 mattresses)
- Gas bottles (maximum 9 kg) and fire extinguishers (maximum 2 items)
- Car bodies (maximum 1 car, no fuels, fluids, batteries, rubbish (maximum 5 tyres))
- Construction and demolition waste (maximum 1 ute load or trailer load)

Prohibited waste on Amnesty Days (must be paid for as per Fees and Charges)

- Asbestos
- Regulated waste
- Chemicals
- Commercial waste

Officers also planned for the anticipated increase in volume likely to occur with the Amnesty Days. An additional member of staff was deployed for the full shift at each site on the appointed Saturday to direct traffic and assist customers.

Transactions and items

The main figures captured from the May 2021 Amnesty Days are:

- 521 Transactions
- 604 Items
- 21.33 Tonnes

By comparing the number of transactions on each site with the previous twelve (12) months average for Saturdays, officers concluded that the amnesty days were very popular (Refer Table 1 below). Across all sites, the number of transactions was averaged at 228% higher than a typical Saturday.

Table 1: Average Saturday Transactions - Domestic Self Haul Vs Amnesty Day(s)

FACILITY	AVE SATURDAY TRANSACTION COUNT	AMNESTY DAY	PERCENTAGE INCREASE
Clermont	27.9	114	309%
Dysart	9.2	55	496%
Moranbah	75.0	189	152%
Nebo	10.7	32	198%
Middlemount	6.7	23	244%
Glenden	1.5	8	450%
Carmila	10.8	32	196%
Greenhill	11.0	52	374%
St Lawrence	6.0	16	168%
TOTAL	**159**	**521**	**228%**

The site which recorded the highest number of visits was Moranbah, with 189 transactions compared to a 12-month average of 75 for Saturdays. Dysart saw the highest percentage increase at 496%, although actual numbers remained low at 55 compared to 9 for a typical Saturday.

The total number of items disposed of was 604. The most popular items being brought for disposal on Amnesty Days were tyres (364 items) and fridges, freezers and air conditioners, grouped together as gassed whitegoods (110 items).

Officers also observed that the numbers of certain items being disposed of on Amnesty Days was disproportionate, for example 43% of the number of tyres normally received for the whole financial year 2020-21 was brought in on the amnesty days. For gas bottles / fire extinguishers the figure was 65%. This suggests that there may be a degree of “hoarding” among residents, who appear to have held on to items rather than pay for their disposal until a cheaper alternative arises.

Officers anticipated the possibility of complaints arising from residents who missed out on the Amnesty Day and expected free disposal the following Saturday, however no complaints of this nature were received. There was however a small number of enquiries about dates of future amnesties. Interestingly in the lead up to the Amnesty Days, domestic customers who expressed dissatisfaction at the prevailing Fees and Charges were given the option to hold on to their items until the amnesty day, however most took the option to pay to dispose of the item rather than wait for free disposal on the Amnesty Day. This behaviour may indicate that residents make decisions to dispose of materials regardless of fees at a time to suit themselves and may further indicate that illegal dumping is more “opportunistic” than first thought.

Unexpected items

The Amnesty Days also saw an increase in numbers of certain items which were not anticipated as “amnesty” items, since they do not normally incur a charge for disposal. These items include car batteries (22) and engine oil (80 litres). In the case of Moranbah, the number of domestic wheelie bins brought in for emptying on site increased from a Saturday average of 4 to 38. This information is interesting and suggests a mistaken belief in Isaac communities that these items are chargeable. As these items can be involved in illegal dumping, there is an opportunity to improve communications that these items are free of charge.

Attachment 1 provides further detail for each individual site.

Cost of the Amnesty Days

In considering the cost of the Amnesty Day(s), several factors were considered. These included:

- Loss of revenue – $11,469
- Processing costs – $8,261
- Staff costs – $2,647

Considering the factors mentioned above, it is estimated that the cost of the entire May 2021 round of Amnesty Days was $22,377.

When considering the processing costs however, it is not possible to be certain whether all of these costs would have been incurred without the Amnesty Days. Processing costs include amounts paid to contractors for processing of wastes, e.g. mattress grinding, tyre recycling, refrigerant gas recovery from fridges. Some of the waste items may have been paid for to be disposed of by the resident, some may have been removed from the processing stream (e.g. mattresses being stripped by the residents themselves), some may have been repurposed or hoarded longer term, and some may have been dumped illegally.

Officers consider that the staffing costs could reduce in any future Amnesty Days. Although the extra staff member was required for the busier sites, this is not the case at all of the smaller sites. At this stage officers consider that risks from additional traffic should be weighed against normal and projected transaction numbers at all sites before deciding which sites should be manned with an additional staff member at any future Amnesty Day.

When processing costs are excluded, the cost of the May 2021 round is estimated to be $14,116. Since it is difficult to estimate the degree to which “hoarding” would affect residents’ behaviour around Amnesty Days, officers’ best estimate for carrying out an annual waste amnesty day would be in the order of $15,000 to $20,000 per round covering all nine (9) sites. This represents a cost of about $40 to $50 per transaction, or $25 to $33 per item.

Historical cost estimates for the cost of cleaning up illegal dumping are not known. Cost figures should include items which were free to dispose of on Amnesty Day such as fridges, mattresses and tyres, but also waste which would end up in landfill such as furniture, bags of rubbish. Cost comparison is further complicated by the fact that clean-up waste from illegal dumping does not attract the State Government Waste Levy in the way that legitimately landfilled waste does.

Ideally the performance of the Amnesty Days should include a comparison between a baseline historical illegal dumping clean-ups and ongoing annual costs and / or prevalence of dumping to determine the amnesty days’ effectiveness, however the baseline is not well enough defined. Some illegal dumping may have accumulated over long periods before being cleaned up.

Records show that in 2020-21 there were 28 loads of illegally dumped mixed waste, totalling 14.5 tonnes, disposed of at the Waste Management Facilities. Officers however have a low degree of confidence that the figures for the types of illegally dumped items being taken to the waste facilities are being captured accurately as illegal dumping. Figures for the 2020-21 financial year show that only 109 items were recorded as illegally dumped items. Nearly all of these were tyres dropped off at St Lawrence Waste Management Facility.

More work needs to be done to establish the causes of apparent mismatch of figures and to correct this. Possible causes are i) unfamiliarity of waste legislation by staff engaged in collecting illegally dumped items, ii) low priority placed by waste services staff in capturing this data compared to other higher priority

data affecting Fees and Charges to customers, iii) mixed loads being brought in by Parks and Roads Teams (e.g. illegally dumped material being brought in alongside other wastes), and iv) the possibility of Parks and Roads Teams accessing waste site outside opening hours at some sites.

Officers therefore propose that accurate collection of this data be given a high priority over the next six (6) months so that a further progress report can be provided to Council including estimates of the cost per item.

Officers conclude that overall the Amnesty Day exercise in May 2021 was successful and that further amnesty days would be desirable subject to budget.

Other Actions from the Illegal Dumping Management and Intervention Plan Pilot Project

Also under action 4 *Reduce Provocations: Not Giving Reasons For People To Dump,* the Illegal Dumping Management and Intervention Plan includes an action to review charges for items currently attracting a fee or charge to ascertain potential to alter some charges to see if this impacts dumping prevalence.

Having recently carried out a procurement exercise for Processing of Green Waste and Certain Other Wastes, officers have established the true cost of processing some waste items. A summary of this information is provided below.

Table 2: True Cost of Processing Waste Items

ITEM	PROCESSING COST EXCL GST	WASTE LEVY EMBEDDED WITHIN ITEM EST.	EST. INCOME FROM SALE OF SCRAP	TOTAL COST TO COUNCIL EXCL GST	2021-22 CHARGE INCL GST	COMMENT
Mattress	$28.50	$1.90	($1.40)	$29.00	$44.00	22 Kg Floc, 11 Kg steel per mattress
Fridge / Freezer	$25.00	$0.10	($2.40)	$22.70	$44.00	20 Kg average per unit. 5.6% average residual in scrap metal
Gas bottle / Fire Ext	$22.60	Nil	Nil	$22.60	$19.00	
Tyre 4WD Light Truck	$7.15	Nil	Nil	$7.15	$14.30	
Tyre 4WD Light Truck on Rim	$21.45	Nil	Nil	$21.45	$19.50	
Tyre/Car/ Trailer/ Quad on Rim	$11.55	Nil	Nil	$11.55	$14.30	
Tyre Motorcycle	$2.50	Nil	Nil	$2.50	$4.50	

Tyre – Truck 17.5+	$16.50	Nil	Nil	$16.50	$25.50	

As can be seen from the above, Council's 2021-22 Fees and Charges appear to under-recover the costs of some items and over-recover the costs of others. Not included in the above estimates however are any costs associated with stockpiling or any share of the operating costs for Waste Management Facilities. These costs are not currently separated out from site operating costs. Officers propose that this be further explored using the recently developed pricing model as part of the 2022-23 budget-setting process early in the 2021-22 financial year.

Other options

Council approved its five-year Waste Management Strategy at its Ordinary Meeting of 26 May 2020. The Strategy includes an action to evaluate hard waste collections. This is not a service which officers would recommend however proponents who tendered for the IRC/CHRC 2083-0019-138 contract for Waste Collection Services in 2019 were required to submit bids as part of their tenders. The cost of providing this service once per year to all serviced properties in the current contract would be approximately $1.75M per year.

Voucher systems are offered in some Councils which charge for disposal of all or most wastes. This option could be explored for the Isaac region however most waste transactions are currently not charged for – Council would be introducing an additional system for approximately 1% of all waste transactions, i.e. 587 transactions for these items out of 56,688 domestic client transactions in 2020-21, and more than 76,000 transactions overall. Councils which operate voucher systems have anecdotally indicated that there are problems with people attempting to copy vouchers, ratepayers (landlords) withholding the vouchers from their tenants, voucher "black markets" and various other administrative problems.

Strategies to deal with such issues could be developed, e.g. requiring the resident to contact Council and provide proof of residency to obtain the vouchers. Council's waste data system can be adapted to include a voucher module to help to manage the process, however this would be at an additional cost. Council's loss of revenue would be considerably higher than that seen in the trial Amnesty Days, since all of these items being disposed of would be free of charge on any day of the year. Officers estimate that this would equate to more than $25,000 per year.

IMPLICATIONS

Financial

Currently there is no provision in the 2021-22 operational budget for any future Amnesty Days.

Service Delivery

The Amnesty Days were very popular within the Isaac communities. Officers conclude that overall the Amnesty Day exercise in May 2021 was successful and that in terms of simplicity, effectiveness and officers' understanding of the costs, further Amnesty Days should be the preferred strategy to other alternatives for the Pilot Plan's objective of *Reducing Provocations: Not Giving Reasons For People To Dump*, subject to budget.

Risk

There are potential risks relating to increased traffic movements on busy Amnesty Days. Officers mitigated this by planning for the anticipated increase in volume likely to occur. An additional member of staff was deployed for the full shift at each site on the appointed Saturday to direct traffic and assist customers. Officers would propose repeating this on any future Amnesty Days.

There is also a risk that, should Council decide to promote Amnesty Days as a regular (e.g. annual) event, the level of hoarding of unwanted items could increase, which would impact on Council's revenue. It is difficult to quantify this risk at this stage.

Future Actions

Officers propose the actions detailed in Table 3 below to build upon the knowledge gained during the Amnesty Days exercise.

Table 3: Actions

	ACTION	BY WHOM	DATE
1	Improve knowledge of costs of Illegal Dumping clean-ups	Manager Infrastructure, Parks and Recreation	Dec 2021
2	Improve data on numbers and types of illegally dumped items to determine unit costs	Manager Infrastructure, Parks and Recreation, Manager Waste Services	Aug 2021
3	Educate staff on relevant waste legislation	Manager Waste Services	Aug 2021
4	Review out of hours access to waste sites	Manager Waste Services	Sept 2021
5	Further explore processing costs using the recently developed pricing model as part of the 2022-23 budget-setting process	Manager Waste Services	Oct 2021
6	Organise a second round of Amnesty Days during 2021-22, subject to achieving operational budget savings	Manager Waste Services	Mar 2022

CONSULTATION

Director Water and Waste

Manager Community Education and Compliance, who is lead officer for the Illegal Dumping Management and Intervention Plan

Projects and Contracts Coordinator Waste Services, who compiled the statistical data

Supervisor Waste Services, who coordinated the additional staff cover for the Amnesty Days

Acting Manager Parks and Recreation

Community Education and Compliance Department

BASIS FOR RECOMMENDATION

Council is committed to transparent decision making, identifying and managing its risks and continuous improvement.

ACTION ACCOUNTABILITY

Manager Community Education and Compliance in collaboration with Manager Parks and Recreation and Manager Waste Services.

KEY MESSAGES

Responsible disposal of waste.

Report prepared by:	**Report authorised by:**
KARL MURDOCH **Manager Waste Services**	GARY MURPHY **Director Water and Waste**
Date: 28 June 2021	Date: 29 June 2021

ATTACHMENTS

- Attachment 1 – Amnesty Day Statistics

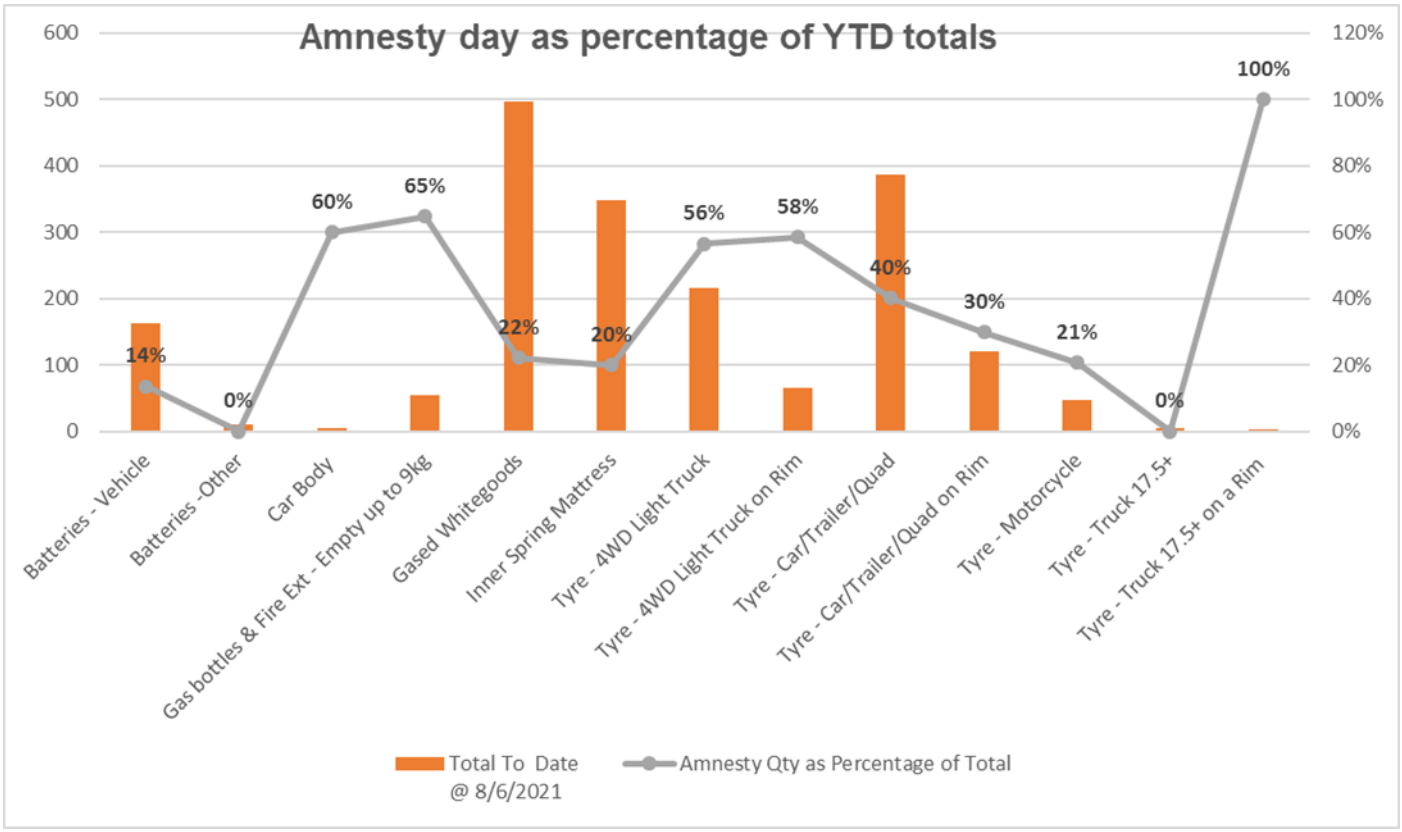
REFERENCE DOCUMENT

- The Illegal Dumping Management and Intervention Plan (the Pilot Plan)

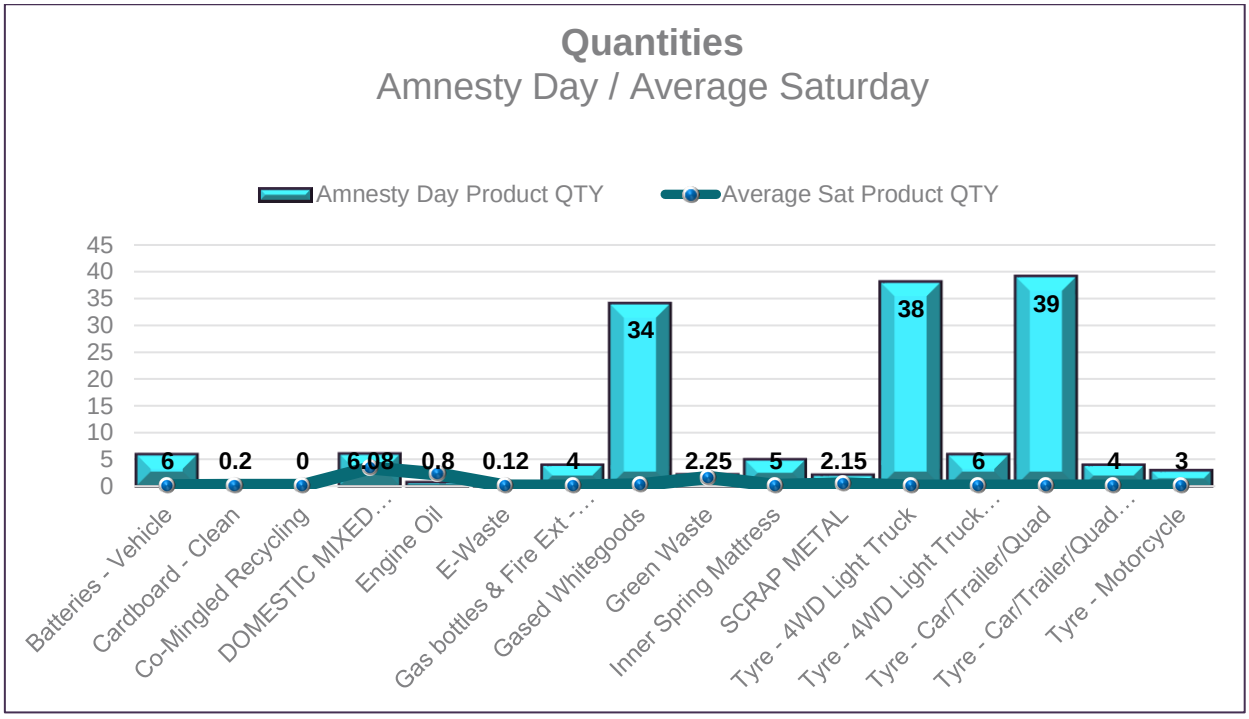
ATTACHMENT 1 – AMNESTY DAY STATISTICS

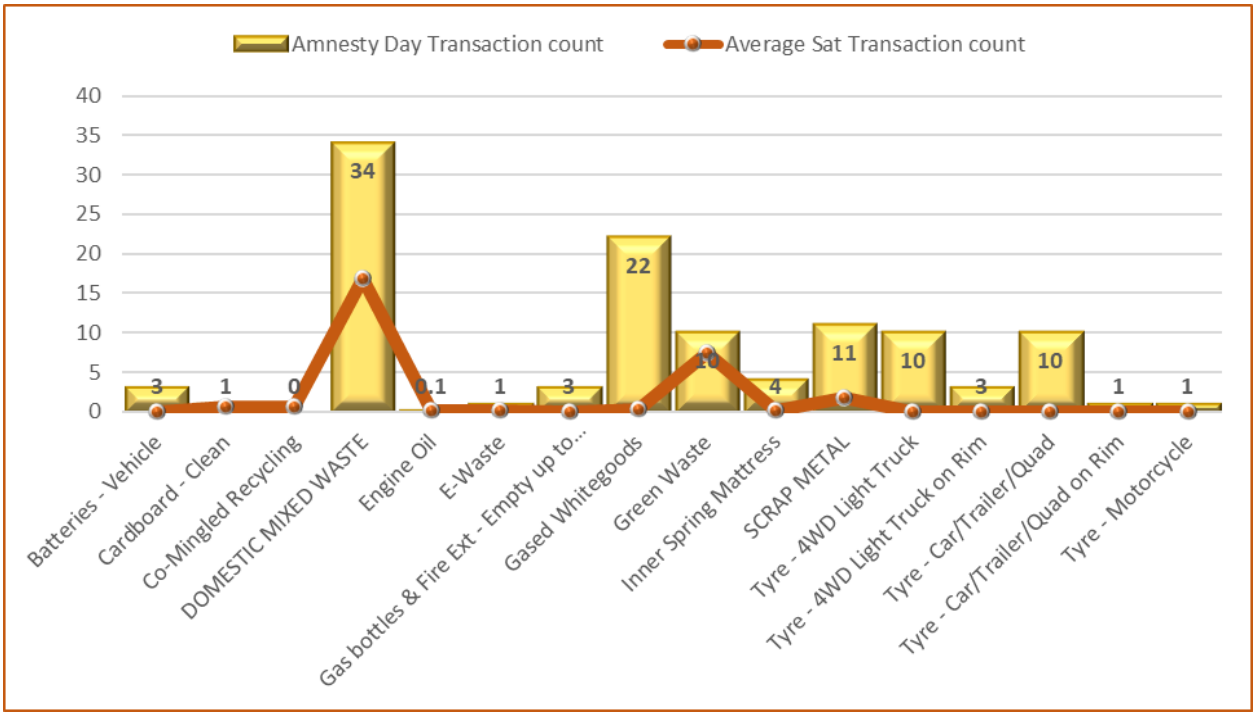
Product	Total QTY Received	Fee ex GST	Processing Fee	Lost Revenue ex GST	Processing Charge (incurred by council	Staff OT cost
Batteries - Vehicle	22	$ -	$ -	$ -	$ -	
Batteries -Other	0	$ -		$ -	$ -	
Car Body	3	$ 76.36	$ -	$ 229.09	$ -	
Engine Oil		$ -	$ -	$ -	$ -	
Gas bottles & Fire Ext - Empty up to 9kg	35	$ 17.27	$ 22.60	$ 604.55	$ 791.00	
Gased Whitegoods	110	$ 39.09	$ 25.00	$ 4,300.00	$ 2,750.00	
Inner Spring Mattress	70	$ 38.18	$ 28.50	$ 2,672.73	$ 1,995.00	
Tyre - 4WD Light Truck	122	$ 12.73	$ 7.15	$ 1,552.73	$ 872.30	
Tyre - 4WD Light Truck on Rim	38	$ 17.27	$ 21.45	$ 656.36	$ 815.10	
Tyre - Car/Trailer/Quad	155	$ 5.45	$ 3.85	$ 845.45	$ 596.75	
Tyre - Car/Trailer/Quad on Rim	36	$ 12.73	$ 11.55	$ 458.18	$ 415.80	
Tyre - Motorcycle	10	$ 4.00	$ 2.50	$ 40.00	$ 25.00	
Tyre - Truck 17.5+	0	$ 22.73	$ 16.50	$ -	$ -	
Tyre - Truck 17.5+ on a Rim	3	$ 36.64		$ 109.92	$ -	
				$ 11,469.01	$ 8,260.95	$ 2,647.38

Product	Carmila	Clermont	Dysart	Glenden	Greenhill	Middlemount	Moranbah	Nebo	St Lawrence
Batteries - Vehicle	0	6				5	11		
Batteries -Other	0	0							
Car Body	1	0				0		1	1
Engine Oil	0	80					49		
Gas bottles & Fire Ext - Empty up to 9kg	3	4	2	7	2		9	8	
Gased Whitegoods	6	34	5		13	7	42	3	
Inner Spring Mattress	5	5	16		5	14	22	1	2
Tyre - 4WD Light Truck	0	38	4		25	7	22	6	20
Tyre - 4WD Light Truck on Rim	6	6	0	1	19	3		3	
Tyre - Car/Trailer/Quad	12	39	5	12	27	3	51	6	
Tyre - Car/Trailer/Quad on Rim	4	4	1		4		11	12	
Tyre - Motorcycle	0	3					4	3	
Tyre - Truck 17.5+		0							
Tyre - Truck 17.5+ on a Rim	3								

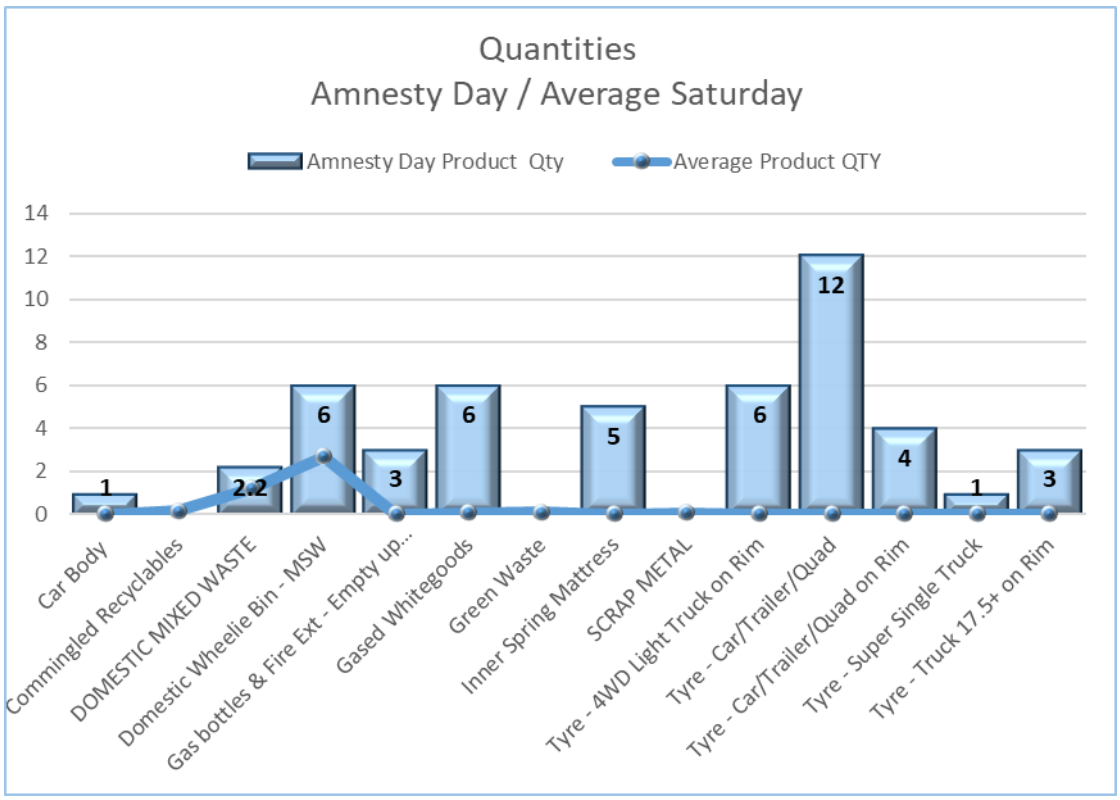

Amnesty day as percentage of YTD totals
600
500
400
300
200
100
0
120%
100%
80%
60%
40%
20%
0%
14%
0%
60%
65%
22%
20%
56%
58%
40%
30%
21%
0%
100%
Batteries - Vehicle
Batteries -Other
Car Body
Gas bottles & Fire Ext - Empty up to 9kg
Gased Whitegoods
Inner Spring Mattress
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Motorcycle
Tyre - Truck 17.5+
Tyre - Truck 17.5+ on a Rim
Total To Date @ 8/6/2021
Amnesty Qty as Percentage of Total

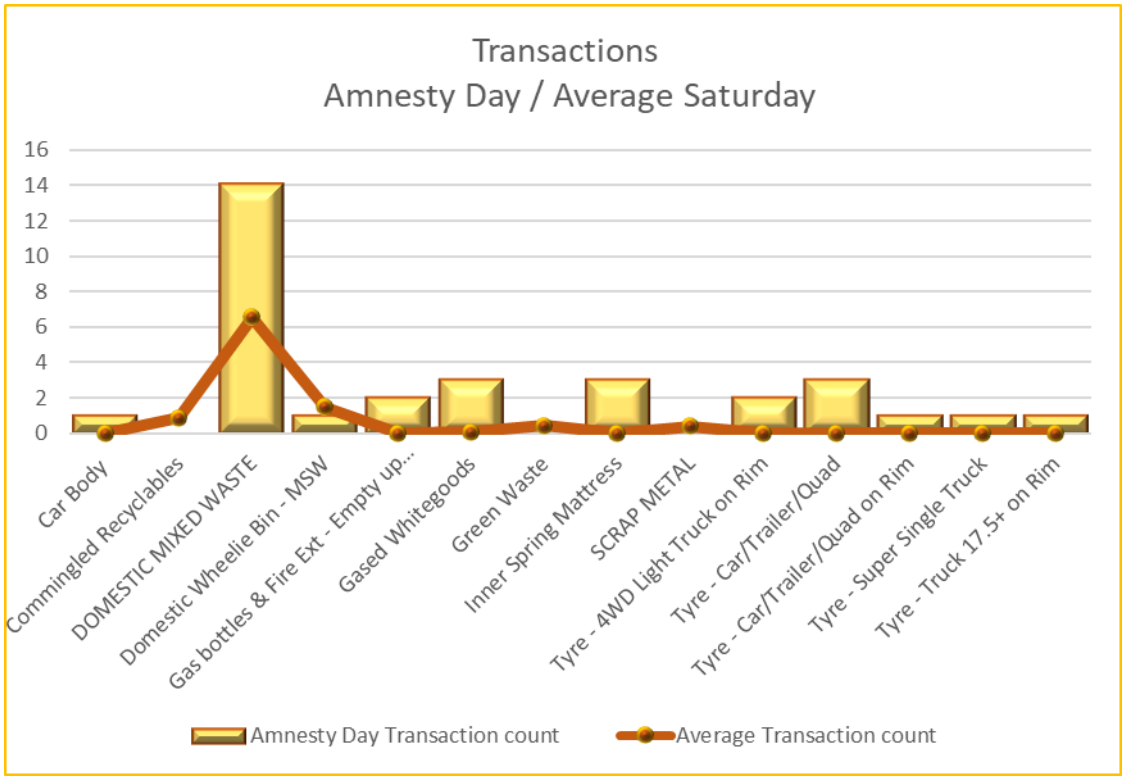
Clermont


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product QTY
Average Sat Product QTY
45
40
35
30
25
20
15
10
5
0
6
0.2
0
6.08
0.8
0.12
4
34
2.25
5
2.15
38
6
39
4
3
Batteries - Vehicle
Cardboard - Clean
Co-Mingled Recycling
DOMESTIC MIXED…
Engine Oil
E-Waste
Gas bottles & Fire Ext -…
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck…
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad…
Tyre - Motorcycle

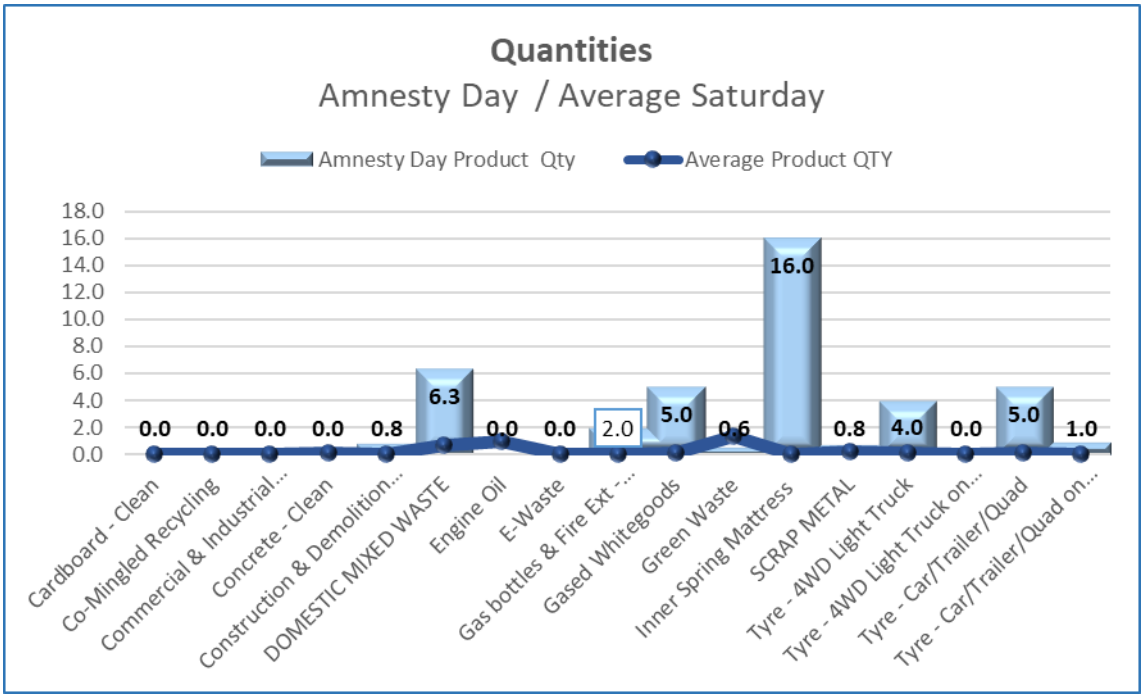

Amnesty Day Transaction count
Average Sat Transaction count
40
35
30
25
20
15
10
5
0
3
1
0
34
0.1
1
3
22
10
4
11
10
3
10
1
1
Batteries - Vehicle
Cardboard - Clean
Co-Mingled Recycling
DOMESTIC MIXED WASTE
Engine Oil
E-Waste
Gas bottles & Fire Ext - Empty up to…
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Motorcycle

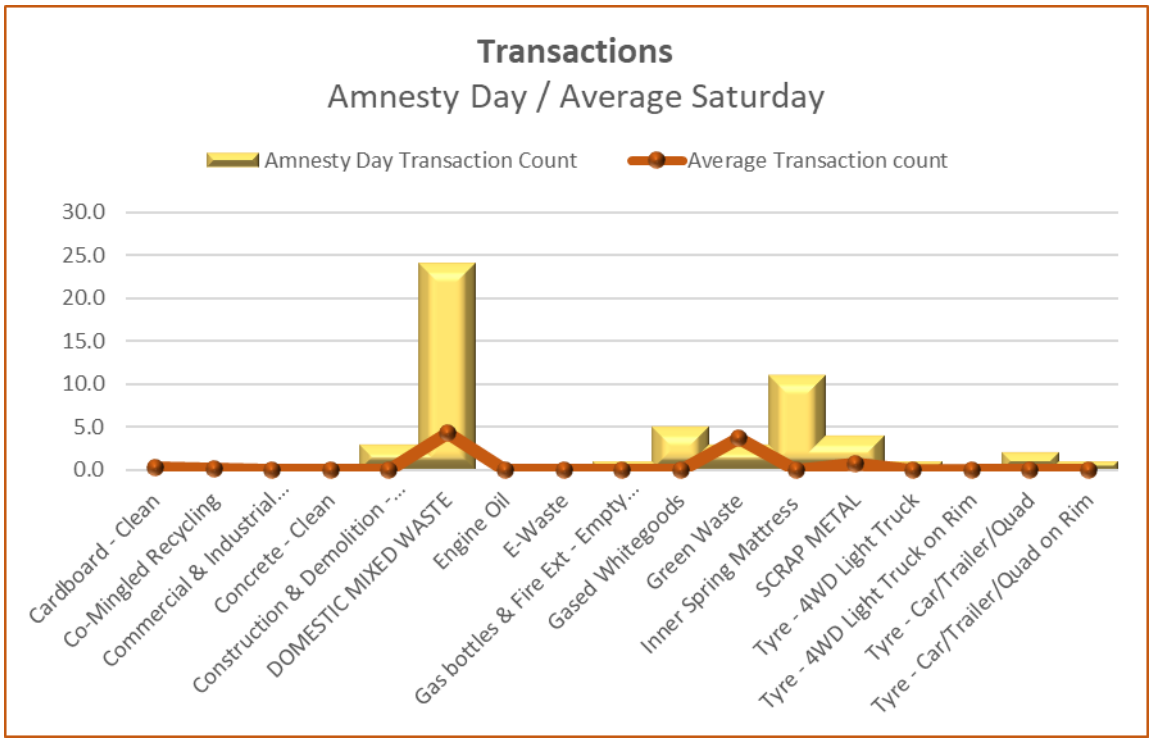
Carmila


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product Qty
Average Product QTY
14
12
10
8
6
4
2
0
1
2.2
6
3
6
5
6
12
4
1
3
Car Body
Commingled Recyclables
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
Gas bottles & Fire Ext - Empty up...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Super Single Truck
Tyre - Truck 17.5+ on Rim

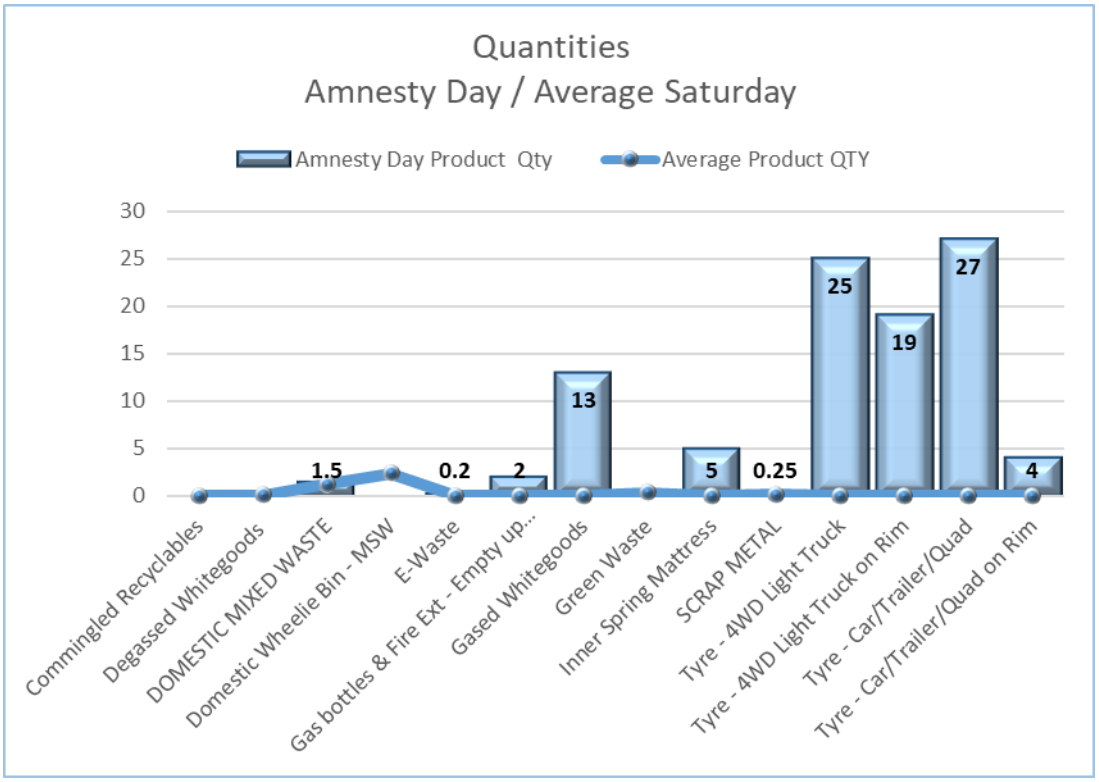

Transactions
Amnesty Day / Average Saturday
16
14
12
10
8
6
4
2
0
Car Body
Commingled Recyclables
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
Gas bottles & Fire Ext - Empty up...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Super Single Truck
Tyre - Truck 17.5+ on Rim
Amnesty Day Transaction count
Average Transaction count

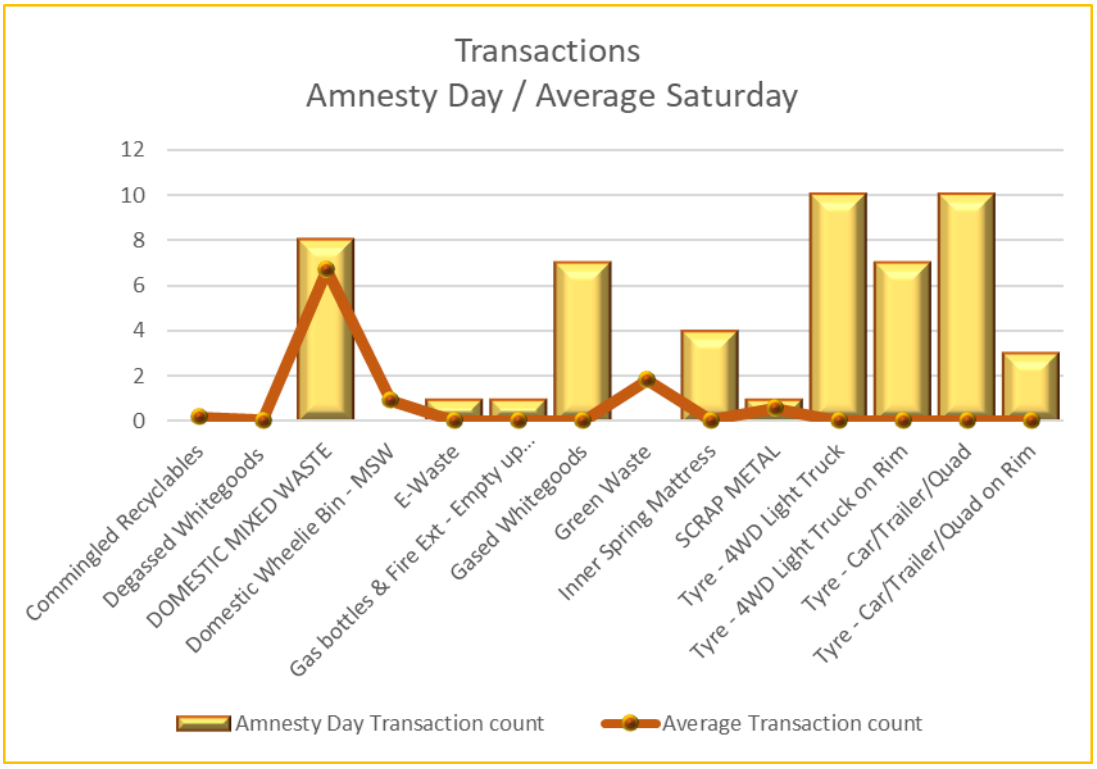
Dysart


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product Qty
Average Product QTY
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.0 0.0 0.0 0.0 0.8 6.3 0.0 0.0 2.0 5.0 0.6 16.0 0.8 4.0 0.0 5.0 1.0
Cardboard - Clean
Co-Mingled Recycling
Commercial & Industrial...
Concrete - Clean
Construction & Demolition...
DOMESTIC MIXED WASTE
Engine Oil
E-Waste
Gas bottles & Fire Ext -...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on...
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on...

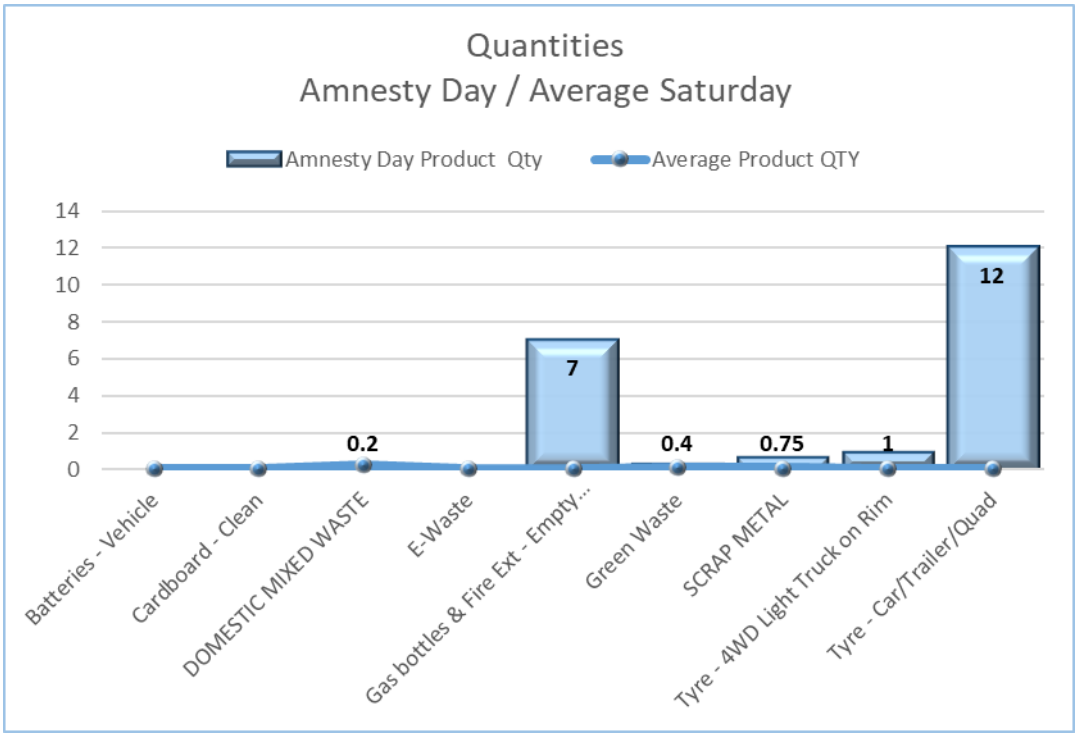

Transactions
Amnesty Day / Average Saturday
Amnesty Day Transaction Count
Average Transaction count
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Cardboard - Clean
Co-Mingled Recycling
Commercial & Industrial...
Concrete - Clean
Construction & Demolition -...
DOMESTIC MIXED WASTE
Engine Oil
E-Waste
Gas bottles & Fire Ext - Empty...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim

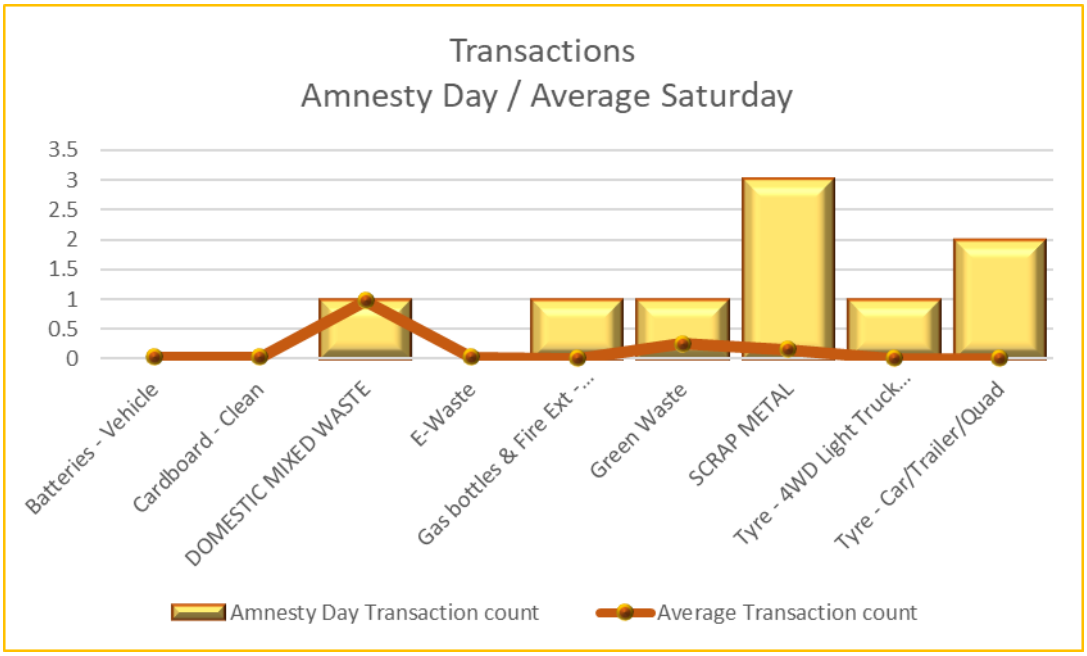
Greenhill


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product Qty
Average Product QTY
30
25
20
15
10
5
0
1.5
0.2
2
13
5
0.25
25
19
27
4
Commingled Recyclables
Degassed Whitegoods
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
E-Waste
Gas bottles & Fire Ext - Empty up...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim

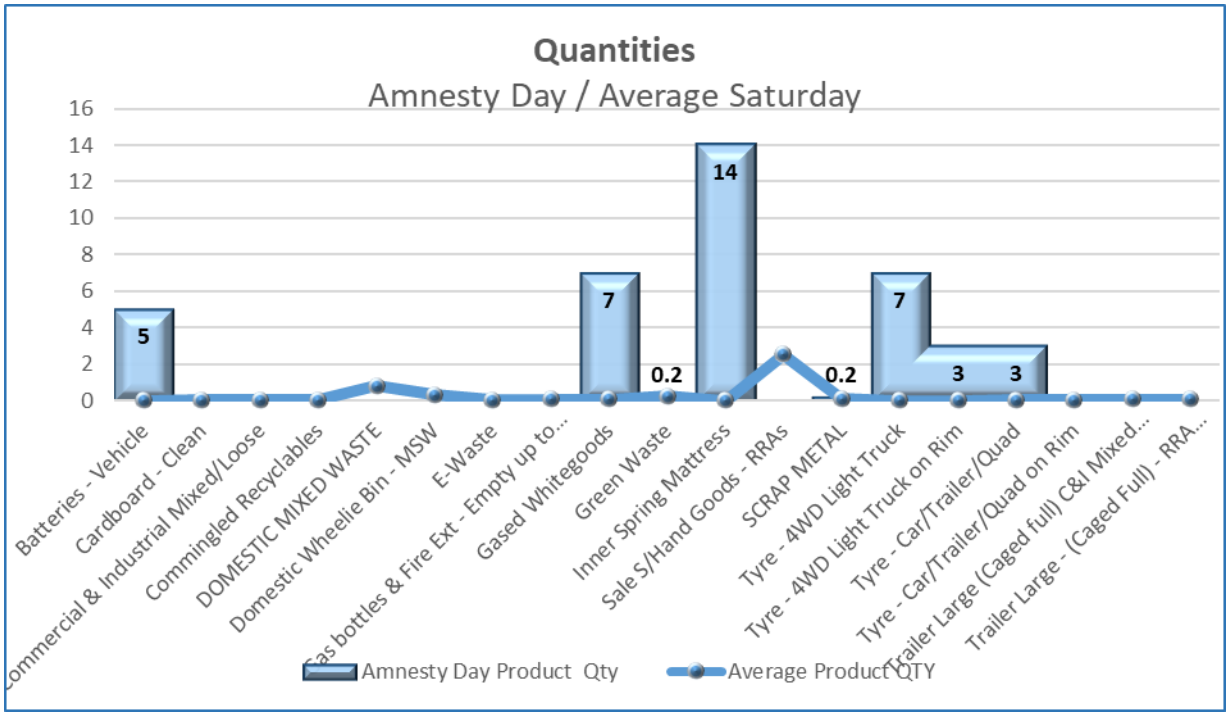

Transactions
Amnesty Day / Average Saturday
12
10
8
6
4
2
0
Commingled Recyclables
Degassed Whitegoods
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
E-Waste
Gas bottles & Fire Ext - Empty up...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Amnesty Day Transaction count
Average Transaction count

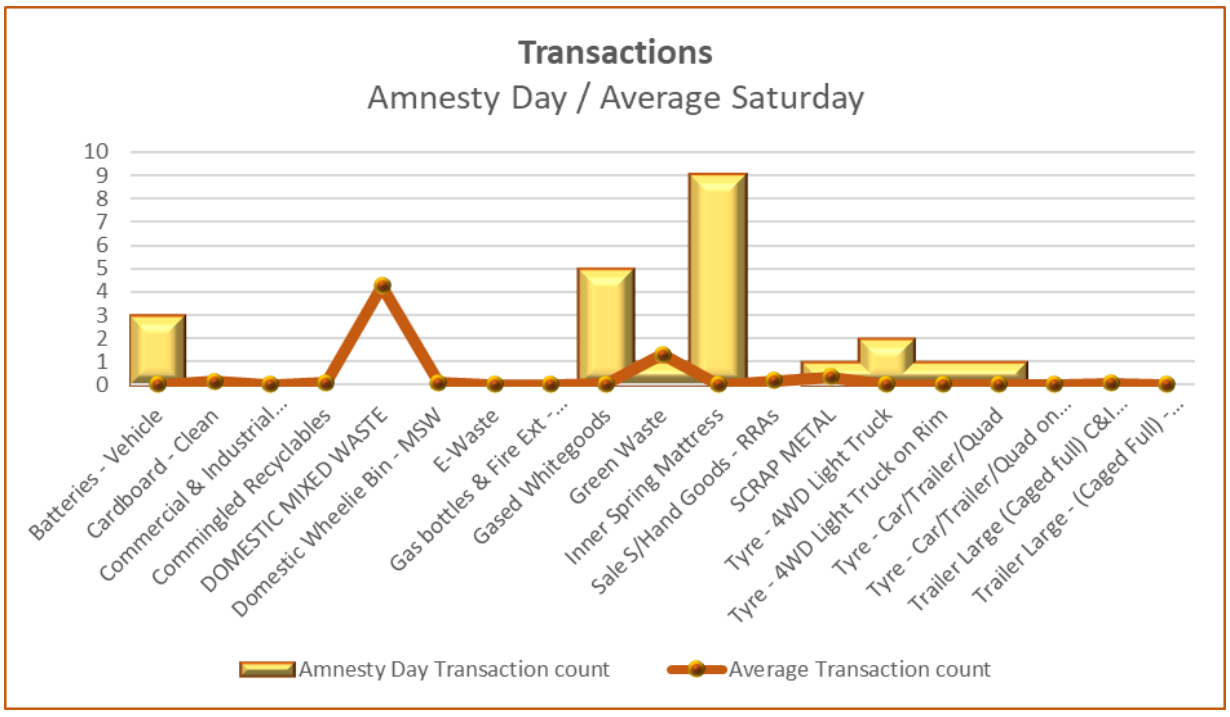
Glenden


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product Qty
Average Product QTY
14
12
10
8
6
4
2
0
0.2
7
0.4
0.75
1
12
Batteries - Vehicle
Cardboard - Clean
DOMESTIC MIXED WASTE
E-Waste
Gas bottles & Fire Ext - Empty...
Green Waste
SCRAP METAL
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad

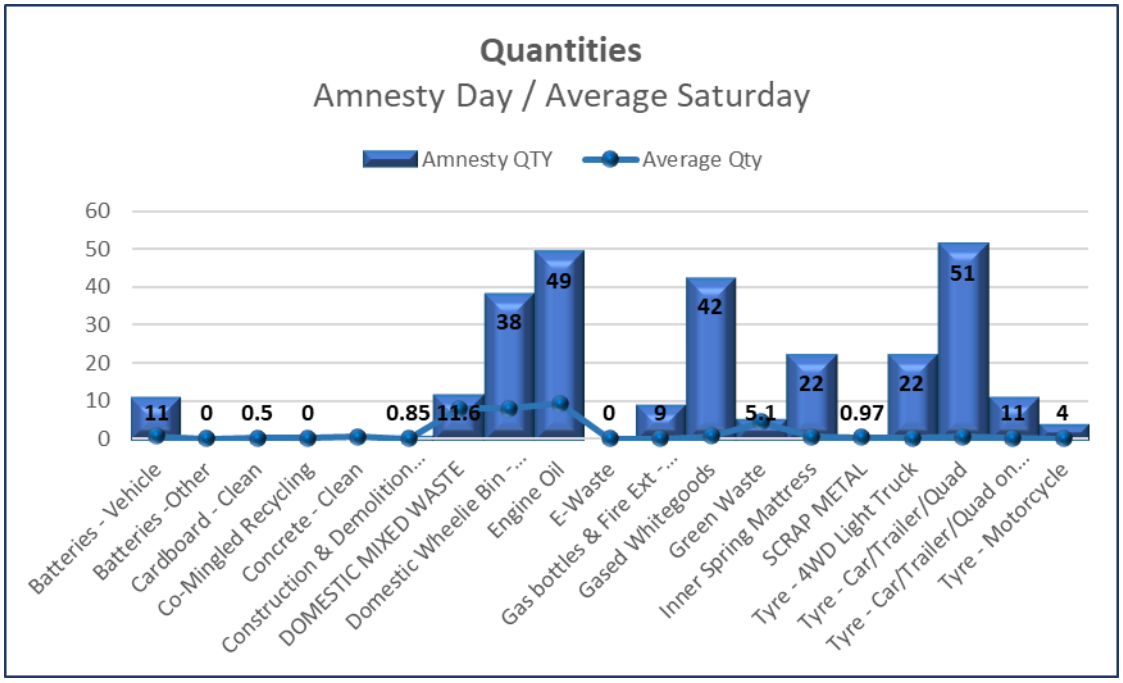

Transactions
Amnesty Day / Average Saturday
3.5
3
2.5
2
1.5
1
0.5
0
Batteries - Vehicle
Cardboard - Clean
DOMESTIC MIXED WASTE
E-Waste
Gas bottles & Fire Ext - ...
Green Waste
SCRAP METAL
Tyre - 4WD Light Truck...
Tyre - Car/Trailer/Quad
Amnesty Day Transaction count
Average Transaction count

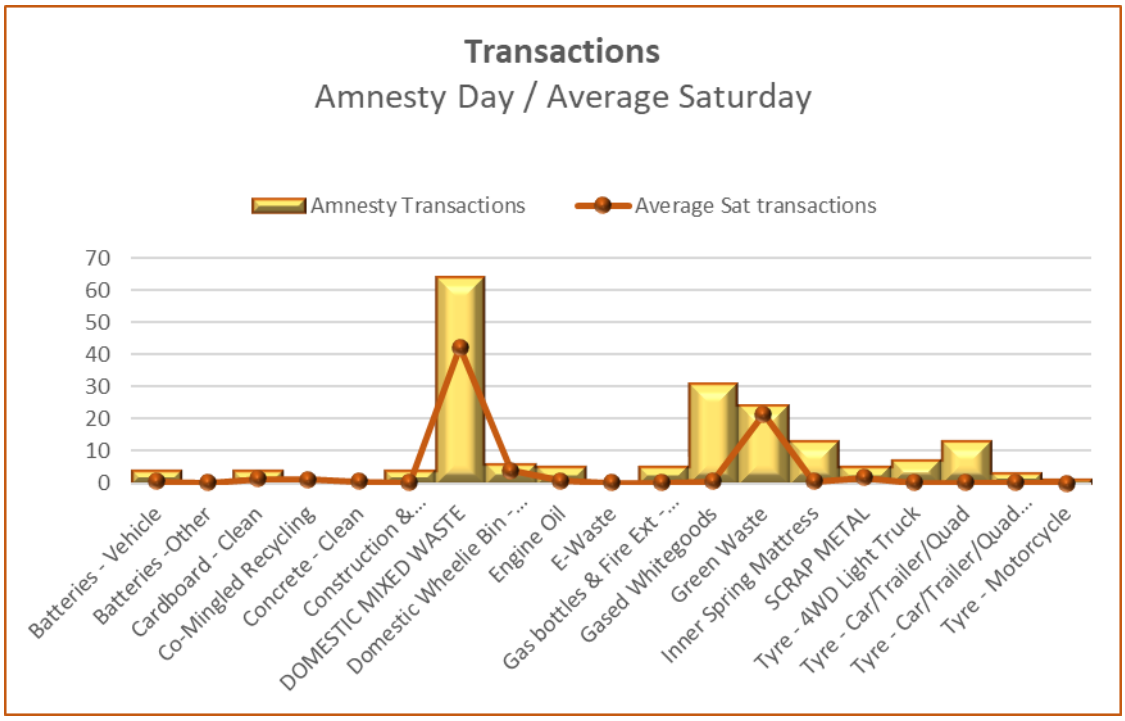
Middlemount



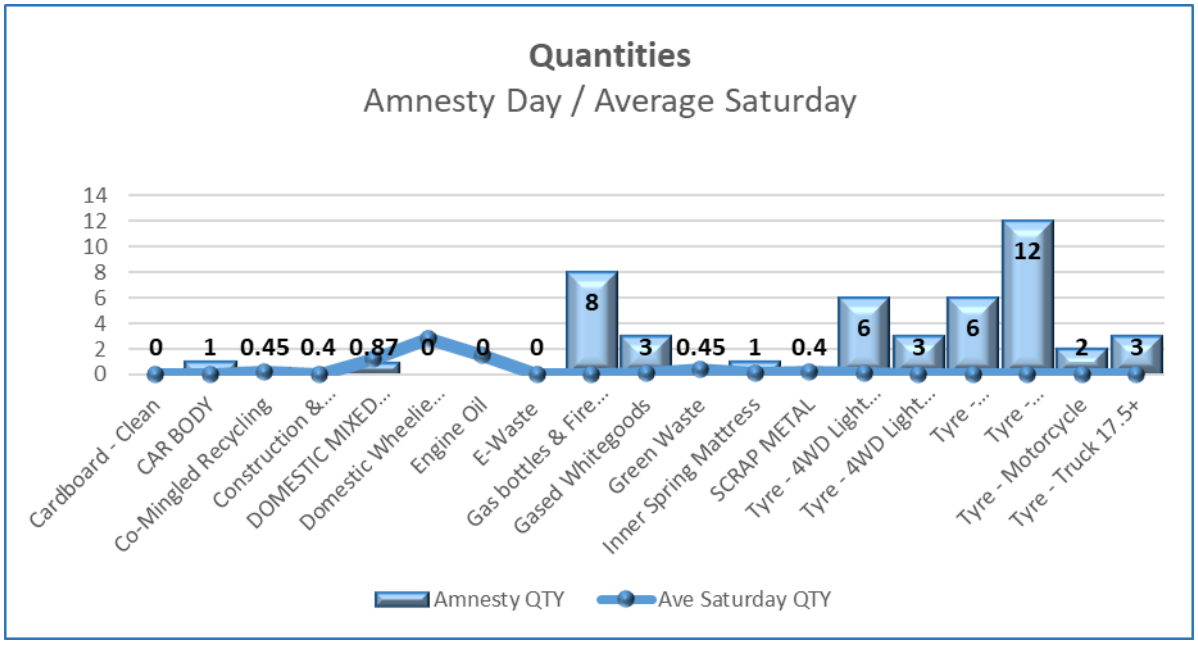


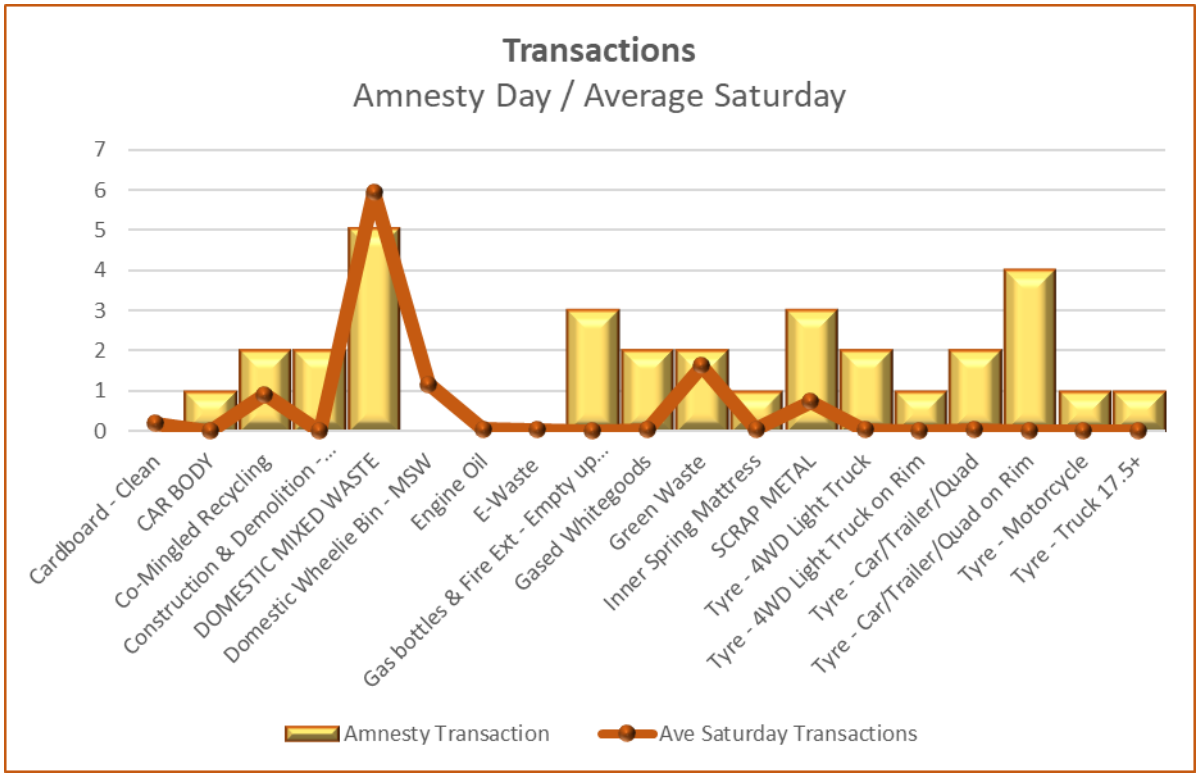
Moranbah


Quantities
Amnesty Day / Average Saturday
Amnesty QTY
Average Qty
60
50
40
30
20
10
0
11
0
0.5
0
0.85
11.6
38
49
0
9
42
5.1
22
0.97
22
51
11
4
Batteries - Vehicle
Batteries -Other
Cardboard - Clean
Co-Mingled Recycling
Concrete - Clean
Construction & Demolition...
DOMESTIC MIXED WASTE
Domestic Wheelie Bin -...
Engine Oil
E-Waste
Gas bottles & Fire Ext -...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on...
Tyre - Motorcycle

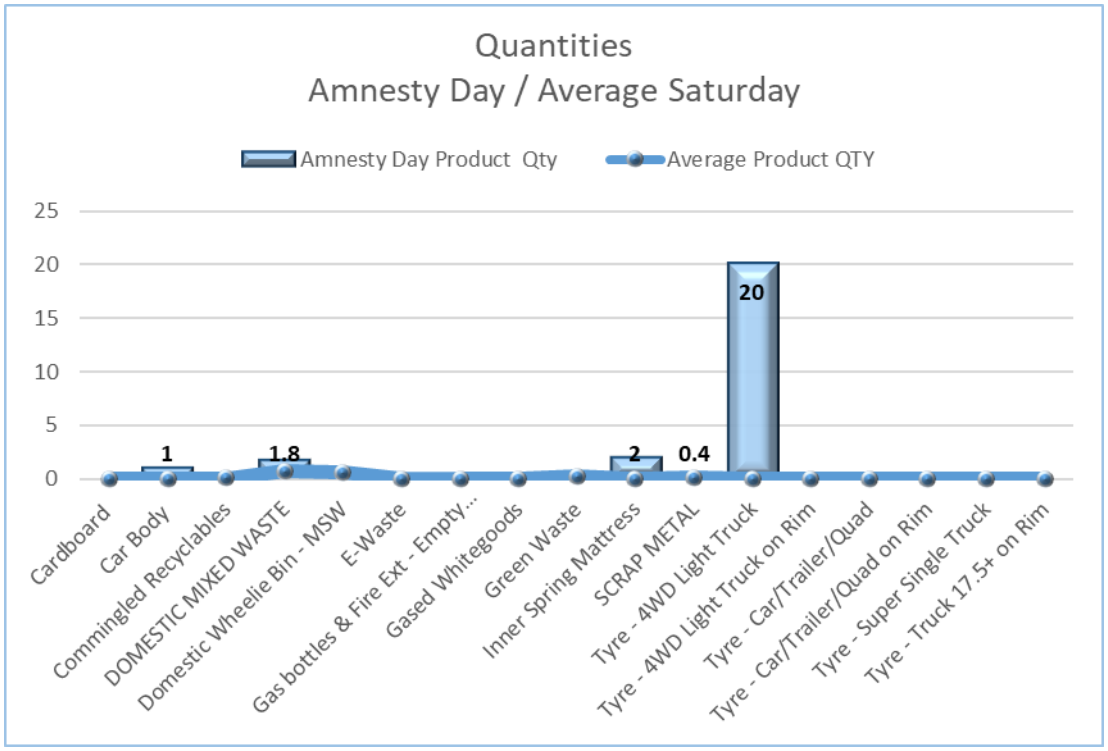

Transactions
Amnesty Day / Average Saturday
Amnesty Transactions
Average Sat transactions
70
60
50
40
30
20
10
0
Batteries - Vehicle
Batteries -Other
Cardboard - Clean
Co-Mingled Recycling
Concrete - Clean
Construction &...
DOMESTIC MIXED WASTE
Domestic Wheelie Bin -...
Engine Oil
E-Waste
Gas bottles & Fire Ext -...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad...
Tyre - Motorcycle

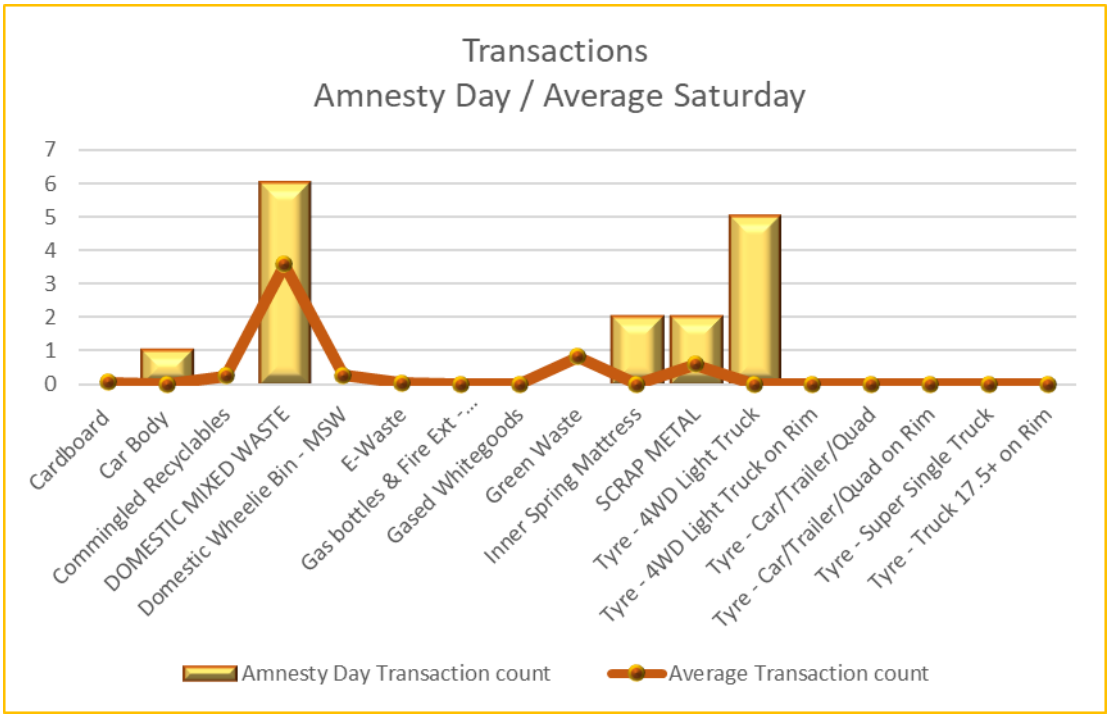
Nebo


Quantities
Amnesty Day / Average Saturday
14
12
10
8
6
4
2
0
0
1
0.45
0.4
0.87
0
0
0
8
3
0.45
1
0.4
6
3
6
12
2
3
Cardboard - Clean
CAR BODY
Co-Mingled Recycling
Construction &...
DOMESTIC MIXED...
Domestic Wheelie...
Engine Oil
E-Waste
Gas bottles & Fire...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light...
Tyre - 4WD Light...
Tyre -...
Tyre -...
Tyre - Motorcycle
Tyre - Truck 17.5+
Amnesty QTY
Ave Saturday QTY


Transactions
Amnesty Day / Average Saturday
7
6
5
4
3
2
1
0
Cardboard - Clean
CAR BODY
Co-Mingled Recycling
Construction & Demolition - ...
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
Engine Oil
E-Waste
Gas bottles & Fire Ext - Empty up...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Motorcycle
Tyre - Truck 17.5+
Amnesty Transaction
Ave Saturday Transactions

St Lawrence


Quantities
Amnesty Day / Average Saturday
Amnesty Day Product Qty
Average Product QTY
25
20
15
10
5
0
1
1.8
2
0.4
20
Cardboard
Car Body
Commingled Recyclables
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
E-Waste
Gas bottles & Fire Ext - Empty...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Super Single Truck
Tyre - Truck 17.5+ on Rim


Transactions
Amnesty Day / Average Saturday
7
6
5
4
3
2
1
0
Cardboard
Car Body
Commingled Recyclables
DOMESTIC MIXED WASTE
Domestic Wheelie Bin - MSW
E-Waste
Gas bottles & Fire Ext - ...
Gased Whitegoods
Green Waste
Inner Spring Mattress
SCRAP METAL
Tyre - 4WD Light Truck
Tyre - 4WD Light Truck on Rim
Tyre - Car/Trailer/Quad
Tyre - Car/Trailer/Quad on Rim
Tyre - Super Single Truck
Tyre - Truck 17.5+ on Rim
Amnesty Day Transaction count
Average Transaction count

MEETING DETAILS	**Water and Waste Standing Committee** Wednesday 14 July 2021
AUTHOR	Linda Roberts
AUTHOR POSITION	Manager Planning and Projects

5.2 DYSART WASTEWATER TREATMENT PLANT ELECTRICAL UPGRADE PROJECT

EXECUTIVE SUMMARY

This report serves to award the successful tenderer of the Electrical Upgrade Project at the Dysart Wastewater Treatment Plant (IRCQ2033-1220-869). The report will highlight the findings and recommend a successful tenderer for Council approval.

OFFICER'S RECOMMENDATION

That the Committee recommends that Council:

1. ***Award the contract for IRCQ2033-1220-869 Dysart Wastewater Treatment Plant Electrical Upgrade to the preferred tenderer for the contract sum of $326,851.05 (inclusive GST).***
2. ***Endorse the use of funds from the project CW212941.***
3. ***Authorise the Chief Executive Officer to negotiate, execute and vary the contract as required.***
4. ***Endorse the movement of $147,000 from CW1825537.***

BACKGROUND

As part of Dysart Sewage Network Enforceable Undertaking (CW202817), a Balance Tank was installed at the Dysart Wastewater Treatment Plant (WWTP) to improve the operation of the plant and to install various control infrastructure including a new PLC/SCADA system during 2020/2021. The remaining funding from CW202817 was transferred to CW212941 to undertake three (3) activities as per Council resolution CGFS-0565 (18 November 2020):

- Building works including relocating and modernising the lab and kitchen (to create space in the office for a new switchboard) and constructing a secure enclosure for Chlorine Cylinder(s).
- Concrete structures assessment report, which includes recommendation of remediation works. This assessment is essential for plant longevity and planning the upgrade of the Trickling Filters (funded to occur in 2021/2022).
- Upgrade the remaining electrical and control infrastructure at the Dysart WWTP thus improving the ability to monitor and control the plant (this project and the subject of the tender).

At the Quarter Two (Q2) review, $150,000 was deferred from CW212941 until the 2021/2022 Budget. At Quarter Three (Q3) review there was a $40,966 adjusted as an increase to partly cover this project.

This project is to upgrade the remaining electrical infrastructure at the Dysart WWTP including expanding and connecting to the existing SCADA/PLC system and control equipment. Several switchboards are also past their useful live and requires replacing or upgrading to meet current practices. This project will improve the ability to monitor and control the plant by better utilising existing electro-mechanical devices (i.e. meters, analysers, electric actuated values and pumps) and where required installing new equipment.

This project is to be conducted as a design and construct project, with vendors providing an itemised quote based on twenty-six (26) items. The project was offered to the market via LG Tenderbox on 24 March 2021 and was closed on 15 May 2021 with 4 compliant responses received.

IMPLICATIONS

Estimated costs (excluding GST) relating to the project include:

- Project Management Related = $ 30,000
- Contingency allowance = $ 30,000
- Design and Construction = $ 297,137.32

Total estimated project cost = $ 357,137.32 (excluding GST)

CW212941 was allocated $150,000 in 2021/2022 budget (from the deferred funds at the Quarter Two (Q2) review) plus ~$60,000 uncommitted from the 2020/2021 budget. The remaining budget requirements(~$147K) is to be transferred from CW182537 with savings on this phase of the project.

Service Levels

This project will comply with Council's Corporate Plan to:

- Provide effective and sustainable water supply and sewerage infrastructure while progressively achieving environmental compliance.
- Strategically operate, maintain and utilise and review the delivery of Council assets to ensure the efficient and cost-effective services to the community are met and continuously improved.
- Ensure that the assets maintained and constructed are appropriate to the current and future needs of the region's industries.

Risks

Financial

Risk if relocation of budget funding does not occur, however, a revision of the program costs has been completed with discussion is occurring with finance on this allocation.

Time/Program

Possible project delays caused by difficulties in the supply of equipment, wet weather, etc.

Compliance and benefits

This project will improve the operation of the Dysart WWTP by allowing better monitoring and control of the plant along with ensuring the plant operates at optimal efficiency. This project will upgrade and replace several electrical switchboards to meet IRC's electrical safety standard.

CONSULTATION

Director Water and Waste

Manager Planning and Projects Water and Waste

Manager Operations and Maintenance Water and Wastewater

Manager of Financial Services

Treatment Plant Supervisor

Treatment Plant Operators

Manager Contracts and Procurement

BASIS FOR RECOMMENDATION

The attached recommendation report provides the detailed basis for the recommendation. In summary, the Council received a total of four Electronic Quote responses to RFQ IRCQ2033-1220-869 which was used via Local Buy and was assessed the selection criteria in Table 1 by the evaluation panel.

Table 1: Selection Criteria

CRITERIA	WEIGHTING
Price	30%
Local preference	20%
Relevant experience and track record	15%
Key skills and experience	15%

Evaluation Scores and Recommendation

Following the evaluation team's assessment, the team recommend awarding contract IRCQ2033-1220-869 Dysart WWTP Electrical to Comlek Group (ABN 97143586967) for the value of $326,851.05 inclusive GST.

ACTION ACCOUNTABILITY

Project management actions and accountability will be provided by Water and Waste Directorate representatives following the contract award.

KEY MESSAGES

The award of this contract will comply with the Council's plan to provide quality infrastructure capable of meeting the community needs and catering for future economic growth.

Report prepared by:	**Report authorised by:**
LINDA ROBERTS **Manager Planning and Projects**	GARY MURPHY **Director Water and Waste**
Date: 28 June 2021	Date: 29 June 2021

ATTACHMENTS

- CONFIDENTIAL Attachment 1 – Recommendation Report – DYSART WWTP Electrical – IRCQ2033-1220-869

REFERENCE DOCUMENT

Nil

PAGES 39 TO 49 HAVE INTENTIONALLY BEEN REMOVED DUE TO CONFIDENTIAL REASONS

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MEETING DETAILS	**Water and Waste Standing Committee** Wednesday 14 July 2021
AUTHOR	Linda Roberts
AUTHOR POSITION	Manager Planning and Projects

5.3 WATER AND WASTE STRATEGIC PROCUREMENT PLAN

EXECUTIVE SUMMARY

This report seeks endorsement of the Strategic Procurement Plan for the delivery of works from within the Water and Waste Directorate for the 2020-22 Financial Year and delegation to the Chief Executive Officer to enter into medium-sized contractual arrangements or large-sized contractual arrangements in accordance with the quote or tender consideration plan.

OFFICER'S RECOMMENDATION

That the Committee recommends that Council:

1. ***Endorse the Procurement Plan for the delivery of works within the Water and Waste Directorate for the 2021-22 financial year.***
2. ***Delegates the authority to the Chief Executive Officer to determine the successful tenderer for the listed works in the Strategic Procurement Plan valued under $1m under delegation LGR88 – "Power to enter into a medium-sized contractual arrangement or large-sized contractual arrangement in accordance with a quote or tender consideration plan adopted by local government resolution" under Section 230(1) Local Government Regulation 2012 subject to the following conditions;***
   a. ***All tender evaluation reports be provided to all Councillors at the same time that the Chief Executive Officer is considering the report,***
   b. ***Should any Councillor (free of any conflict of interest or material personal interest) notify the Chief Executive Officer that the matter should be escalated for Committee consideration, the Chief Executive Officer shall not exercise his delegated authority to determine the tender and shall instead arrange for the matter to be included in the agenda for the next available Water and Waste Standing Committee Meeting or Council Meeting,***
   c. ***Should the Chief Executive Officer consider that the tender evaluation gives rise to extraordinary or potentially contentious issues, the Chief Executive Officer shall not exercise his delegated authority to determine the tender and shall instead arrange for the matter to be included in the agenda for the next available Water and Waste Standing Committee Meeting or Council Meeting,***
   d. ***The Chief Executive Officer shall report outcomes of his actions to the Water and Waste Standing Committee on a monthly basis.***
3. ***Delegates the authority to the Water and Waste Standing Committee to determine the successful tenderer for the listed works in the Strategic Procurement Plan valued up to $10m under delegation***

LGR88 – "Power to enter into a medium-sized contractual arrangement or large-sized contractual arrangement in accordance with a quote or tender consideration plan adopted by local government resolution" under Section 230(1) Local Government Regulation 2012 subject to the following conditions;

a. ***All tender evaluation reports be provided to all Councillors at the same time that the Water and Waste Standing Committee is considering the report,***
b. ***Should any Councillor (free of any conflict of interest or material personal interest) notify the Chief Executive Officer that the matter should be escalated for Council consideration, the Water and Waste Standing Committee shall not exercise its delegated authority to determine the tender and shall instead request the Chief Executive Officer to arrange for the matter to be included in the agenda for the next available Council Meeting,***
c. ***Should the Water and Waste Standing Committee resolve that the tender evaluation gives rise to extraordinary or potentially contentious issues, the Water and Waste Standing Committee shall not exercise its delegated authority to determine the tender and shall instead request the Chief Executive Officer to arrange for the matter to be included in the agenda for the next available Council Meeting.***

4. ***Delegates the authority to the Chief Executive Officer to negotiate, execute and vary contracts determined under delegation by the Chief Executive Officer or the Water and Waste Standing Committee.***

BACKGROUND

On Wednesday 30 June 2021, Isaac Regional Council endorsed the Budget for the 2021-22 Financial Year which includes Capital works to be delivered by the Water and Waste Directorate.

The included Strategic Procurement Plan provides detail as to the procurement strategies intended to be utilised across the directorate to ensure that the works committed under the endorsed budget are completed within the allowable time.

Further to outlining the expected procurement activities to be undertaken under the plan, Section 104(3) (c.) of the *Local Government Act 2009* defines a sound contracting principle as *the development of competitive local business and industry.* Accordingly, when determining how capital projects are delivered consideration of strategies which allow for packages to be delivered by local contractors. The Procurement Plan will identify this opportunity per project.

The strategies outlined within the program are intended to provide a framework in which the projects may be delivered in accordance with the approved scope and budget. Under this Framework, delegation is sought for the Chief Executive Officer to enter into medium-sized contractual arrangement or large-sized contractual arrangement. Should there be consequential changes as a result of extraordinary circumstances or for projects with a value of greater than $200,000 that result in an amended procurement strategy for a project, these shall be reported through to Council. While the routine activities shall be included as part of the Water and Waste Information Bulletin.

IMPLICATIONS

The principal benefit shall be realised in the reduction of procurement timeframes for the included works. This would relieve time pressures in the delivery of the 2021/22 Capital Budget. Procurement strategy for each project are listed within the attached report. However, the most significant risk is the non-completion of works within the allowable time. This plan aims to mitigate this risk.

To mitigate any risk associated with this delegation the following actions will be undertaken:

a. The principal risk associated with this delegation is that elected members may not be aware of the procurement activities undertaken. This may be mitigated through regular reporting through the standing committee as to the implementation of the plan. Further, if there is a recommendation that may have risk associated, the elected members shall be consulted with prior to the Chief Executive Officer entering into the contract.

b. The Chief Executive Officer shall not re-delegate anything with a procurement value.

c. Review and Audit of this delegation may be included as part of the Internal Audit Plan to ensure oversight.

Should there be amendments to projects as a result of the budget approval process, an updated version of the procurement plan shall be submitted to Council for further review/endorsement.

Councils procurement practises would currently be able to withstand investigation. This Procurement Plan aims to further support and demonstrate compliance with the *Local Government Act 2009* (the *Act*) and *Local Government Regulation 2012* (the *Regulation*).

Monthly reporting through the Water and Waste Standing Committee shall provide regular updates as to the implementation of the plan. If there are concerns regarding the delivery, the elected members may wish to revoke the delegation.

CONSULTATION

Manager Operations and Maintenance Water and Wastewater

Manager Contracts and Procurement

Director Water and Waste

BASIS FOR RECOMMENDATION

Council Officers have identified the optimum procurement methodology for each of the included projects to achieve an optimal value for money outcome while complying with Isaac Regional Councils Procurement policies and procedures.

ACTION ACCOUNTABILITY

Manager Planning and Projects within the Water and Waste Directorate is to ensure timeframes are adhered to and satisfactory tender selection and process carried out. All tender recommendation reports to be provided to Manager Contracts and Procurement for review prior to submission to Chief Executive Officer for execution.

KEY MESSAGES

The Water and Waste Procurement plan provides the framework for delivering the capital program in financial year 2021-22.

Report prepared by:	Report authorised by:
LINDA ROBERTS **Manager Planning and Projects**	GARY MURPHY **Director Water and Waste**
Date: 25 June 2021	Date: 30 June 2021

ATTACHMENTS

- CONFIDENTIAL Attachment 1 – Water and Waste Strategic Procurement Plan

REFERENCE DOCUMENT

Nil

PAGES 54 TO 61 HAVE INTENTIONALLY BEEN REMOVED DUE TO CONFIDENTIAL REASONS

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MEETING DETAILS	**Water and Waste Standing Committee** Wednesday 14 July 2021
AUTHOR	Neville Bell
AUTHOR POSITION	Assets and Compliance Officer

5.4 INTEGRATED WATER CYCLE MANAGEMENT STRATEGY PROGRESS AND INTEGRATED QUANTITY AND QUALITY MODEL FINDINGS AND RECOMMENDATIONS FOR MORANBAH

EXECUTIVE SUMMARY

The purpose of this report is to advise Council of the findings and recommendations from the Integrated Quantity Quality Model (IQQM) completed for the Grosvenor Creek at Moranbah and provide an update of the Integrated Water Cycle Management Strategy (IWCMS) endorsed by Council resolution 6190 on the 23 July 2019. This report is also to provide Council with data that supports the recommendation that no further action be taken for the Integrated Quantity Quality Model.

OFFICER'S RECOMMENDATION

That the Committee recommends to Council to:

1. ***Note the Integrated Quantity and Quality Model report and its findings for Moranbah.***
2. ***Note the status of actions of the Integrated Water Cycled Management Strategy for Moranbah.***
3. ***Resolve to take no further action on progressing an Integrated Quantity Quality Model for Moranbah.***

BACKGROUND

The raw water costs to supply the Moranbah Community was the driver behind the Integrated Quantity Quality Model (IQQM) to establish if it is possible to harvest water from the closest water source to the Moranbah township which is Grosvenor Creek. At Councils ordinary meeting 29 May 2019 endorsement was made as per resolution 6062 to provide a model of how water harvesting, from Grosvenor Creek, will affect downstream users and identify potential environmental impacts downstream.

A consultancy was engaged to provide the IQQM report, on the efficacy of surface water as a potential augmentation of the existing Moranbah municipal water supply. The IQQM is a model that the Water and Waste Directorate must undertake to gain approval by the Department of Regional Development, Manufacturing and Water (RDMW) for stormwater water harvesting out of Grosvenor Creek and other sources in Moranbah.

The major components of the water harvesting areas assessed are storm water from hard surface areas, Grosvenor Creek and natural springs around the Moranbah township.

The IQQM has been completed and is able to be sent for assessment by RDMW to approve or decline stormwater harvesting of Grosvenor Creek by Isaac Regional Council (IRC) if progression is desired.

Unfortunately based on the information supplied to date the harvesting of water from Grosvenor Creek does not appear to be a viable alternate to existing external supplies.

The IQQM is included in the issues, opportunities and actions that have been identified in the Integrated Water Cycle Management Strategy (IWCMS) that was developed to encompass the strategic planning for the efficient use of available water resources over the whole water cycle, including water supply, recycled water and stormwater which includes surface waters.

The actions arising from the adopted IWCMS are further explored below in order to update Council on progress and confirm actions that will be pursued. The expenditure on these projects includes $48,185.50 for the IWCMS and $15,704.40 for the IQQM.

IQQM Outcomes

A consultancy was engaged to assess the environmental impacts and stormwater harvesting yields that are possible from the Grosvenor Creek by carrying out the IQQM. The assessment included:

- Initial update of the Fitzroy IQQM (as supplied by the Queensland Department of Environment and Science) to include representation of Grosvenor Creek and the proposed water harvesting offtake location.
- Completion of four (4) modelling scenarios to assess the impact of the proposed surface water harvesting.
- Potential impacts were assessed against the following:
    a) Relevant Environmental Flow Objectives (EFOs) as stated in the Water Plan (Fitzroy Basin) 2011 (the Fitzroy Water Plan)
    b) Relevant Water Allocation Security Objectives (WASOs) as stated in the Fitzroy Water Plan
    c) Any relevant water harvesting entitlements as contained in the IQQM

The assessment **did not** include the following:

- Consideration, assessment or design of any hydraulic infrastructure that may be required to harvest water from Grosvenor Creek. Budget estimates have not yet been obtained as this will require a further assessment and recommendation of proposed extraction and designs.
- Consideration, assessment or design of any on/offline water storage infrastructure that may be required in order to facilitate surface water harvesting from Grosvenor Creek. Estimates have not yet been obtained nor a final solution for water extraction and design.
- Consideration of the actual municipal water demand for Moranbah. It should be noted that the current raw water supply system is adequate and that to reduce costs of raw water the IQQM was initiated. Raw water cost reductions are in progress through review and negotiation with water suppliers and this will continue.

The IQQM assessment therefore assessed the unconstrained potential harvestable water volume in the absence of any consideration of environmental/pass flows, extraction, storage, evaporation losses in storage or demand constraints. It is almost certain that the RDMW will impose pass flows for riparian purposes and this will again restrict water take volumes and timeframes.

The IQQM model was run over a simulation period of 1/1/1900 to 31/12/2007 as per the Fitzroy Water Plan and within the consultants IQQM assessment the merit of water harvesting at the proposed offtake had the following conclusions that were noted:

- *Due to the small number and duration of flow events (i.e. when flow is present), water harvesting would potentially require a large pumping flowrate in order to extract enough volumes of water during a flow event to achieve a desired yearly water harvesting volume.*
- *Extraction of water in some years may not be possible due to lack of availability of harvestable flow.*
- *This assessment has not determined what, if any pass flow (minimum flow in Grosvenor Creek before extraction pumping could occur) will be required, though the medium flow threshold (10th percentile daily flow exceedance) as defined in the Water Plan (Fitzroy Basin) 2011 is applied as an example pass flow. If applicable, the inclusion of a pass flow threshold will result in an additional limitation on the availability of water for possible extraction.*

The pass flow would not be known until the IQQM is lodged with the RDMW for a decision to be made on the acceptable pass flow volumes required for Grosvenor Creek to maintain riparian systems.

Based on the work completed to date and the known constraints, there does not appear to any value in further pursuing extraction from the Grosvenor Creek based on the IQQM outcomes.

Below is a table of further works and some estimated costings, should the option to proceed with the stormwater harvesting at Grosvenor Creek be undertaken:

FURTHER ACTION	SCOPE	ESTIMATED COST
Lodging of IQQM	Mediation with RDMW	**$4000**
Licence Application	Apply for take of water from Grosvenor creek which will likely include engagement of consultancy to convey the likely take of water required, environmental impacts and the volumes allowed. ***Note this only occurs if approvals are given.***	**$40,000**
New Infrastructure (including upgrades)	Full business case as to infrastructure suitability and possible upgrades required to meet licence requirements and must be completed by qualified professionals. This would include: • Pump station design and costs • Dam capacity investigation of the 400ML dam – purchase of more land may also be required • Level controls (SCADA) • Water delivery mains • Water analysis to determine treatability • Hydraulic analysis • Electrical requirements including connection to mains supply • Operation of system while not in use (it may be two years before flows are adequate for harvesting)	**$180,000**

PAG	Capital works program for outcomes of the infrastructure upgrades. This cost estimate is for report purposes only and may be greater or less than the estimated costs.	**$2,000,000**
Ongoing maintenance	Maintaining the pump station which will most likely operate during high wet weather events and ensuring it is operational for these events.	**$50,000 /annum**

IWCMS Actions

A review of the actions of the adopted IWCMS has also been undertaken.

See below Table 15 from the IWCMS for Moranbah with the listed actions and extra column of status included for understanding of the progression of the recommended actions. (Note all High High Priorities have been initiated).

TABLE 15: ISSUES AND OPPORTUNITIES FOR INVESTIGATION AND ACTIONS FOR RESOLUTION ISSUE / OPPORTUNITY		ACTIONS TO RESOLVE THE ISSUE	PRIORITY	STATUS
General				
G1	Data gaps as listed in Appendix C	Address data gaps to enable completion of the IWCM for Moranbah.	High	On Hold at present. CONTINUE
Water Supply				
W1	Raw Water reliability – Supply Security Water Supply from the Mining allocations is not mandated by government to be the highest supply priority, thus there is a critical risk of Mining allocations being provided for first. Dams may not have enough water or infrastructure may not have enough capacity to meet competing demands – some townships in Qld have not received supply for weeks.	• Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses. • Establish “water order” schedule so water supply delivery is planned, and 400 ML Res 3 provides some backup for short term short fall. • Proactively engage RDMW and other key State Government departments to establish guaranteed raw water supply governance rules for the township as the highest priority.	High-High	PSA for supply to Moranbah has increased awareness of resource sector of opportunity to for IRC to purchase excess water. AAMC (Anglo) Agreement for 180ML nearing completion. Pembroke supply triggers confirmed and final Agreement in draft. Short term supply water able to be purchased from Sunwater as required. CONTINUE

W2	Raw Water reliability – Quality and Quantity Quality issues with source waters and Raw Water network operations has identified a vulnerability to supply quality failures.	• Investigate alternate raw water sources, including stormwater harvesting. • Negotiate control of receiving waters, so that poor water can be bypassed to BMA or halted, and received waters isolated and managed between the three raw water reservoirs. • Conduct detailed study of raw water quality data and WTP performance to identify WTP improvements and raw water management improvements needed to provide reliable WTP performance. • Develop a risk management plan for the WTP and adequate upstream monitoring to inform treatment process operations to manage changes in quality.	High-High	Completed - Installation of the raw water pipeline to directly feed the 400ML dam to allow aeration and blending of the water to improve raw water quality for treatment. LOWER PRIORITY
W3	Raw Water Supply Risk – BMA supply affordability, Risk of BMA supply reliance becoming unaffordable for local residents.	• Investigate alternate supply opportunities. • Implement Demand Management Plan, (including high user demand management) • Complete leakage management investigation (confirmation of network losses – using MiWater data, H/L reservoir flows and levels, and WTP outlet flows) and identify mitigation works. Incorporate into Leakage Management Plan.	High	In Progress – System Leakage Management and Demand Management Plans developed and in place. Flow meters have been installed for monitoring of the Distribution Reservoirs in MBH. CONTINUE – HIGH PRIORITY

		• Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses.		
W4	Potable Water Demand reduction from 496L/p/d to 230-300L/p/d (nominal) Reduction in demand increases system capacity and some supply security, deferring system augmentations. (note demand reduction from 800L/EP/d in 2012)17.	• Refer IRC Demand Management Plan for continued actions. • Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses.	Med	To be progressed. Council has expressed desire for "green" towns and need to balance this against supply issues CONTINUE – MEDIUM PRIORITY
W5	Potable water supplementation for non-potable use. *As above*	Investigate alternate water sources for residential and major use customers and per the IRC Demand Management Plan. This may include rainwater tanks, or class A third pipe network to residential properties. This supports W1, W2, W3 and W5.	Med	No action to date. LOW PRIORITY
W6	Water Network optimisation.	Revisit network layout and operation philosophy, and identify optimisations which consider asset life expectancy, LOS, energy use and operational cost, future growth (W5) and demand offsets (W3, W2, R4).	Med	No action to date LOW PRIORITY
W7	Future Growth – Inclusive of dramatic population influx from mine operation increase.	• Identify capacity issues in the existing township network and treatment plants for water, (plus wastewater and drainage). This includes confirming EP inclusive of non-residential demands, network augmentations for pressure and fire flows, high level reservoir redundancy via bypass pumping, and review of storage capacity and WTP process component constraints.	Med (this will be high where significant mining population influx is confirmed)	To be reviewed as some actions supported and others not. REVIEW FURTHER

		• Negotiate contributions for capacity upgrades in existing network and treatment plant infrastructure. • Consider negotiations for raw water supply, with support from DNMRE and State Government to guarantee raw water to the township as the highest priority. • Consider water sensitive design in new development areas to enhance water storage in soils and reduce potable water demand for private and council irrigation.		
Sewerage				
S1	Network asset condition - failures increasing due to end of life, high corrosion and H2S attack on susceptible materials (including maintenance holes).	• Investigate the condition of the network via CCTV condition assessment and other inspections if needed. • Develop a prioritised capital works program targeting high risk and synergistic projects. This relates to network optimisation study (S2) and capacity planning (S3, S4).	High	Not an activity of W&W. Stormwater harvesting requires further analysis of viability and is not a high priority. LOW PRIORITY
S2	Network optimisation – capacity risks and asset renewals provide an opportunity to rethink the operation of Moranbah network. Scheduled CCTV inspections will highlight H2S attack and main replacements.	Review of existing system, including pump operations and connection to the gravity system or other pump stations, review of energy use in potential configurations and operation scenarios. This relates to network asset condition (S1).	Med	To be progressed as not seen as high priority. CONTINUE
S3	Treatment Optimisation – capacity risks may require the review of the existing treatment process to extend capacity.	Review by specialist for maximising the capacity of the existing treatment trains and potentially inclusive of sludge treatment. This is to minimise odour issues and extend the current treatment capacity. This may include pilot trial of	Med	To be progressed as not seen as high priority CONTINUE

		varying treatment configurations/settings.		
S4	Future Growth – Inclusive of dramatic population influx from mine operation increase.	Develop reliable sewer network, pump station and pressure mains model to accurately determine the impact of flows from additional 8000 population and identify the system components that must be upgraded before this increase occurs. Refer W1 This should be considered in relation to S1 and S2.	Med (this will be high where significant mining population influx is confirmed)	Addressed in the Moranbah Sewer Strategy in 2021-22. MED PRIORITY
Recycled Water				
R1	Quality of effluent water leaving WWTP effluent storage ponds, impacts on polishing plant performance.	• Investigate the risk of known poor water quality and its variations on the performance of the polishing plant to meet Class A standards consistently. • Investigate process mitigation measures. Consider the opportunity and benefit of mitigating pond related contamination by installing a small treated effluent tank to directly feed the polishing plant in this investigation.	Med	To be considered further as polishing plants are coping however there are some compliance risks. Will be partially progressed with the Moranbah Sewerage Strategy in 2021-22. MED PRIORITY
R2	Greater supply of recycled water than demand, and seasonal demands Of concern is the treated effluent storage capacity, and Plant 3 treatment capacity which is exceeded upon connection of 8000EP or by 2027 for BAU. In addition, the 8000EP increase recycled water supply by over 40%, requiring significant additional recycled water users, or other effluent disposal options.	• Obtain approvals for additional irrigation areas, investigate future irrigation areas including irrigated agriculture opportunities. • Identify any consistent (non-seasonal) supply opportunities, or private onsite storage opportunities. • Develop greater structure around recycled water governance, to encourage onsite storages so as to offset any future storage requirements (especially	Med	To be considered and progressed as a strategic approach is required. MED PRIORITY

		considering potential significant growth.		
R3	Lack of post treatment storage, with only private storage at golf course.	Investigate other options for supply quality reliability Storage of (some) Class A irrigation water is at the golf course, which compromises water quality and supply for other customers taking from this storage dam. There is no other storage of treated irrigation water at the WWTP, which limits supply security.	Low	To be considered and progressed if required. To be included as part of Recycled Water Optimisation Strategy (not funded in 2022'). MED PRIORITY
R4	Class A water use as 3rd pipe scheme in proposed mine camp and new development areas This will reduce demands on the Drinking Water supply.	Investigate the requirements to mandate third pipe network into new development, and any additional requirements for Class A distribution scheme.	Med	To be considered and progressed if required. To be included as part of Recycled Water Optimisation Strategy (not funded in 2022'). The Moranbah pressure analysis will inform as will the Moranbah Irrigation Management Plan. MED PRIORITY
Stormwater and Drainage				
D1	Surface water harvesting opportunity – Grosvenor Creek: Water extraction from Grosvenor Creek during high flows typically occurring during normal to wet 'wet seasons' (above minimum extraction flowrate threshold – to be determined).	• Complete feasibility study on the stormwater harvesting opportunity at Grosvenor Creek. • Investigate infrastructure capacities and requirements for diversion and transfer to storage, water quality impacts on the WTP. • Determine harvesting yield - timing, availability and reliability, investigate extraction and infrastructure impacts on waterways, and on other uses.	High	IQQM has been completed. Not recommended to progress. NO FURTHER ACTION

		• Consider risks associated with any upstream discharge by mines/ industry. Consideration of Water Quality and thus treatment process impacts to be explored. • Complete IQQM for submission to Department of Resources extraction approvals.		
D2	Stormwater harvesting opportunity – proposed road elevation and retarding basin.	Complete feasibility study to concept design with appropriate hold points in conjunction with the drainage department at IRC. Study to include harvesting yield potential, water quality risks, WTP performance impacts and ROI for original project augmentations.	Med	Land tenure issues and viability in question. No further action proposed. NO FURTHER ACTION
D3	'Natural springs' and associated disused standpipes. These natural water sources may provide.	Investigate the source cause, reliability and potential for harvesting of the multiple small 'springs' around town, including the BMX area, the large sports fields and the higher flow spring near Apex park.	Med	Only the spring near the Grosvenor area is suitable. To be considered further and progressed if required. Not a high priority. LOW PRIORITY
D4	Drainage works at Forest Road for outfall diversion near STP.	Work with drainage department to ensure deviation project does not result in flows being diverted onto the WWTP site. Flows may able to be diverted to the south side of the effluent treatment ponds or a separate new stormwater pond adjacent to the WWTP.	Med	COMPLETED
D5	Future Growth – Inclusive of dramatic population influx from mine operation increase.	• Identify capacity issues in the existing township network for drainage. • Negotiate contributions for capacity upgrades in existing network infrastructure.	Low	Not required at this stage. LOW PRIORITY

		• Consider implementing water sensitive design to enhance water storage in soils and reduce impermeable surfaces so as to reduce peak flood impacts. This will become important in the proposed mine camp development area. • Investigate impacts on surface flows and flooding, especially along Grosvenor River.		
D6	Environmental Flow contributions from WWTP Class B/C storage ponds to assist the natural.	Investigate the possibility of contribution to environmental flows using excess Class B/C water (treated effluent). This may be an option – however must be considered carefully with relation to the higher priority stormwater harvesting from Grosvenor River to the Raw Water storage reservoir.	Low	Not required. NO FURTHER ACTION
D7	Stormwater Harvesting to treated effluent ponds, to offset Grosvenor River peak flows and provide some flood mitigation.	• Investigate whether the available capacity in the treated effluent pond can be used to collect local stormwater, to offset Grosvenor River peak flows. The available capacity will be both real and licence condition related. • To create extra capacity, investigate the potential to discharge effluent waters from the storage reservoirs to Grosvenor Creek, particularly before significant wet weather events, or anticipated wet weather events. This may be an option – however must be considered carefully with	Low	Not required at this stage. NO FURTHER ACTION

		relation to the higher priority stormwater harvesting from Grosvenor River to the raw water storage reservoir.		

It is recommended by Water and Waste that a focus on recommendation W1 and W3 from Table 15 above from the IWCMS be the immediate focus to address water security and the unaccounted water in Moranbah. Leak detection and demand management is critical to this process.

IMPLICATIONS

There is no cost with the option to cease further action with IQQM for stormwater harvesting at Grosvenor Creek in Moranbah. However, should the option to continue with stormwater harvesting from Grosvenor Creek be requested, it is estimated a cost of $44,000 would be required to complete lodgement with the RDMW and licence application should water take be approved by RDMW. The IWCMS actions are at present being considered in house if appropriate for further progression, with requests for funding being supplied in future reports or in Project Gateway Accountability (PAG).

CONSULTATION

Water and Waste Director

Manager Planning and Projects

BASIS FOR RECOMMENDATION

The analysis does not support IQQM progression for the stormwater harvesting of Grosvenor Creek. The Moranbah IWCMS actions include proactively engaging with RMDW and other key State Government departments to establish guaranteed raw water supply governance rules for the township as the highest priority. Leak management is also a high priority to address the unaccounted-for water in Moranbah.

ACTION ACCOUNTABILITY

Water and Waste Managers for each action remaining from the IWCMS.

KEY MESSAGES

Council must always look to improve water supplies and reduce costs to customers and meet population needs. Managing a scarce resource and ensuring security of supply is paramount.

Report prepared by:	**Report authorised by:**
NEVILLE BELL **Assets and Compliance Officer**	GARY MURPHY **Director Water and Waste**
Date: 15 June 2021	Date: 30 June 2021

ATTACHMENTS

- Attachment 1 – Jacobs – Isaac Regional Council Integrated Water Catchment Management Strategy – Surface Water Harvesting Assessment – 14 February 2020

- Attachment 2 – Jacobs – Moranbah Integrated Water Cycle Management Strategy – 25 June 2019

REFERENCE DOCUMENT

- Water Plan (Fitzroy basin) 2011

Isaac Regional Council Integrated Water Catchment Management Strategy

Surface Water Harvesting Assessment

3 | B

14 February 2020

IRC

IH168600

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A	13/02/2020	Jacobs Review	TW	SW	SW	
A	14/02/2020	Final Draft for PM Approval	TW	SW	SW	LH
B	14/02/2020	Client Issue	TW	SW	SW	LH

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments
B	LH	14/02/2020	Neville Bell	Issued for Review

Isaac Regional Council Integrated Water Catchment Management Strategy

Project No:	IH168600
Document Title:	Surface Water Harvesting Assessment
Document No.:	3
Revision:	B
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Project Manager:	Leon Hellberg
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Jacobs Australia Pty Limited

32 Cordelia Street
PO Box 3848
South Brisbane QLD 4101 Australia
T +61 7 3026 7100
F +61 7 3026 7300
www.jacobs.com

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Executive Summary

Isaac Regional Council (IRC) wish to assess the efficacy of surface water harvesting from Grosvenor Creek as a potential augmentation of the existing Moranbah municipal water supply. Jacobs was contracted to assess the potential harvestable volume that could be reasonably extracted from Grosvenor Creek. This work has been conducted in two phases as follows:

- Phase 1 – characterisation of the existing streamflow regime and potential water availability at the proposed offtake (Appendix A); and
- Phase 2 (this report) – IQQM (Integrated Quantity and Quality Model) assessment of the proposed offtake to support IRC's application for a water licence.

The scope of this assessment comprised:

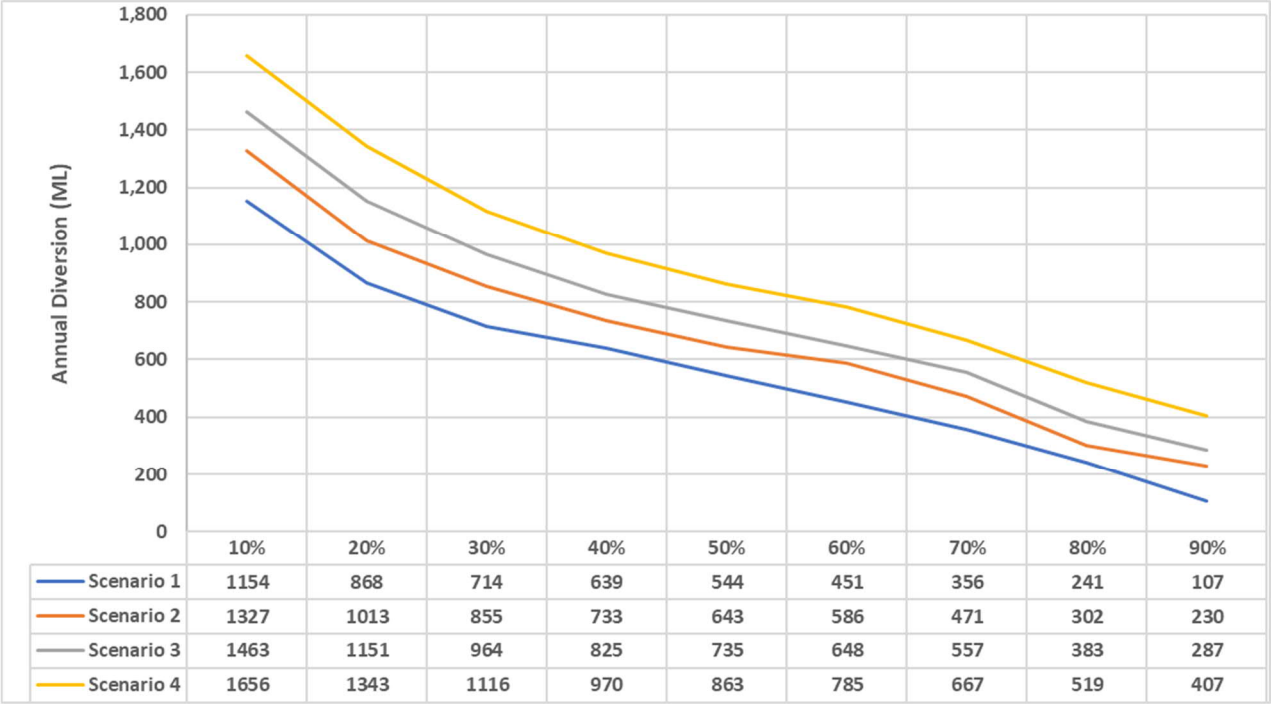
- Initial update of the Fitzroy IQQM (as supplied by the Qld Department of Environment and Science) to include representation of Grosvenor Creek and the proposed water harvesting offtake location;
- Completion of 4 modelling scenarios to assess the impact of the proposed surface water harvesting.
- Potential impacts were assessed against the following:
  - Relevant Environmental Flow Objectives (EFOs) as stated in the Water Plan (Fitzroy Basin) 2011 (the Fitzroy WP);
  - Relevant Water Allocation Security Objectives (WASOs) as stated in the Fitzroy WP; and
  - Any relevant water harvesting entitlements as contained in the IQQM.

The results of the assessment indicated that:

- A mean annual diversion (MAD_ of 984 ML could be achieved with a 300 L/s pump capacity and no passflow (Table 1.1);
- Two EFOs objectives (total number of flow days in the May to August and September to December flow seasons) were not met by any scenario assessed. However these objectives were not met under the existing condition (base case) either;
- All other EFOs were met by all scenarios assessed;
- The maximum reduction in mean annual diversion for relevant downstream model user nodes was less than 4%; and
- While Scenario 4 results in a MAD of 984 ML, the likelihood that this would be met or exceeded is only approximately 30% (Figure 1.1).

Table 1.1: Mean Annual Diversion Results

Scenario	Passflow (ML/d)	Pump Capacity (ML/d)	Mean Annual Diversion (ML)
Base Case (existing condition)	N/A	N/A	N/A
1	12	300	620
2	6	300	747
3	3	300	839
4	0	300	984



	10%	20%	30%	40%	50%	60%	70%	80%	90%
Scenario 1	1154	868	714	639	544	451	356	241	107
Scenario 2	1327	1013	855	733	643	586	471	302	230
Scenario 3	1463	1151	964	825	735	648	557	383	287
Scenario 4	1656	1343	1116	970	863	785	667	519	407

Figure 1.1: Annual Diversion Probability for Proposed Moranbah Water Harvesting Offtake

This assessment has not included the following:

- Consideration, assessment or design of any hydraulic infrastructure that may be required to harvest water from Grosvenor Creek;
- Consideration, assessment or design of any on- or offline water storage infrastructure that may be required in order to facilitate surface water harvesting from Grosvenor Creek; or
- Consideration of the actual municipal water demand for Moranbah;

This assessment therefore assessed the unconstrained potential harvestable water volume in the absence of any consideration of extraction, storage or demand constraints.

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to complete an IQQM (Integrated Quantity and Quality Model) assessment with the scope of services set out in the contract between Jacobs and Isaac Regional Council (IRC).

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by IRC, the Queensland Department of Environment and Science (DES) and others. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs has predominately derived the information presented in this report from the IQQM model and post-processing utilities provided by DES at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of Isaac Regional Council and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and Isaac Regional Council. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

1. Introduction

1.1 Background

Isaac Regional Council (IRC) wish to assess the efficacy of surface water harvesting from Grosvenor Creek as a potential augmentation of the existing Moranbah municipal water supply. Jacobs was contracted to assess the potential harvestable volume that could be reasonably extracted from Grosvenor Creek. This work has been conducted in two phases as follows:

- Phase 1 – characterisation of the existing streamflow regime and potential water availability at the proposed offtake (Appendix A); and
- Phase 2 (this report) – IQQM (Integrated Quantity and Quality Model) assessment of the proposed offtake to support IRCs application for a water licence.

1.2 Scope

The scope of this IQQM assessment is as follows:

- Initial update of the Fitzroy IQQM (as supplied by the Qld Department of Environment and Science) to include representation of Grosvenor Creek and the proposed water harvesting offtake;
- Complete a number of modelling scenarios to assess the impact of the proposed surface water harvesting. Potential impacts were assessed against the following:
  - Relevant Environmental Flow Objectives (EFOs) as stated in the Water Plan (Fitzroy basin) 2011 (the Fitzroy WP);
  - Relevant Water Allocation Security Objectives (WASOs) as stated in the Fitzroy WP; and
  - Any relevant water harvesting allocations as contained in the IQQM.

1.3 Limitations and Assumptions

This assessment does not include the following:

- Consideration, assessment or design of any hydraulic infrastructure that may be required to harvest water from Grosvenor Creek;
- Consideration, assessment or design of any on- or offline water storage infrastructure that may be required in order to facilitate surface water harvesting from Grosvenor Creek; or
- Consideration of the actual municipal water demand for Moranbah;

This assessment has consequently assessed the unconstrained potential harvestable water volume in the absence of any consideration of extraction, storage or demand constraints.

The supplied Fitzroy IQQM and post-processing utilities have been assumed to be correct and fit for purpose. No additional verification or validation of the supplied materials has been undertaken except to confirm the correctness of any changes made by Jacobs in the course of completing the assessment.

1.4 Water Plan (Fitzroy) 2011

Moranbah is located adjacent to Grosvenor Creek, a tributary of the Isaac River. The Isaac River is located within the Isaac Connors subcatchment area of the Water Plan (Fitzroy Basin) 2011 (the Fitzroy WP) area. The Fitzroy WP is subordinate legislation to the Water Act 2000 and provides the strategic framework for the allocation and sustainable management of water for the Fitzroy Basin. The plan establishes performance indicators for both water supply security and the environment.

There are currently no Water Allocation Security Objectives (WASOs) specified for the Isaac Connors subcatchment as there are no existing water supply schemes within the catchment.

Environmental Flow Objectives (EFOs) are detailed in Schedule 6 of the Fitzroy WP. EFOs for Node 9 (model node 401, GS130401A, Isaac River at Yatton), located on the Isaac River below its confluence with the Connors River are relevant for the assessment of proposed surface water harvesting at Moranbah on Grosvenor Creek. The EFOs related to Node 9 are summarised as follows.

Seasonal Baseflow Objectives

The percentage of the total number of days in a water flow season in the simulation period that the base flow (104 ML/d) for node 9 is equalled or exceeded is to be at least 0.9 times the percentage stated for the water flow season in Table 1.1 below.

Table 1.1: Season Baseflow Objectives for Node 9

Baseflow (ML/d)	Water Flow Season		
	January–April Water Flow Season	May–August Water Flow Season	September–December Water Flow Season
104	84%	49%	33%

Medium to High Flow Objectives

The mean and median annual flows for the simulation period, expressed as a percentage of the pre-development flow pattern is to be at least the percentage shown in Table 1.2. The Annual Proportional Flow Deviation (AFPD) is to be not more than the AFPD stated in Table 1.2 below.

Table 1.2: Medium to High Flow Objectives for Node 9 (Annual)

Mean Annual Flow	Median Annual Flow Ratio	Annual Proportion Flow Deviation
90%	80%	1.2

For the simulation period, the flow statistics in Table 1.3 below, expressed as a percentage of the pre-development flow pattern are to be at least the percentage stated in Table 1.3.

Table 1.3: Medium to High Flow Objectives for Node 9 (Flow Duration and Event Volume)

10% Daily Exceedance Duration Flow	4% Daily Exceedance Duration Flow	2-Year Daily Flow Volume	5-Year Daily Flow Volume	20-Year Daily Flow Volume
80%	82%	80%	94%	92%

First Post-Winter Flow Objectives

For the simulation period. the first-post winter flow performance indicators are to be at least the percentage shown in Table 1.4 below.

Table 1.4: Post Winter Flow Objectives for Node 9

Number Of First Post- Winter Flows	Number of Flows Within 5 Weeks of The Pre-Development	Number of Flows Within 2 Weeks of The Pre-Development	Flow Duration (2-Times Base Flow)	Flow Duration (5-Times Base Flow)
90%	80%	80%	80%	70%

2. Integrated Quantity and Quality Model (IQQM)

2.1 Supplied Model

The Fitzroy WP Integrated Quantity and Quality Model (IQQM, the Model) was obtained from the Queensland Department of Science (DES) in August 2019. The ROP (Resource Operation Plan) version of the model is the most up to date and contains the latest operating rules and latest ROP amendments. The model as provided included the following data and scenarios:

- Pre-development streamflow for each of the relevant Fitzroy WP EFOs nodes. This data represents flows within the system with no water infrastructure or extractions and is used to assess EFO compliance. This is henceforward referred to as pre-development flows.
- Existing scenario model incorporating all water resource development within the catchment at the time of model development and assuming full utilisation of any existing water allocations. This Base Case scenario was used as the basis for all modelled scenarios detailed.

All modelling has been completed in IQQM version 6.75.32 as supplied by DES:

- The Model has not been verified by Jacobs, is assumed to be correct and has been used as supplied by DES; and
- Minor modifications made to the Model for the purpose of completing the assessment have been checked under a 'zero extraction' case to confirm consistency with the Base Case model as supplied.

2.2 Model Setup

In order to complete the surface water harvesting assessment the supplied Model was modified as follows:

- Addition of a new tributary to represent Grosvenor Creek;
- Fixed demand with flow constraint node (type 3.1) added to represent the new offtake at Moranbah;
- Reduction in Isaac River inflows upstream of confluence with Grosvenor Creek to account for new tributary catchment.

Figure 2.1 shows the updated model configuration.

For the purpose of the assessment the following criteria were adopted:

- A 12-month water year beginning on 1st July each year as per the Fitzroy WP;
- A model simulation period of 1/1/1900 to 31/12/2007 as per the Fitzroy WP; and
- A model run duration of 1/1/1889 to 31/12/2007 to provide a period of model warm up and ensure that model results are not unduly influenced by model initial conditions and assumptions.
- All existing user nodes within the modified reach were assumed to be located on the Isaac River as per the supplied model. No verification of actual user locations was undertaken.

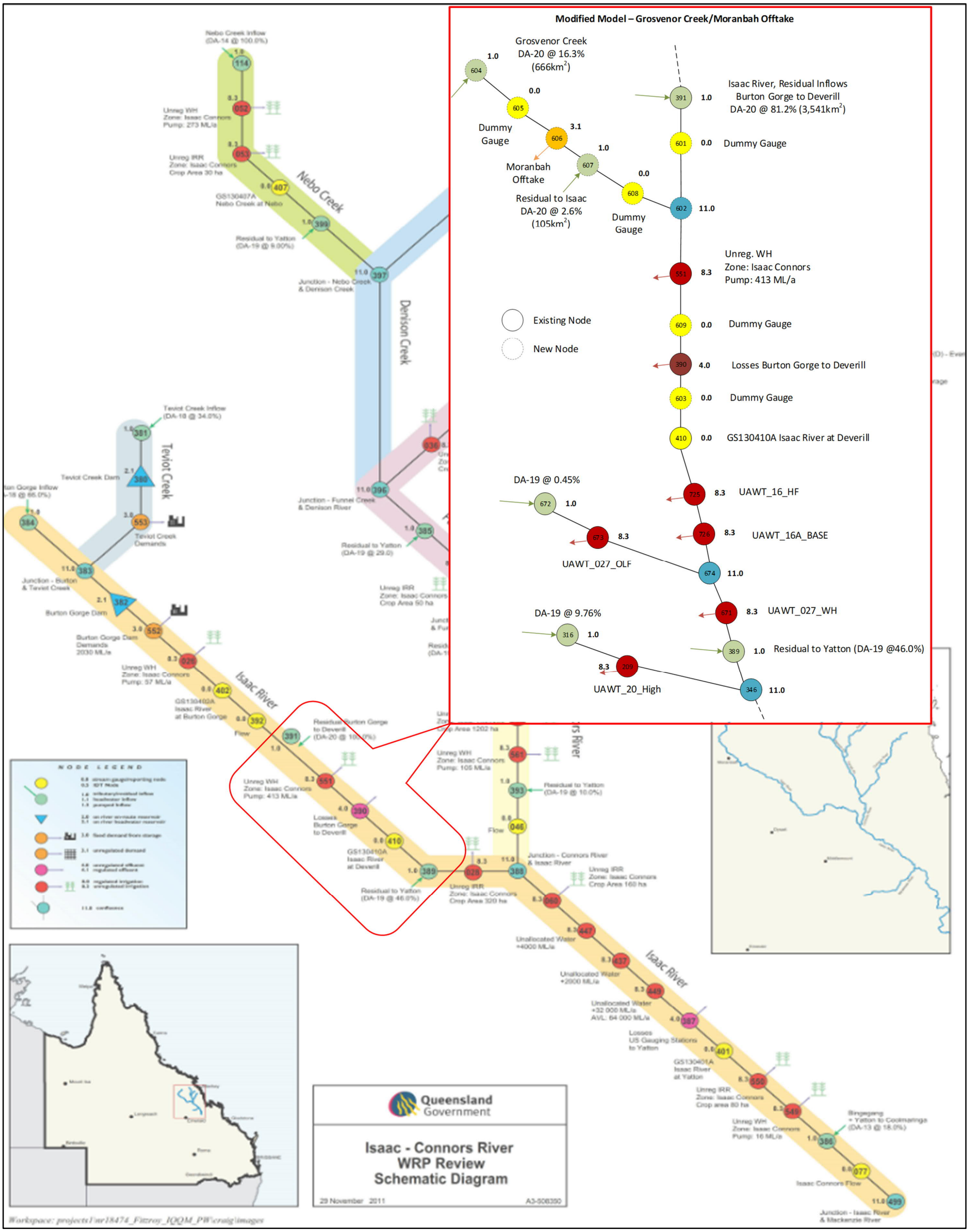


Figure 2.1: Model Configuration Showing Addition of Grosvenor Creek

2.3 Scenarios

A total of four scenarios were assessed as shown below in Table 2.1. Each scenario considered the same pump capacity of 300 L/s with the difference between scenarios being the passflow i.e. the daily streamflow that must be achieved before pumping can commence. Results for each scenario were assessed against the Fitzroy WP EFOs as described in Section 1.4. In addition, mean annual diversions (MAD) for the 6 closest user nodes downstream were also compared against the existing condition.

Table 2.1: Moranbah Offtake Scenarios Assessed

Scenario	Passflow (ML/d)	Pump Capacity (ML/d)
Base Case (existing condition)	N/A	N/A
1	12	300
2	6	300
3	3	300
4	0	300

3. Results

3.1 Seasonal Baseflow Objectives

Table 3.1 below shows the results of the seasonal baseflow assessment:

- For the January to April water flow season all scenarios were found to meet the objectives of the Fitzroy WP; and
- For both the May to August and September to December flow seasons neither the base case or the scenarios assessed met the Fitzroy WP objectives. However, the results show that the scenarios assessed had a negligible impact on the base case results.

Table 3.1: Results for Seasonal Baseflow Objectives

Scenario	Aspect	Baseflow (ML/d)	Water Flow Season		
			January–April Water Flow Season	May–August Water Flow Season	September–December Water Flow Season
N/A	Fitzroy Water Plan Objective[1] (Node 9)	104	84%	49%	33%
Pre-Dev	Pre-Development Flows	104	84.7%	49.5%	33.7%
Base Case	Result	104	80.4%	42.8%	27.9%
	Ratio to Fitzroy Water Plan Objective		0.96	0.87	0.85
1	Result	104	80.4%	42.8%	27.8%
	Ratio to Fitzroy Water Plan Objective		0.96	0.87	0.84
2	Result	104	80.4%	42.8%	27.8%
	Ratio to Fitzroy Water Plan Objective		0.96	0.87	0.84
3	Result	104	80.4%	42.8%	27.8%
	Ratio to Fitzroy Water Plan Objective		0.96	0.87	0.84
4	Result	104	80.4%	42.8%	27.8%
	Ratio to Fitzroy Water Plan Objective		0.96	0.87	0.84

Note: Green values indicate that the WP objective has been met, red indicate the objective was not met.

[1] The percentage of the total number of days in a water flow season in the simulation period that the base flow (104 ML/d) is equalled or exceeded is to be at least 0.9 times the percentage shown in row 1.

3.2 Medium to High Flow Objectives

Results for the assessment of the annual medium to high flow objectives are shown below in Table 3.2. All scenarios were found to meet the Fitzroy WP objectives.

Table 3.2: Results for Medium to High Flow (Annual) Objectives

Scenario	Aspect	Mean Annual Flow (ML)	Median Annual Flow Ratio	Annual Proportion Flow Deviation
N/A	Fitzroy Water Plan Objective[2] (Node 9)	90%	80%	1.2
Pre-Dev	Pre-Development Flows	2,273,624	100	0
Base Case	Result	2,196,638	93.1	0.61
	Ratio to Fitzroy Water Plan Objective	96.6%		
1	Result	2,196,192	93.1%	0.61
	Ratio to Pre-Development Flows	96.6%		
2	Result	2,196,142	93.1%	0.61
	Ratio to Pre-Development Flows	96.6%		
3	Result	2,196,106	93.1%	0.61
	Ratio to Pre-Development Flows	96.6%		
4	Result	2,196,056	93.1%	0.61
	Ratio to Pre-Development Flows	96.6%		

Note: Green values indicate that the WP objective has been met, red indicate the objective was not met.

Results for the assessment of flow duration and event volume for medium to high flow objectives are shown below in Table 3.3. All scenarios were found to meet the Fitzroy WP objectives.

[2] The mean and median annual flows for the simulation period, expressed as a percentage of the pre-development flow pattern is to be at least the percentage shown in row 1. The Annual Proportional Flow Deviation (AFPD) is to be not more than the AFPD shown in row 1.

Table 3.3: Results for Medium to High Flow Objectives (Flow Duration and Event Volume)

Scenario	Aspect	10% Daily Exceedance Duration Flow	4% Daily Exceedance Duration Flow	2-Year Daily Flow Volume	5-Year Daily Flow Volume	20-Year Daily Flow Volume
N/A	Fitzroy WP Objective[3] (Node 9)	80%	82%	80%	94%	92%
Pre-Dev	Pre-Development Flows	4,291	23,154	171,620	510,834	1,387,607
Base Case	Result	3,840	21,529	166,970	506,938	1,382,791
	Ratio to Fitzroy WP Objective	89.5%	93.0%	97.3%	99.2%	99.7%
1	Result	3,838	21,515	166,950	506,926	1,382,751
	Ratio to Fitzroy WP Objective	89.4%	92.9%	97.3%	99.2%	99.7%
2	Result	3,838	21,515	166,950	506,923	1,382,691
	Ratio to Fitzroy WP Objective	89.4%	92.9%	97.3%	99.2%	99.6%
3	Result	3,838	21,515	166,950	506,923	1,382,691
	Ratio to Fitzroy WP Objective	89.4%	92.9%	97.3%	99.2%	99.6%
4	Result	3,837	21,513	166,950	506,921	1,382,691
	Ratio to Fitzroy WP Objective	89.4%	92.9%	97.3%	99.2%	99.6%

Note: Green values indicate that the WP objective has been met, red indicate the objective was not met.

[3] For the simulation period, the flow statistics expressed as a percentage of the pre-development flow pattern are to be at least the percentage shown in row 1

3.3 Post Winter Flow Objectives

Results for the assessment of post winter flow objectives are shown below in Table 3.4. All scenarios were found to meet the Fitzroy WP objectives.

Table 3.4: Results for Post Winter Flow Objectives

Scenario	Aspect	Number of First Post-Winter Flows	Number of Flows Within 5 Weeks of Pre-Dev Flows	Number of Flows Within 2 Weeks of Pre-Dev Flows	Flow Duration (2-Times Base Flow)	Flow Duration (5-Times Base Flow)
N/A	Fitzroy Water Plan Objective[4] (Node 9)	90%	80%	80%	80%	70%
Base Case		99.1%	87.9%	91.5%	83.0%	96.3%
1		99.1%	91.5%	87.9%	83.0%	96.3%
2		99.1%	91.5%	87.9%	83.0%	96.3%
3		99.1%	91.5%	87.9%	83.0%	96.3%
4		99.1%	91.5%	87.9%	83.0%	96.3%

Note: Green values indicate that the WP objective has been met, red indicate the objective was not met.

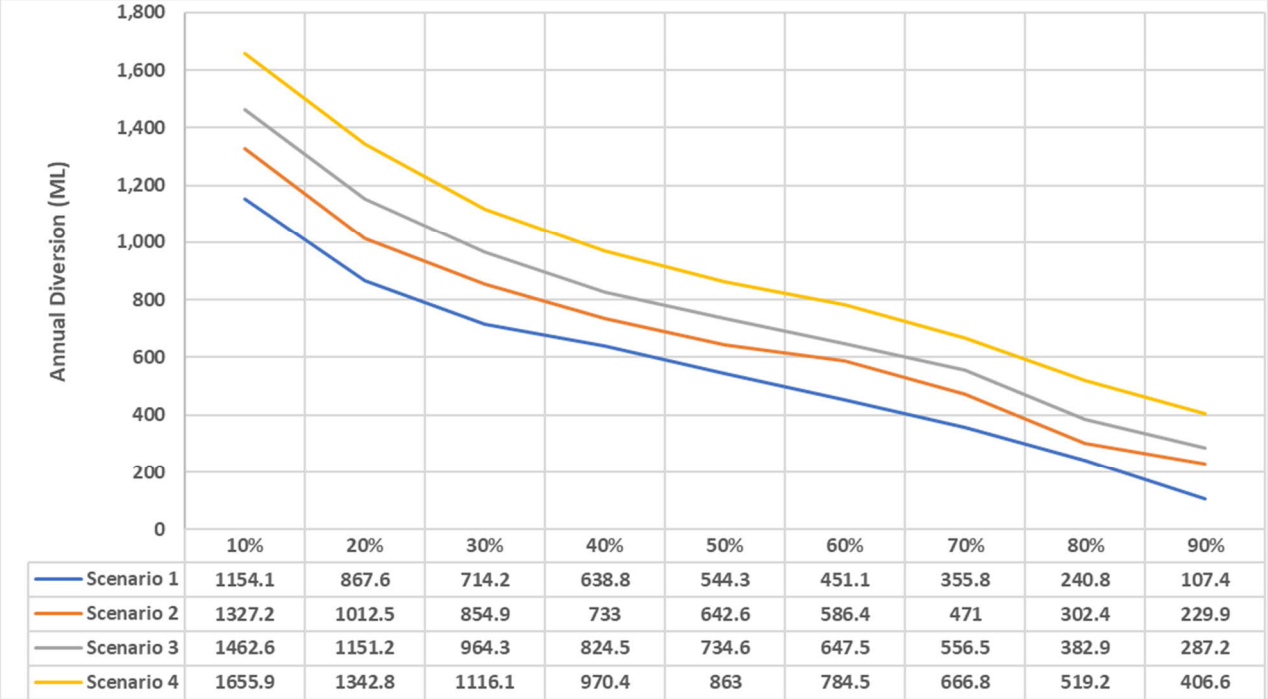
The 1.5 and 3.0m depth flows input to the assessment were derived from the rating curve for gauge 130401A (Isaac River at Yatton) which was obtained from the Queensland Water Monitoring Information Portal (https://water-monitoring.information.qld.gov.au/).

[4] For the simulation period, the flow statistics expressed as a percentage of the pre-development flow pattern are to be at least the percentage shown in row 1

3.4 Mean Annual Diversion

Figure 3.1 shows the annual diversion probability for the proposed Moranbah water harvesting offtake and Table 3.5 shows mean annual diversion (MAD) results for each scenario. From Table 3.5 it can be seen that MAD for Scenarios 1 to 4 ranges from 620 to 984 ML respectively. Figure 3.1 shows the probability that a given estimated volume could be harvested. For example, while Scenario 4 results in a MAD of 984 ML, the likelihood that this would be met or exceeded is only approximately 30%.

Table 3.5 indicates that for all the scenarios assessed, the maximum reduction in MAD for the user nodes assessed was less than 4%. It should be noted however that the closest water user node to the proposed offtake (node 551, WH Zone: ISAAC-CONNORS) comprises a number of individual water harvesters. No information was able to be obtained on the exact number and location of the individuals that comprise this group. Therefore, depending on the exact location of specific individual harvesters, the potential impact on MAD may be different to that shown in Table 3.5.



	10%	20%	30%	40%	50%	60%	70%	80%	90%
Scenario 1	1154.1	867.6	714.2	638.8	544.3	451.1	355.8	240.8	107.4
Scenario 2	1327.2	1012.5	854.9	733	642.6	586.4	471	302.4	229.9
Scenario 3	1462.6	1151.2	964.3	824.5	734.6	647.5	556.5	382.9	287.2
Scenario 4	1655.9	1342.8	1116.1	970.4	863	784.5	666.8	519.2	406.6

Figure 3.1: Annual Diversion Probability for Proposed Moranbah Water Harvesting Offtake

Table 3.5: Mean Annual Diversion Results

User Node	Name	Base Case	Scenario 1 (ML)	Change	Scenario 2 (ML)	Change	Scenario 3 (ML)	Change	Scenario 4 (ML)	Change
606	Moranbah Offtake	N/A	620.0		744.6		839.1		984.4	
551	WH Zone: ISAAC-CONNORS	7,527.4	7,428.0	-1.3%	7,368.9	-2.1%	7,322.1	-2.7%	7,247.6	-3.7%
725	UAWT_16_HF	53.3	53.0	-0.6%	52.9	-0.8%	52.9	-0.8%	52.9	-0.8%
726	UAWT_16A_BASE	5.9	5.8	-1.7%	5.8	-1.7%	5.8	-1.7%	5.7	-3.4%
671	UAWT_027_WH	512.7	510.4	-0.4%	510.3	-0.5%	510.2	-0.5%	510.1	-0.5%
28	UnregIRR Zone: ISAAC-CONNORS	1,015.4	1,013.8	-0.2%	1,013.4	-0.2%	1,013.1	-0.2%	1,012.4	-0.3%
60	UnregIRR Zone: ISAAC-CONNORS	711.9	711.9	0.0%	711.9	0.0%	711.9	0.0%	711.9	0.0%

Appendix A. Phase 1 Hydrological Assessment

JACOBS

Memorandum

Floor 11, 452 Flinders Street
Melbourne VIC 3000
PO Box 312, Flinders Lane
Melbourne VIC 8009 Australia
T +61 3 8668 3000
F +61 3 8668 3001
www.jacobs.com

Subject	**Grosvenor Creek - Hydrological Assessment**	**Project Name**	IRC Integrated Water Catchment Management Strategy
Attention	Neville Bell	**Project No.**	IH168600
From	Jo Szemis and Tim Wallis		
Date	11 September 2019		

1. Purpose

Jacobs has been engaged by Isaac Regional Council to undertake a hydrological assessment to support an application for a surface water harvesting licence from Grosvenor Creek. The assessment is being conducted in two phases:

1) Phase 1 - Characterise existing streamflow regime and potential water availability; and
2) Phase 2 – Update existing Fitzroy Basin IQQM (Integrated Quantity and Quality Model) to reflect potential surface water extraction from the proposed offtake and ensure relevant environmental flow objectives (EFOs) as outlined in the Water Plan (Fitzroy Basin) 2011 (Queensland Govt, 2011) are met.

The purpose of Phase 1 was to develop an understanding of streamflow at the proposed offtake and allow Isaac Regional Council (IRC) to assess the potential feasibility of surface water extraction from the proposed offtake. This has been undertaken by completing a hydrological spells analysis which will provide an indication of the likely probability, magnitude and duration of streamflow at the proposed offtake. Based on an assessment of Phase 1 findings, IRC will determine the utility of proceeding to Phase 2.

The results and summary presented in this technical memo therefore are those completed as part of Phase 1 only.

2. Summary of Results

Streamflow at the proposed offtake from Grosvenor Creek (refer attachment 1) is ephemeral, highly seasonal and episodic. Streamflow is typically confined to the wet season months of January through March. Streamflow is likely to recess relatively quickly and prolonged periods of baseflow are not expected. Cease to flow conditions are dominant with no flow present on approximately 79% of all days.

The estimated annual volume of streamflow is highly variable ranging from zero in some years (1968 and 1992) to a maximum of 242,090 ML (242 GL) in 1957. This variability is reflected in the mean and median annual flow of 23,735 and 9,166 ML/y respectively.

Results of the hydrologic spells analysis indicate that the number and duration of flow spells (a flow spell is a period of continuous flow in excess of a specific flow trigger or threshold) reduces relatively quickly as the threshold increases from cease to flow. For example, the median number of wet season (November to April) flow events reduces from 10 to 7 when the trigger threshold increases from 1 ML/d (assumed effective cease to flow) to 11.6 ML/d (the Water Plan (Fitzroy Basin) 2011 trigger for

medium flow). Similarly, the median duration of each flow event reduces from 5.3 to 4.0 days when the trigger threshold increases from 1.0 to 11.6 ML/d.

A simple estimate of the potential mean annual diversion (1 below) was completed using a range of pump capacities and three passflow thresholds from 1 ML/d (effectively no passflow threshold) to 12 ML/d (the 10th percentile daily flow). A passflow threshold is the minimum flowrate within the creek before water extraction can occur.

The results indicate that utilising a 250 L/s pump could allow a mean annual diversion of around 880 ML, assuming no passflow threshold. It should be noted, however, that the volumes presented in Figure 2.1 are averages, and for higher levels of reliability (e.g. achieved in 90% of all years for example) the volumes will be significantly smaller.

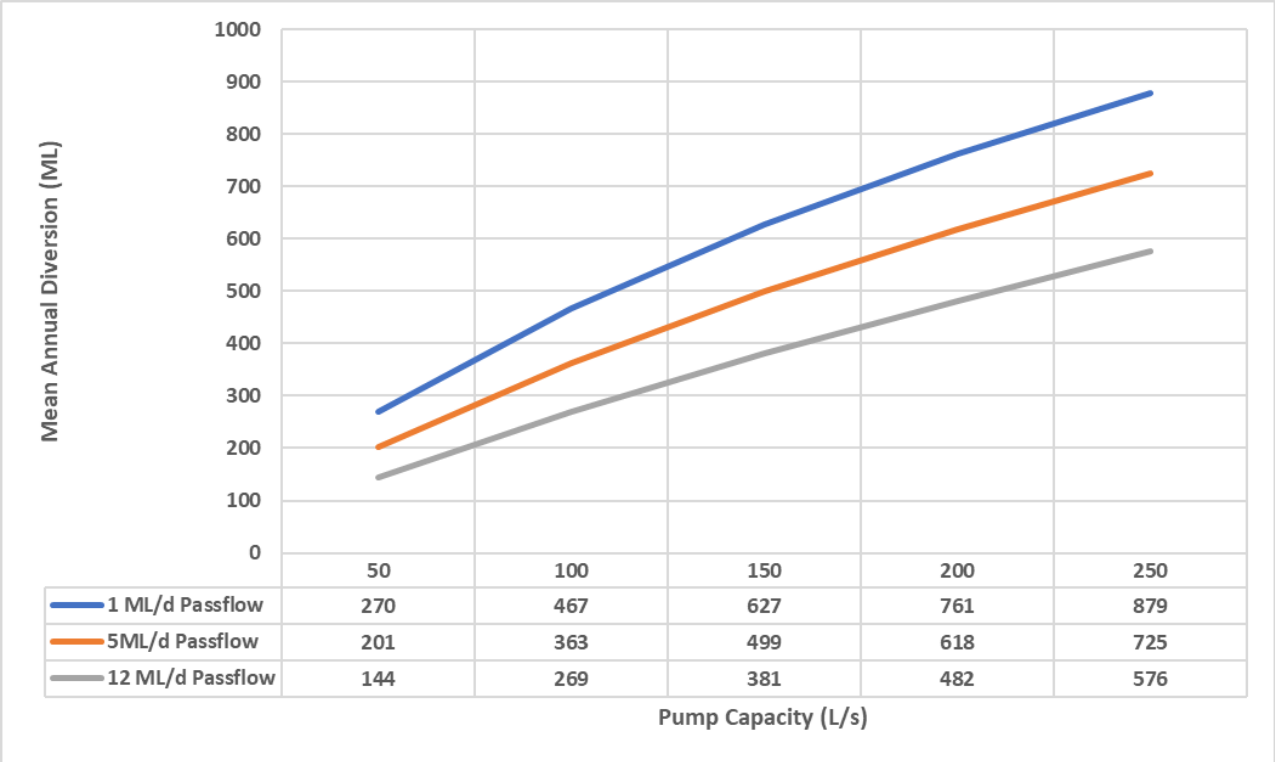


Figure 2.1: Potential Mean Annual Diversion

It is not within the scope of the current assessment to assess the merit of water harvesting at the proposed offtake however the following conclusions are noted:

- Due to the small number and duration of flow events (i.e. when flow is present), water harvesting would potentially require a large pumping flowrate in order to extract sufficient volumes of water during a flow event to achieve a desired yearly water harvesting volume;
- Extraction of water in some years may not be possible due to lack of availability of harvestable flow;
- This assessment has not determined what, if any passflow (minimum flow in Grosvenor Creek before extraction pumping could occur) will be required, though the medium flow threshold (10th percentile daily flow exceedance) as defined in the Water Plan (Fitzroy Basin) 2011 is

applied as an example passflow. If applicable, the inclusion of a passflow threshold will result in an additional limitation on the availability of water for possible extraction.

3. Method and accuracy

3.1 Streamflow data and scaling

No recorded streamflow data was available for the project site as the Queensland Department of Natural Resources Mines and Energy (DNRME) does not operate any streamflow gauges on Grosvenor Creek. For this assessment, streamflow data from the DNRMEs Fitzroy Basin IQQM was utilised. As the selected IQQM data is representative of a larger catchment area including Grosvenor Creek it was scaled to be more representative of potential streamflow at the proposed offtake site. Key attributes of the data used are outlined in Table 3.1.

Table 3.1: Streamflow Scaling Summary

Aspect	Description	Comment
Adopted IQQM streamflow data	Residual inflow Burton Gorge to Deverill (DA-20)	Period 1/1/1889 – 31/12/2007 (118 years) (model node 391)
IQQM catchment area for adopted streamflow data	3,541km^2	Total catchment to GS130410A (Isaac River at Deverill) less catchment to GS130402A Isaac River at Burton Gorge
Grosvenor Creek catchment reporting to proposed offtake	666 km^2	
Scaling ratio	16.3%	Linear scaling applied

A linear scaling relationship is considered appropriate for the assessment however it should be noted that the representativeness of the resulting scaled streamflow is:

- Dependant on the calibration fit originally completed by DNMRE (this has not been assessed and the data has been utilised as supplied); and
- May not correctly represent daily exceedance probability of the cease to flow (CTF) conditions as scaling from a larger catchment to a smaller one may result in an overestimation of flow recession. The scaling process only converts the daily flow data, it does not change the number of flow days or flow events and hence the flow duration curve is simply a downward translation proportional to the adopted scaling factor.

3.2 Methodology

The scaled streamflow data was subject to a hydrological spells analysis to identify key flow regime characteristics including:

- Flow seasonality and flow variability;
- Flow predictability (expressed as the flow rate likely to be exceeded for a given probability);
- Flow volume (expressed as a daily volume); and,
- Flow event duration (expressed as length of time/number of times a flow of a certain likelihood is continuously exceeded).

RAP (River analysis Package, version 3.0.8) and GetDat (version 3.35) were used to complete a statistical analysis of the scaled streamflow data including potential passing flow thresholds (the daily flow that might need to be exceeded before extraction could commence).

Potential water diversion volumes were estimated using a simplistic sensitivity analysis of pumped flows that incorporated the hydrological spells analysis results and passflow thresholds adopted in the analysis.

4. Results

4.1 Annual flow volume

The mean and median annual flow at the proposed offtake is estimated to be approximately 23,735 ML/y and 9,166 ML/y. The significant difference between the mean and median indicates that there is a large variability in annual discharge, with the mean being skewed by a small number of very wet years (e.g. 1954 and 1957 (Figure 4.1)).

The 10th and 4th percentile daily flow (medium and high daily flow indicators used in the Fitzroy Water Plan (Queensland Govt, 2011)) at the site are 11.6 and 71.0 ML/d. This signifies that:

- On 10% of all days flow was estimated to be in excess of 11.6 ML/d (or, on 90% of all days flow was *less than* 11.6 ML/d); and
- On 4% of all days flow was estimated to be in excess of 71.0 ML/d (or, on 96% of all days flow was *less than* 71.0 ML/d);

The 2-year ARI (average recurrence interval) flow event was identified as 2,072 ML/d. A 2-year event is approximately analogous to a bank full event.

Table 4.1shows the key flow performance indicators.

Table 4.1:Key flow indicators

Indicator	Units	Discharge
Mean Annual	ML/yr	23,735
Median Annual	ML/yr	9,166
10th percentile daily flow (indicative medium flow)	ML/day	11.6
4th percentile daily flow (indicative high flow)	ML/day	71.0
2 Year ARI Daily Flow Volume (indicative bank full)	ML/day	2,072.1
5 Year ARI Daily Flow Volume	ML/day	9,132
20 Year ARI Daily Flow Volume	ML/day	29,255

Figure 4.1 below shows total annual water year flow for the proposed offtake. From the figure it can be seen that the annual volume is highly variable ranging from zero in some years (1968 and 1992 water years) to a maximum of 242,090 ML (242 GL) in 1957.

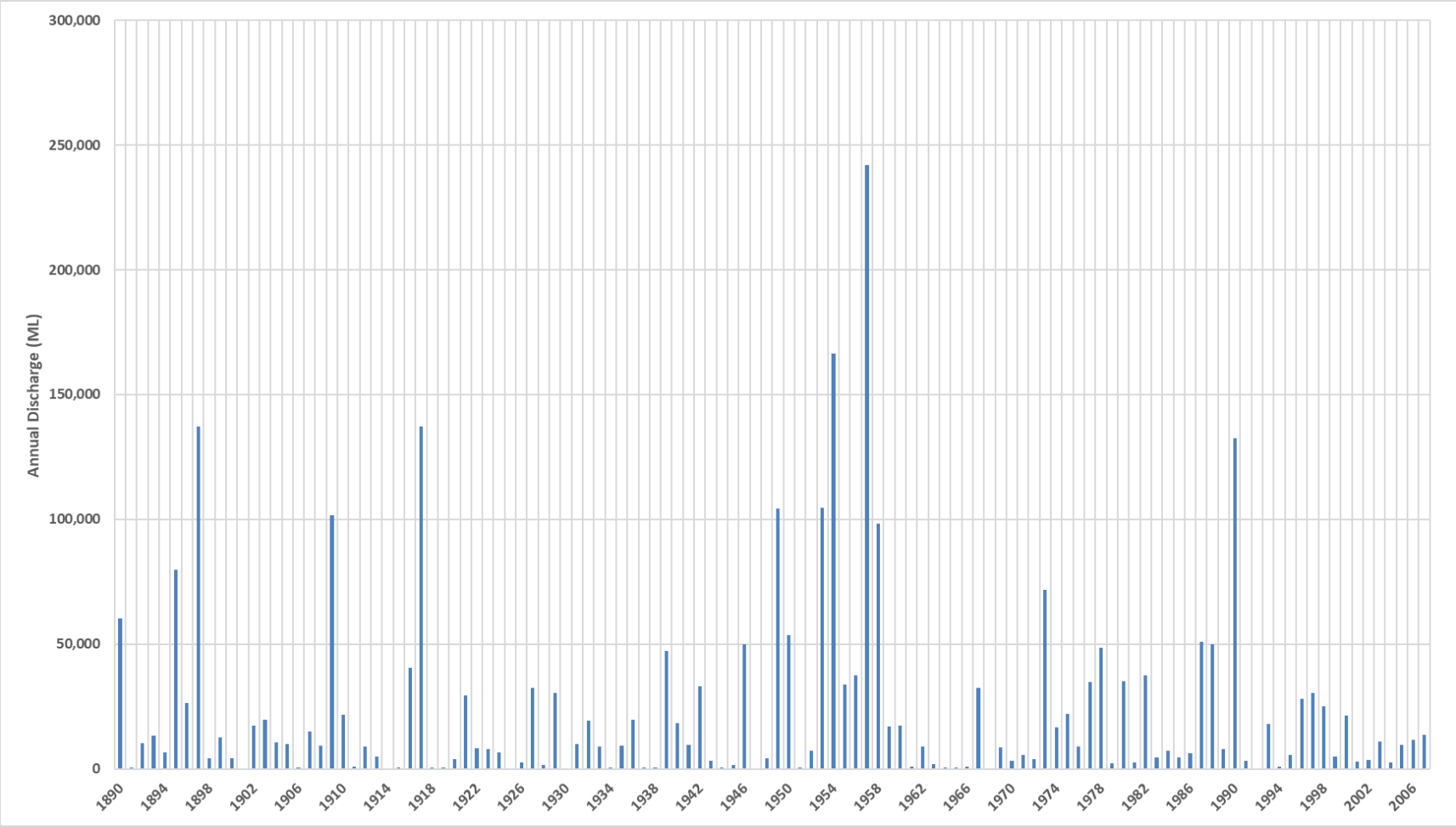
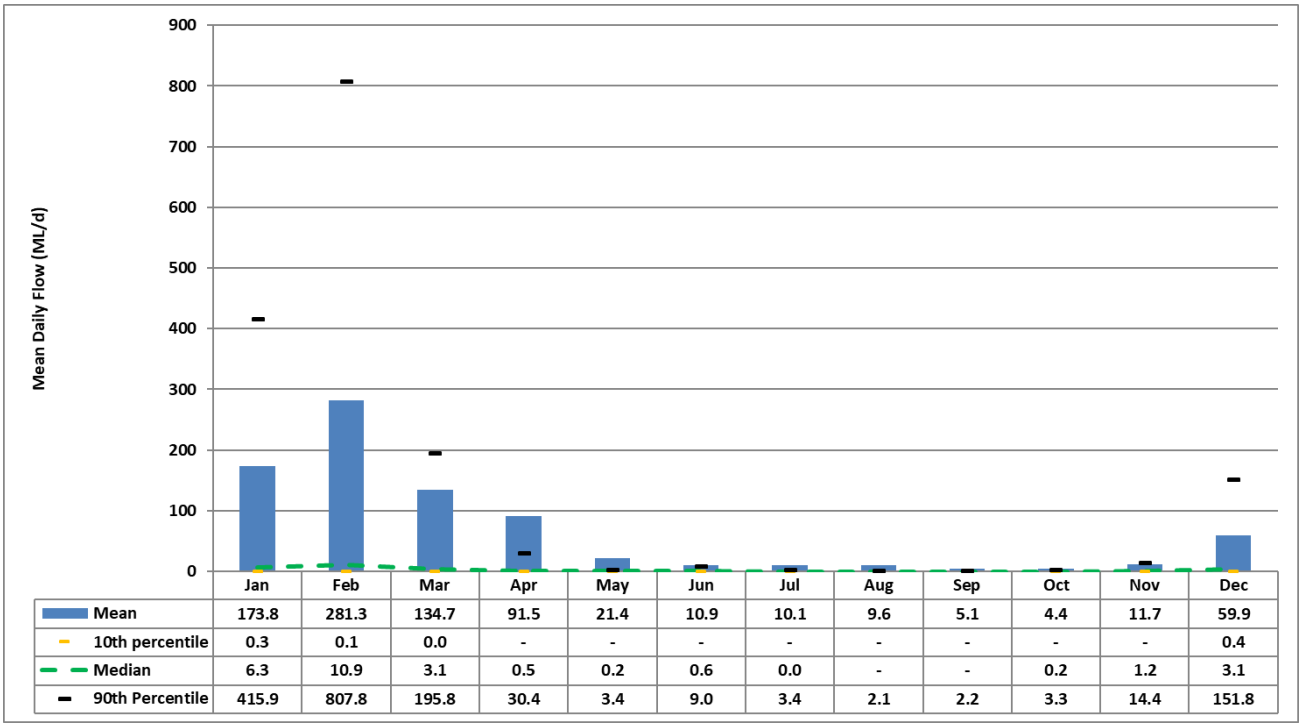


Figure 4.1: Estimated Annual Flow for Grosvenor Creek at Proposed Offtake

4.2 Monthly flow seasonality

Monthly daily discharge for the proposed offtake is shown Figure 4.2:

- The streamflow shows a clear seasonal distribution with a distinct high flow season occurring from December through April; however, most of the flow occurs in the months of January through March.
- Significant variability in streamflow can be seen during the high flow period of January through March which is reflective of variability in wet season rainfall. For example, while mean daily flow for February is 281.3 ML/d, it ranges from approximately 807.8 ML/d (90th percentile result) to 0.1 ML/d (10th percentile result).
- During the low flow season (May through November) median daily flow is less than 1 ML/d (effectively cease to flow) for all months except November.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	173.8	281.3	134.7	91.5	21.4	10.9	10.1	9.6	5.1	4.4	11.7	59.9
10th percentile	0.3	0.1	0.0	-	-	-	-	-	-	-	-	0.4
Median	6.3	10.9	3.1	0.5	0.2	0.6	0.0	-	-	0.2	1.2	3.1
90th Percentile	415.9	807.8	195.8	30.4	3.4	9.0	3.4	2.1	2.2	3.3	14.4	151.8

Figure 4.2: Monthly flow for Grosvenor Creek at the Proposed Offtake Location

4.3 Daily flow exceedance

Figure 4.3 shows the daily flow duration at the proposed offtake location. Using the complete record of daily flows each daily record is ranked and subjected to a plotting position formula. The resulting daily flow duration chart (Figure 4.3) shows the likelihood that daily flows will exceed a given value. From Figure 4.3 it can be seen that:

- Cease to flow (CTF) conditions (less than 1 ML/d (11.5 L/s)) are present on approximately 79% of all days i.e. on 79% of all days flow was less than 1 ML/d;
- The steep gradient of the flow duration curve indicates that flow recession is short i.e. streamflow is likely to recess relatively quickly after an event with typically short periods of prolonged baseflow.

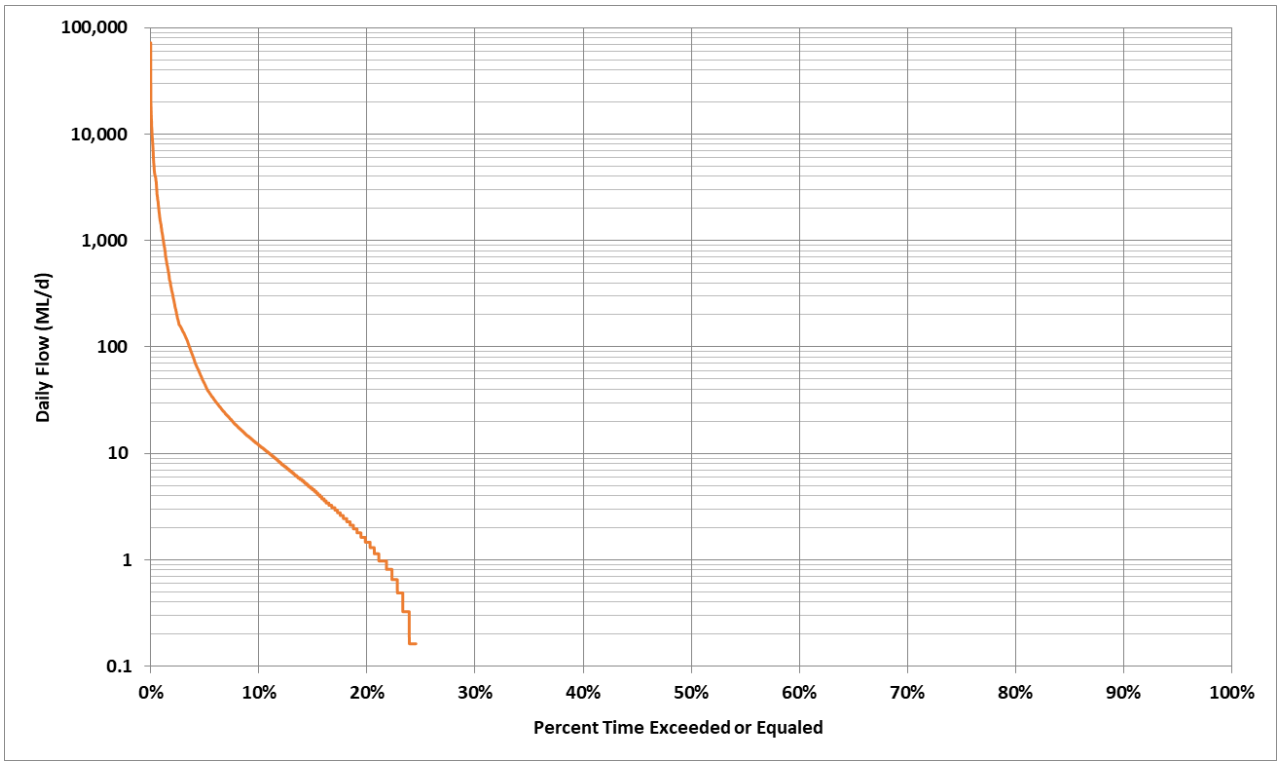


Figure 4.3: Daily Flow Duration Plot for Grosvenor Creek at the Proposed Offtake Location

4.4 Hydrological spells analysis

A hydrological spell is a period of sustained streamflow at, or in excess of, a specific flow threshold. During the spell streamflow must remain at or above the threshold. Once streamflow has fallen below the threshold the spell is considered to be over. Completion of a spells assessment allows for the development of an understanding of how frequently and for how long flows at the proposed offtake are likely to be present.

Table 4.2 provides details of the assessment criteria adopted for the spells assessment.

Table 4.2: Flow spells assessment – adopted criteria

Aspect	Adopted Definitions	Comment
Flow data analysed	1890 to 2007 scaled flow data obtained from Fitzroy WP IQQM	For Grosvenor Creek reporting to proposed offtake
Seasons	Wet – November through to end of April Dry – May through to end of October	
Flow Spells assessed	1 ML/d	Effective cease to flow conditions
	5 ML/d	Assumed lower limit for pumped offtake
	11.6 ML/d	10^{th} percentile daily flow or medium flow trigger as used in the Water Plan

The summary results are presented below in Table 4.3 and Table 4.4 for the proposed offtake.

For the assumed Cease to Flow (1 ML/d) the median results indicate that:

- On an annual basis (Table 4.3):
    - Flow conditions exceed 1 ML/d approximately 17.0 times per year and have a median duration of 4.8 days; and
    - The time between each flow spell is 13.0 days.
- Over the wet season (Table 4.4):
    - Flow conditions exceed 1 ML/d approximately 10.0 times per wet season and have a median duration of 5.3 days; and
    - The time between each flow spell is 7.9 days during the wet season.

For the 5 ML/d threshold the median results indicate that:

- On an annual basis (Table 4.3):
    - Flow conditions exceed 5 ML/d approximately 12.0 times per year and have a median duration of 4.1 days; and
    - The time between each flow spell is 17.8 days.
- Over the wet season (Table 4.4):

- Flow conditions exceed 5 ML/d approximately 9.0 times per wet season and have a median duration of 5.3 days; and
- The time between each flow spell is 7.9 days during the wet season.

For the 11.6 ML/d threshold (medium flow) the median results indicate that:

- On an annual basis (Table 4.3):
  - Flow conditions exceed the threshold approximately 9.0 times per year and have a median duration of 3.7 days; and
  - The time between each flow spell is 23.0 days.
- Over the wet season (Table 4.4):
  - Flow conditions exceed 11.6 ML/d approximately 7.0 times per wet season and have a median duration of 4.0 days; and
  - The time between each flow spell is 13.7 days during the wet season.

Table 4.3: Interannual flow spell summary – per year (Nov-Oct)

Statistic	Units	Flow > 1 ML/d	Flow > 5 ML/d	10th Percentile Daily Flow (11.6 ML/d)
Spell Threshold	ML/day	1.0	5.0	11.6
Mean Number of Spells	Count	15.5	12.5	9.4
Mean of Longest Spell	Days	26.8	19.5	15.2
Mean Duration of Spells	Days	7.4	5.5	4.6
Mean Period Between Spells	Days	17.2	20.9	25.5
Median Number of Spells	Count	17.0	12.0	9.0
Median of Longest Spell	Days	21.0	17.0	13.0
Median Duration of spells	Days	4.8	4.1	3.7
Median Period Between Spells	Days	13.0	17.8	23.0

Table 4.4: Interannual flow spell summary – per wet season (Nov-Apr)

Statistic	Units	Flow > 1 ML/d	Flow > 5 ML/d	10th Percentile Daily Flow (11.6 ML/d)
Spell Threshold	ML/day	1.0	5.0	12
Mean Number of Spells	Count	10.1	9.0	7.0
Mean of Longest Spell	Days	24.0	18.3	14.5
Mean Duration of Spells	Days	8.4	6.0	4.9
Mean Period Between Spells	Days	10.3	12.9	16.1
Median Number of Spells	Count	10.0	9.0	7.0
Median of Longest Spell	Days	20.0	15.0	13.0
Median Duration of spells	Days	5.3	4.6	4.0
Median Period Between Spells	Days	7.9	10.8	13.7

4.5 Potential diversion volumes

A simple estimate of the potential mean annual diversion available at the proposed offtake has been undertaken using a variety of potential pump flowrates from 50 to 250 L/s. The different passflow thresholds were assessed as per the three thresholds used in the spells analysis, and continuous pumping during the allowable extraction period was assumed. Figure 4.4 below shows that:

- Assuming no passflow restriction (pumping takes place whenever flow is greater than 1 ML/d) an estimated maximum mean annual diversion of approximately 879 ML could be realised with a pump flowrate of 250 L/s. It can be seen that the potential volume drops significantly as the pump flowrate is reduced.
- As the passflow threshold is increased a greater pump capacity is required in order to achieve a similar mean annual diversion. For example, to achieve a mean annual diversion of 500ML, the required pump flowrate is:
    - 150 L/s when the there is no effective passflow threshold;
    - 150 to 200 L/s when the passflow threshold is 5 ML/d; and
    - 250 L/s when the passflow threshold is 12 ML/d.

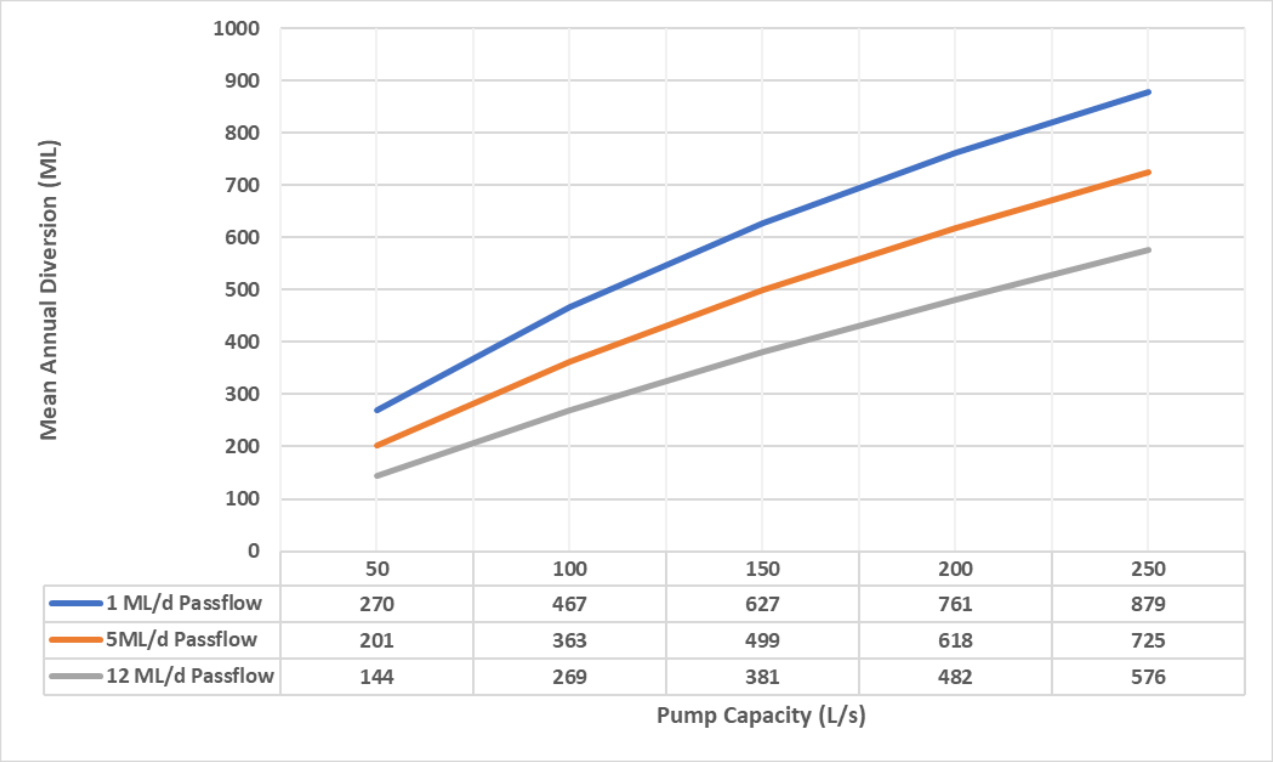
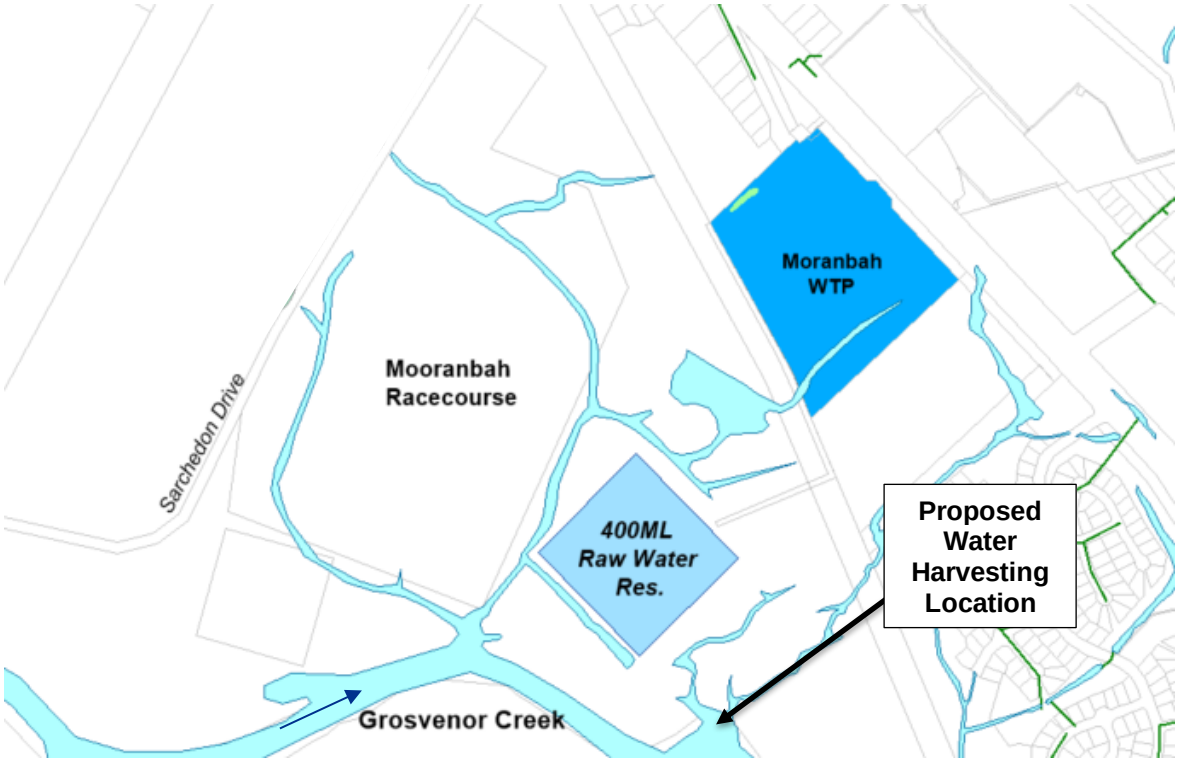


Figure 4.4: Potential Mean Annual Diversion

5. References

Queensland Govt. (2011). Water Plan (Fitzroy Basin) 2011.

Attachment 1: Proposed Grosvenor Creek Water Harvesting Location



Moranbah Integrated Water Cycle Management Strategy

Isaac Regional Council

IH168600 Integrated Water Cycle Management Strategy

25 June 2019

Moranbah Integrated Water Cycle Management Strategy

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Jacobs Australia Pty Limited

32 Cordelia Street
Brisbane QLD 4101
PO Box 3848
Brisbane QLD 4101
T +61 7 3026 7100
F +61 7 3026 7300
www.jacobs.com

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A	24/5/19	Client issue	G.Catto Smith B. Maxwell		B.Lade B.Hatt	L. Hellberg
B	26/6/19	Client comments incorporated	B.Maxwell		B.Maxwell/ L.Hellberg	L. Hellberg

Contents

1. Introduction

Isaac Regional Council (IRC) has engaged Jacobs to undertake, in cooperation with IRC, the development of an Integrated Water Cycle Management (IWCM) strategy for the town of Moranbah; to support their Water and Wastewater Infrastructure arm. The IWCM strategy is based on information provided by IRC, documenting gaps in that data and identifying further works required to produce a complete IWCM strategy.

This document is an IWCM strategy, with minor sections and data gaps for further development.

1.1 What is an IWCMS

An IWCM strategy encompasses the strategic planning for the efficient use of available water resources over the whole water cycle, including water supply, sewerage services, recycled water, stormwater and surface waters.

Effective water management is critical to the health and well-being of the community, the reliability of the town water supply, liveability of town, and securing the future prosperity of the region.

The key objectives of the Moranbah IWCM strategy are:

- to provide a roadmap for the development of integrated solutions that are consistent with an integrated IWCM strategy for Moranbah that will facilitate a resilient and reliable water supply for the township in the face of large population changes to a drier climate.
- to enhance security of the water supply to meet the projected needs of the community and local industry (mining and agriculture), through utilisation of traditional and alternate water sources including fit for purpose use of recycled water and stormwater.
- to incorporate IRC's developing water cycle management systems including the Leakage Management, Demand Management, and operational enhancements including SCADA implementation and system monitoring.

This IWCM Strategy is developed for the Moranbah township, and through this is intended to provide a framework for development of IWCM strategies for the other towns in the region, including Clermont, Nebo, Glenden, Lawrence, Carmila, Dysart, and Middlemount.

This strategy is developed in alignment with the Integrated Water Cycle Management Strategy Check List – July 2014 (DEPI NSW Govt, 2014), as requested by IRC.

1.2 Moranbah Township

Moranbah is the largest town in the Isaac Regional Council (IRC) service area, with approximately 11,000 predominantly permanent residents, with significant proportion of Fly-In Fly-Out (FIFO) residents. The nearby industries and land use consist of mining and agriculture (grazing). Figure 1 below shows the location of Moranbah township.

The Climate is subtropical with approximately 500mm rainfall per annum, which varied between 360mm and 590mm/year from 2012 to 2018. Maximum temperatures vary between 30°C and 42°C, with minimum temperatures between 0°C and 17°C. Potential Evaporation is considered high.

The township is built on the top of a local rise, with Isaac River traversing to the east and its tributary, Grosvenor Creek passing to the west and south. Isaac River is perennial, with a dry alluvial bed during the dry season. Grosvenor Creek is also perennial, though with incised sides, periodic variations between alluvial and clay bed and isolated water pools during the dry season at various locations along its reach. Although uncommon, wet season flows can cause flooding beyond the river banks for both waterways.

Township existing water services include potable water, sewerage, recycled water and stormwater drainage.

Figure 1: Moranbah township areal plan

2. Description of Existing Systems

The following details each of the town's water cycle service systems.

2.1 Water Supply System

2.1.1 Overview

Moranbah township receives raw water by pipeline either directly from the Burdekin Dam and Eungella Dam, via the local SunWater Dam or directly from a BM Alliance Coal Operations (BMA) pipeline.

Moranbah Water Treatment Plant (WTP) receives raw water from these two pipelines, one of which is operated by IRC (the former Anglo pipeline) and the other is operated by BMA. Raw water allocations are supplied through these pipelines following a request to SunWater for bulk water delivery. Both pipelines deliver raw water to the 400ML raw water reservoir for blending prior to being pumped to the inlets of the two treatment plants on the Moranbah WTP site. Raw water is treated and stored in three clear water storage reservoirs at the Moranbah WTP. The WTPs are operated to maintain the level in the clear water storage reservoirs.

Treated water is distributed to the two high level distribution reservoirs that supply the town, one of which is located at the WTP site and the other is at Clements Street, Moranbah.

The 3610 connected and metered properties[1] in town receive drinking water from these reservoirs via the 56km network of DN525-DN50 mains.

2.1.2 Raw Water Supplies

The delivery of raw water supplies to the township are controlled by SunWater directly, or by BMA, who receive water from SunWater. IRC do not have control over when the requested water allocations will be provided, what pipeline will deliver the water or which reservoir the water is sourced from or delivered to. IRC do control their pipeline from the SunWater Dam.

Water allocations for township raw water are taken from the various mining and gas company allocations. There is no agreement for water supply to the township to be of a higher priority than for the mining and gas company allocations. SunWater and BMA bulk water infrastructure capacities and water reserves are of critical importance for Moranbah township supply security, particularly when multiple entities submit competing requests for delivery of water allocation.

The Burdekin Reservoir, also known as Burdekin Falls Dam, is located approximately 300 km North West of the township. Water is transferred from the Burdekin Dam to the 600ML SunWater Dam at Moranbah (SunWater owned). This water then is pumped to the 400ML raw water storage reservoir at the Moranbah WTP. The supply can also by-pass the SunWater Dam if needed. This supply pipeline from the Burdekin Dam, to the SunWater Dam, and then to the WTP is operated by BMA.

The Eungella Dam is located 150 km north-east of the township. Water is pumped from this dam to the SunWater Dam at Moranbah and is then pumped directly to the 400ML WTP reservoir. These raw water pumps and dams are operationally controlled by SunWater. There is a second pipeline from Eungella, which is a BMA main and joins the BMA pipeline downstream of the SunWater Dam and upstream of the WTP.

Figure 2 illustrates the interconnectivity of the raw water supplies described above. SunWater controlled assets are shown in blue; BMA controlled assets are shown in red; and the newly acquired IRC pipeline and existing raw water storage are shown in light blue.

[1] IRC Draft System Leakage Management Plan – Phase 1 (14 January 2019),

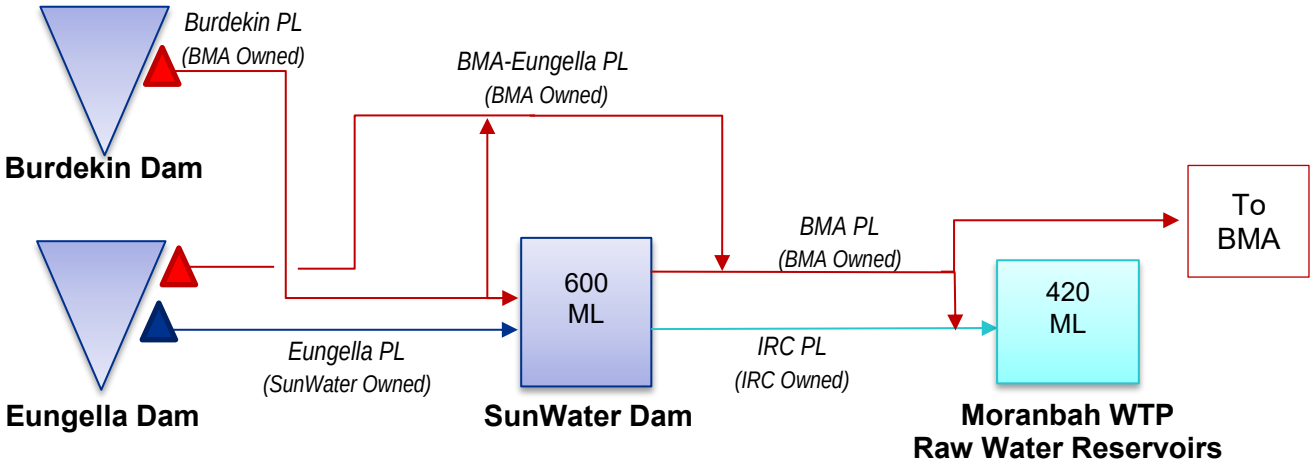


Figure 2: Moranbah Raw Water Supply Schematic

2.1.3 Water Treatment Plant

Each source reservoir has a different raw water quality, which impacts the effectiveness of the WTP. In addition, operational decisions by BMA and/or SunWater have occasionally resulted in slugs of poor water quality received at the WTP.

Raw water is received into the recently constructed 400ML Raw Water Reservoir 3, where it is blended with stored water to reduce the severity of treatment process shocks that can be caused by water quality variations. The blended water is transferred to the 8ML Reservoir 1 and 12ML Reservoir 2 (aka “Turkeys Nest dams 1 and 2”), which are interconnected. Blended raw water is pumped from these two small reservoirs to either the Main Plant or Boby Plant for treatment.

When the Main Plant and Boby Plant operate in parallel, the total WTP inflow capacity is 180L/s. It is reported that the Main Plant has potential to operate at up to 160L/s[2], potentially increasing the WTP inflow capacity to around 230L/s.

The Main Plant includes initial PAC dosing, aluminium chlorohydrate (ACH) coagulant and polymer dosing to the flash mixer, nine sand filters and chlorine and fluoride dosing. The Bobby plant consists of a clarifier, sand filters, and chlorine and fluoride dosing.

Treated water is transferred to the three interconnected clear water storage (CWS) and distribution reservoirs, with a combined volume of 29.2ML. The target chlorine contact time of 2.5hrs equates to 1 to 2ML of storage within the CWS, which will vary with process requirements and an increase of township water demands.

Filter Backwash water is recovered after being transferred to Finger Dam, adjacent to the Raw Water Reservoir 3. Finger Dam contains a wetland area that provides some treatment and settling, before the recovered water collects in a sump and pumped back into Raw Water Reservoir 3.

[2] Moranbah WTP Audit 2015

Figure 3: Moranbah Water Treatment Plant Layout

Table 1: Moranbah Water Treatment Key Asset Details

Asset Type	Asset Name and Description	Description / information	Capacity and Typical Operation
Raw Water Network	BMA Burdekin main	BMA supplies water from the Burdekin Dam to the WTP, and BMA mine directly	Xmm dia., XL/s flow, BMA controlled
	BMA Eungella main	BMA supplies water from the Eungella Dam to the SunWater Dam	Xmm dia., XL/s flow, BMA controlled
	SunWater Eungella main	SunWater supplies water from the Eungella Dam to the SunWater Dam	Xmm dia., XL/s flow, SunWater controlled
	IRC SunWater (Anglo) Main	IRC supplies water from the SunWater Dam to the WTP RW Res. 3	Xmm dia., XL/s flow, IRC controlled
Raw Water Reservoirs	Raw Water Res. 1	(1970 circa)	8 ML
	Raw Water Res. 2	(19XX circa)	12 ML
	Raw Water Res. 3	(constructed 2017)	400 ML (Total 420ML)
Water Treatment Plant	Boby Plant	(1970 circa – near end of life)	70 L/s operational, 5,400EP [3]
	Main WTP	(19XX circa)	160 L/s design, 110 L/s operational 12,300EP [3]
	Flash Mixer	Flash Mixer noted as limiting capacity in 2015,completion of recommended 20m^3 flash mixer TBC	Total plant operational limit 180 L/s (~21ML/D), 11,400 EP [4] Or 17,700EP with 20m^3 flash mixer [3] Note: EPs for both plants and flash mixer are based on different demand per EP (valid at the time of the design), and vary considerably.
Clear Water & Distribution Storage (CWS)	Clearwater & Distribution Tank 1	East (TWL: 262.2m AHD, BWL: 257.2m AHD)	5.7 ML (or 5.3ML) [5]
	Clearwater & Distribution Tank 2	West (TWL: 261.7m AHD, BWL, 255.7m AHD)	8 ML
	Distribution Tank 3	South	15.5ML
	(note future Distribution Tank 4, 15ML)		Total 29.2 ML Tank 1 and 2 provide chlorine contact time, which is around ~-1.5ML [6]
High Level Reservoir	WTP H/L Res.(west tower)	TWL: 288.2mAHD	0.45 ML
	Clements St H/L Res. (east Tower)	TWL: 275.3m AHD	0.45 ML
Pump Stations	Raw Water PS 1	Pumps from RW Res. 1 to Boby WTP	2 pumps (duty/standby) xxL/s @ XXm lift
	Raw Water PS 2	Pumps from RW Res. 2 to Main WTP	2 pumps (duty/ standby) xxL/s @ XXm lift
	Raw Water PS 3	Pumps water from RW Res. 3 to RW	2 pumps (duty/ assist)

[3] Report for IRC - Moranbah Water Supply Strategy 2015
[4] Moranbah WTP Audit 2015
[5] Water Treatment Plant Capacity Assessment 2016
[6] Moranbah Water Supply Strategy, GHD 2016

Asset Type	Asset Name and Description	Description / information	Capacity and Typical Operation
		Res 2	1 pump: 150L/s @ 40m head 2 pumps: 310L/s @ 40m head [7]
	WTP PS 1	Dedicated supply from CWS 1 to West (WTP) H/L reservoir. Emergency pumps provides supply during power outages.	450mm dia. DICL rising main 2 pumps(duty/ standby) plus 1 diesel pump xxL/s @ XXm lift
	WTP PS 2	Dedicated supply from CWS 2 to East (Clements St.) H/L reservoir. Emergency pumps provides supply during power outages.	525mm dia. AC Rising Main 2 pumps (duty/standby) plus 1 diesel pump xxL/s @ XXm lift

2.1.4 Potable Water Network

WTP Pump station transfers treated water from the CWS reservoirs to two high level reservoirs:

- WTP High Level Distribution Reservoir
- Clements Street High Level Distribution Reservoir

The Clements Street H/L reservoir is supplied by Pump station 2 and a dedicated DN525 asbestos cement rising main. The two high level reservoirs provide the town with a balanced hydraulic grade. Township usage is metered on the outflows of each tank. The WTP drinking water is connected to the inlet of the WTP High Level Reservoir.

The distribution and reticulation pipe networks consist of 56km of DN525 to DN50 mains[8]. On average the network assets are approximately 40 years old, and therefore approximately halfway through their nominal asset life and are reported to be generally in good condition. The smaller diameter PE pipes, are newer and are in good condition.

The MiWater scheme has sponsored the installation of water meters to all IRC customers providing automated remote reading meters via IRC SCDA system, so that all properties have automatic and remote hourly readings, which are available to registered owners, tenants and real estate managers via the MiWater portal.

There are no planned major water supply augmentations for capacity or condition.

Figure 4 illustrates the town potable water supply network. Table 2 presents the key statistics and average age of pipe work, weighted by pipe length[1].

[7] Report for IRC – Moranbah WTP Raw Water Storage 2016
[8] IRC Draft System Leakage Management Plan – Phase 1 (14 January 2019), IRC GIS data set (January 2019)

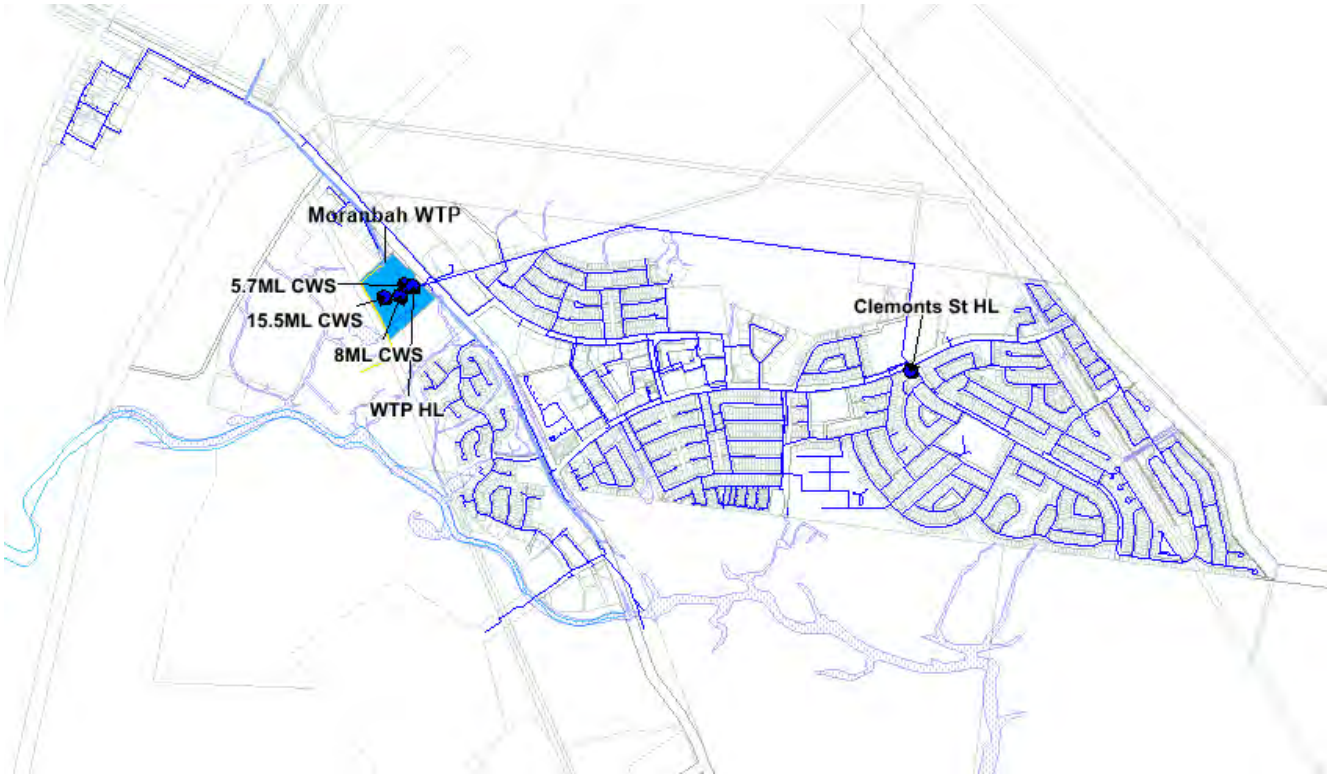


Figure 4 Moranbah Drinking Water Supply Distribution and Reticulation Network

Table 2: Moranbah Potable Water Network Pipeline Summary (source – IRC Draft System Leakage Management Plan – Phase 1 (14 January 2019), IRC GIS data set (January 2019))

Pipe diameter[2]	Length of pipe (m)	Average age of pipes (years)
50-525 mm diameter pipe	56,257	37

2.2 Sewerage System

The Moranbah Wastewater Treatment Plant (WWTP) is located to the north-east of the Moranbah township and is accessed via Forrest Drive. Sewage is pumped from four separate sewage pump stations within the existing sewer reticulation network to the inlet works at the WWTP.

The treatment plant employs aeration, clarification and chlorine dosing treatment to achieve Class B effluent, which is stored in two storage lagoons for treatment to Class A and reuse via the recycled water network.

2.2.1 Waste Water Treatment Plant

Sewage is received at the inlet pit, transferred through preliminary grit screening to the newer “blue” activated sludge/clarifier for initial aeration in the outer oxygen ditch, and then clarification (Plant 3). The effluent is chlorinated (chlorine gas) and passes through a contact tank before being pumped to the treated effluent storage ponds (ESP).

Plant 2, which consists of the separate activated sludge ditch and two parallel clarifiers (Clarifier 2) is currently offline.

Waste activated sludge from each activated sludge/clarifier plant is transferred to the original Plant 1 clarifier, where it is aerated to achieve aerobic stabilisation. Stabilised sludge is transferred to the “anoxic ponds” and then to the drying beds resulting biosolids are stockpiled onsite and transferred to Council’s landfill.

The treated effluent water is stored in the earthen storage ponds, Mo-ESP1 and Mo-ESP2.

Storage Pond 1 (Mo-ESP1) was built in early 1980s as part of the original WWTP, and recent modifications to the Spillway Crest Level have reduced its storage capacity.

Effluent Storage Pond 2 (Mo-ESP2) was constructed by 2005 and has 163 ML storage capacity at spillway crest level. Pond 2 is connected to Pond through two DN300 pipes to provide additional storage.

An earthen Overflow Storage Dam (Mo-OSD) was constructed in 2011 to provide emergency storage of raw sewage overflow during wet weather events or process upsets and has a storage capacity of 5.65 ML at spillway crest level.

The polishing system extracts effluent from Mo-ESP2 for the recycled water treatment process.

Figure 5 illustrates the WWTP area and the three storage ponds.

Table 3 provides the WWTP key asset data.

Figure 5: Moranbah WWTP Treated Effluent Storage Ponds (ESP) and Overflow Storage Dam (OSD)

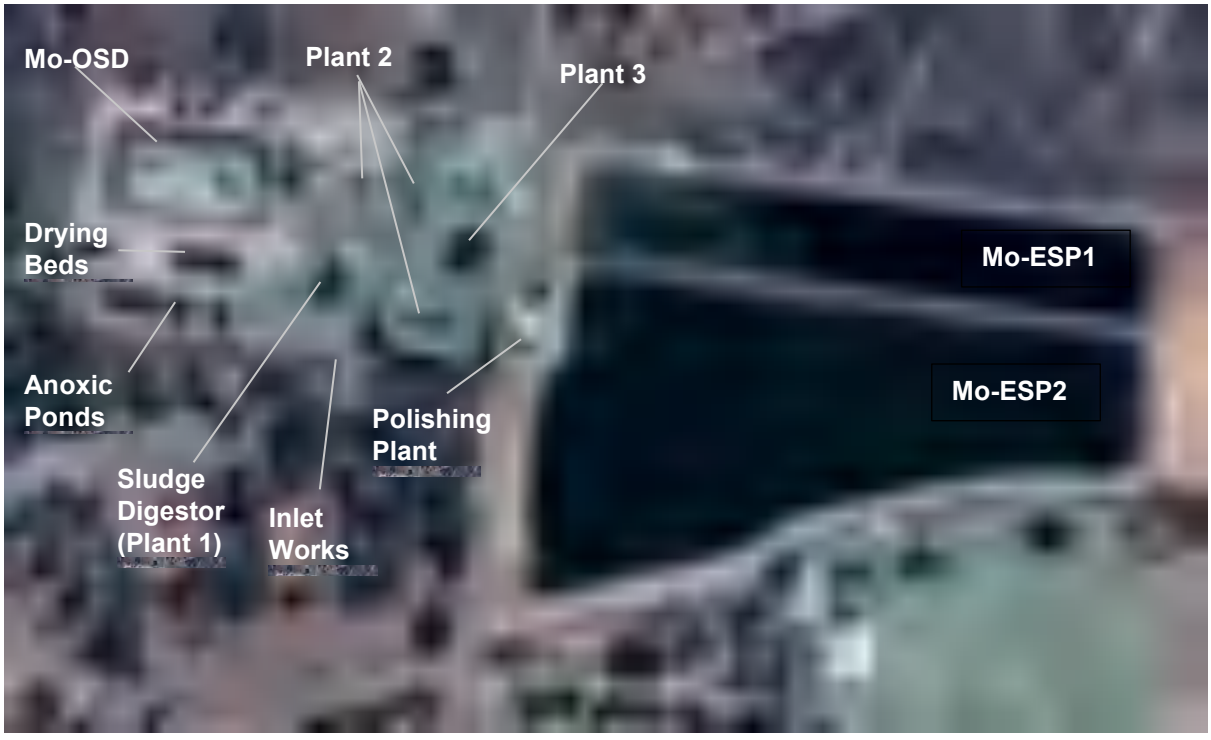


Table 3: Moranbah WWTP Key Asset Details

Asset Type	Asset Name and Description	Description / information	Capacity and Typical Operation
Treatment			
Primary Screening	Inlet Structure	Open rectangular inlet pit, receives flows from PS1, 2, 4, 5	TBC

Asset Type	Asset Name and Description	Description / information	Capacity and Typical Operation
	Grit Chamber	Coarse screen and screw auger system lifting grit to small dumpster bins	TBC
Treatment	Plant 3 (Clarifier 3 incl. Oxidation Ditch Contact Tank 3) Plant 2 (Clarifier 2 Contact Tank 2) - Offline	Initial aeration with typical clarification process, with gas chlorination from nearby storage shed Oxygenation ditch, two parallel clarification process tanks and gas chlorination	14,000EP (@200L/EP/d) [9] Or 2.8 ML/D 4,000EP (@200L/EP/d) [9]
Sludge Treatment	'Sludge digestor Sludge drying pans	Intermittent aeration	TBC TBC
Storage			
Effluent Storage Lagoons	Mo-ESP1 Mo-ESP2	Open Storage in linked lagoons, contamination from wildlife	42 ML 163 ML
Raw Sewerage Emergency Overflow	Mo-OSD	Emergency storage for Raw Water inlet overflows during significant wet weather events	5.65 ML

2.2.2 Sewerage Network

The sewerage network comprises of 14 operating sewage pump stations (SPS), 14km of DN50 to DN250 rising mains and 89km of DN 600 to DN100 reticulation sewers. Network pipe materials include asbestos cement, ductile iron, PVC, PP, PE and HDPE.

Average network age could not be determined, however 18.5km, or 21% of network mains were installed after mid 2007,and 1.9km or 14% of rising mains were installed after 2011.

General ground slopes result in gravity sewers transferring flows to the SPS generally located at the edge of existing developments.

Fourteen SPS transfer flows to other SPS, or to gravity sewers flowing directly to the WWTP. SP014 transfers flows directly to the WWTP inlet works. There are odour control dosing facilities at some SPS.

SP015 is a newly constructed SPS, not yet connected or operational, intended for future growth.

Due to the pumping regimes (thus turbulent flows), and naturally higher temperatures, hydrogen sulphide (H2S) attack is likely to be an issue on asbestos cement and ductile iron pipes at network high points, rising mains and their outfall gravity mains. The recent failure of the asbestos cement rising main from SP03 due to H_2S attack, resulted in these flows being diverted to SP01.

It is noted that the capacities of the pumps are not recorded, though some wet well data has been gathered. SP01 is thought to be approaching capacity.

[9] Moranbah STP Audit Report 2012, noting this report indicates Plant 3 may be able to operate at higher EP efficiency

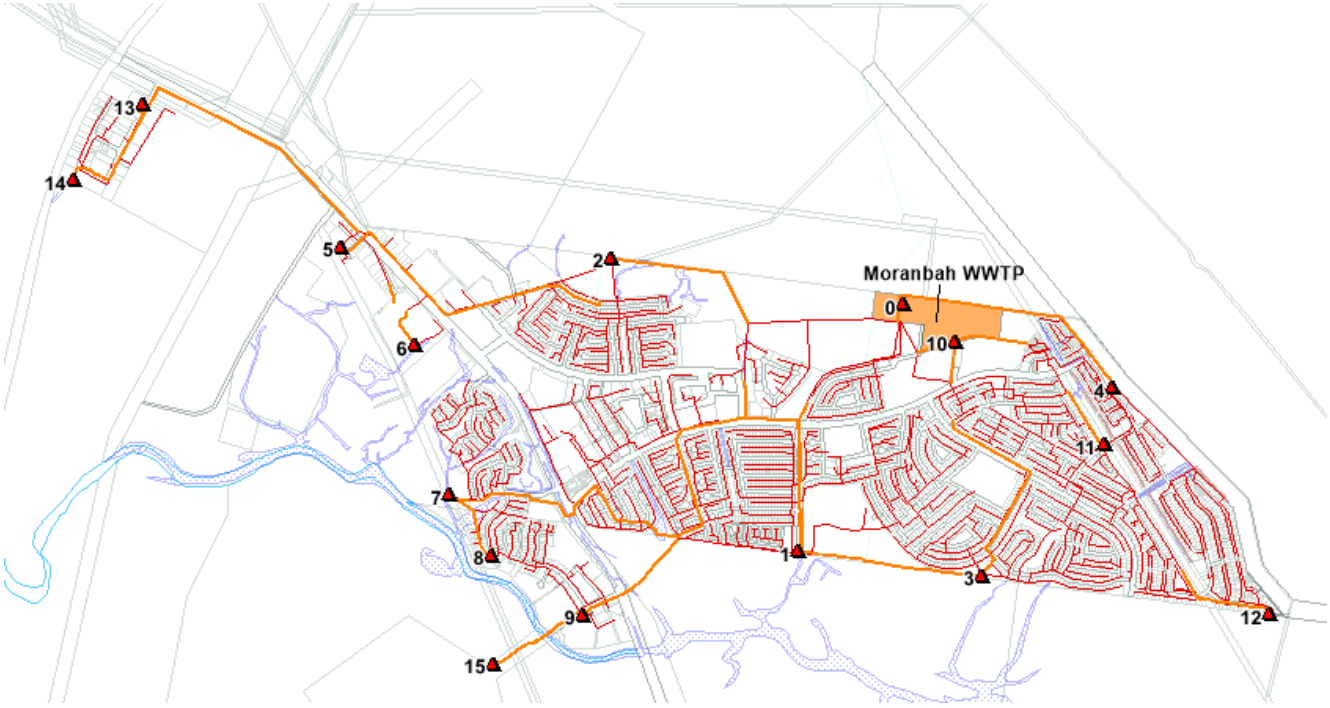


Figure 6: Moranbah Sewerage Network

Table 4: Moranbah Sewerage Network Pump Station Details (source – IRC GIS Data Set (January 2019))

Pump stations	Descriptions	Rising Mains Dia.	Rising Mains length
14 operational, 1 new – not operational	TBC range flowrate (L/s) (#15)	50-250 mm	13.2 km

Table 5: Moranbah Sewerage Network Pipeline Details (source – IRC GIS Data Set (January 2019))

Pipework diameter (mm)	Length of pipe (km)
100-600 mm	**89.1 km**

2.3 Recycled Water System

2.3.1 Overview

The recycled water system consists of the recycled water polishing plant, distribution pump and tanker filling point at the WWTP. The recycled water reticulation network transfers recycled water to key irrigation areas within and surrounding the town. There are also private network assets, such as the golf course storage dam and private transfer mains from this point. Private assets are not yet captured within the IRC GIS system.

2.3.2 Recycled Water Supply

The recycled water supply is extracted from MO-ESP2 for treatment in the polishing plant. Treated effluent quality varies due to birdlife on ponds and algal blooms, which reduce the effluent quality below the WWTP treated effluent quality. In a typical year effluent volumes produced by the WWTP in the wet season exceed recycled water demand, however dry season recycled water demands exceed the available effluent supply. Treated effluent in excess of available storage is discharged to Grosvenor Creek during wet weather events when the creek flow is above the minimum flowrate for allowed treated effluent discharge.

2.3.3 Polishing Plant

The polishing plant consists of 8 no of disk filters, chlorination and UV disinfection. The recycled water is extracted from the treated effluent storage reservoirs and treated to achieve Class A quality.

The recycled water is monitored by online monitoring equipment to confirm the quality. The plant is shut down and supply halted where recycled water quality does not meet the required standard.

There is no treated water storage reservoir at the plant, which may pose a supply risk.

2.3.4 Irrigation Network

Recycled water is pumped to the IRC owned irrigation network for distribution to end users, including Council departments and schools, and to the Golf Course storage dam, where it is distributed to some private users. IRC network diameters, materials and age are not captured in the Council's GIS data. Private irrigation water assets are not captured as GIS records.

Recycled water use and risks associated with human contact are managed by reuse management practices defined within the End User Agreements.

The Golf Course storage dam is an open reservoir, subject to contamination from wildlife, similar to the Effluent Storage Ponds, with likely cross contamination between these and other open water bodies. The water quality cannot be guaranteed by IRC, including after it enters the Golf Course storage dam.

2.3.5 Customers and Demand Regulation

The recycled water distribution, agreed water allocation volumes and associated service standards are provided under the IRC Recycled Water Management Plan (2018) and supporting documents, End User Agreements (EUAs), and the applicable regulations, guidelines and standards.

Recycled water allocations are subject to restrictions where the recycled water supply cannot meet the demand, indicated by low treated effluent storage levels. Customer usage limits assigned to the storage pond high, low and low-low levels are defined within the *MBH Recycled Water Allocations V9* document.

To minimise impacts on existing capacity limited infrastructure, irrigation water extraction must be completed within each customer's allocated time period.

There is anecdotal advice that:

a) some customers are extracting outside of their allocated time period, and

b) some customers are extracting far greater than their agreement allocation, and

c) other customers are only extracting around half of their agreed volume.

Due to the impacts on storage infrastructure during the wet season and conversely water resource management during dry periods, the user allocation amounts should be reviewed.

As at April 2019, the recycled water customers include:

- Isaac Regional Council (IRC)
- IRC Parks and Recreation for parks and road verge/ centre islands irrigation
- Moranbah Golf Club
- Moranbah Bowls Club

- Moranbah Rugby League Club
- Moranbah Worker's Club
- Moranbah Hospital
- Moranbah State School
- Moranbah East State School
- Moranbah State High School
- MAC CAMP

The golf course onsite storage is used to store treated water for other customers. Figure 7 below identifies the location of existing irrigation areas (in purple) and potential irrigation areas (in green) and depicts the Council owned irrigation network (purple). The potable water treatment plant (WTP) and wastewater treatment plant (WWTP), including polishing plant, are shown for reference.

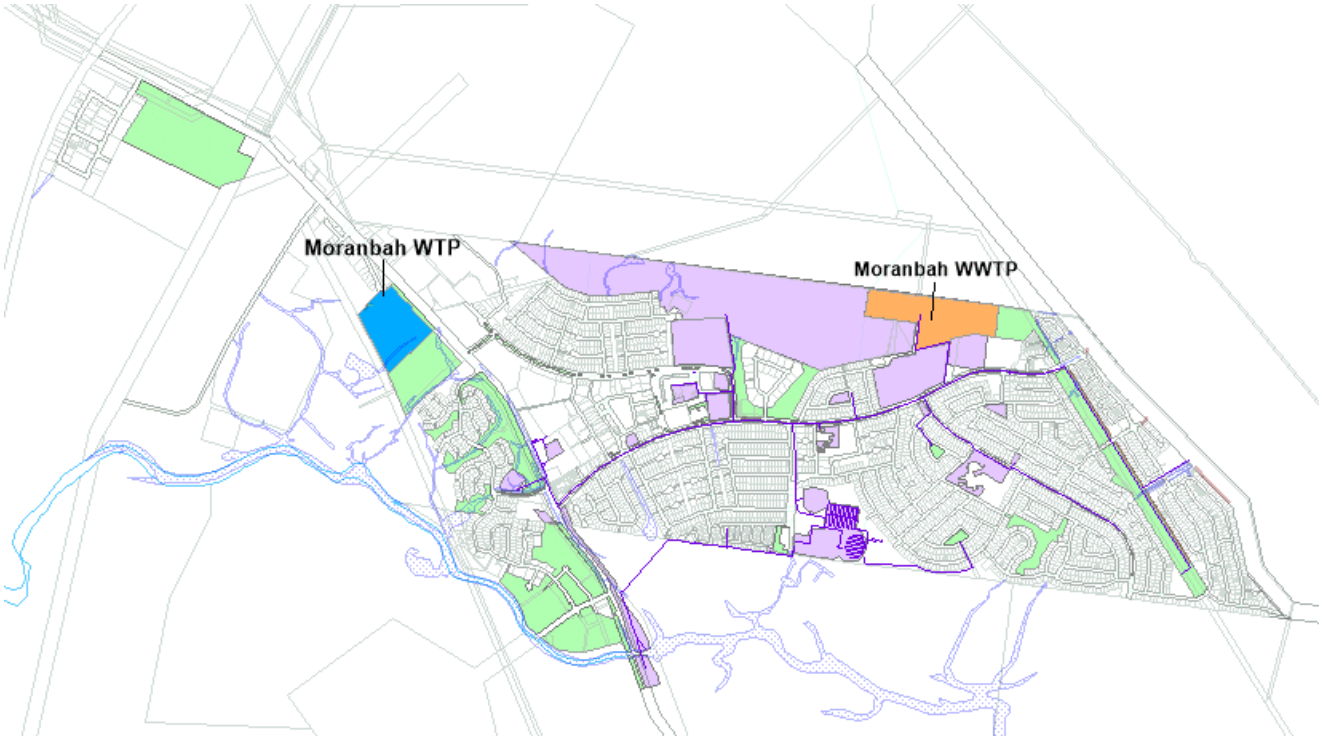


Figure 7: Moranbah Recycled Water (irrigation) Network with existing (purple) and future (green) irrigation areas

Table 6: Moranbah Recycled Water Scheme Plant and Network Pipeline Details (source – IRC GIS Data Set (January 2019))

Asset Type	Asset Name and Description	Description / information	Capacity and Typical Operation
'Recycled Water Polishing Plant	Polishing Plant – disc filters Chlorination UV treatment	Used for irrigation	50 L/s (at 80 m head – TBC)
Recycled Water Pump Station	Pump station Truck filling point	Pumps Recycled Water to the network First connection on the network, to enable truck filling for irrigation and dust suppression	50 L/s at 80 m head Typical fill rate 10-20L/s (based on hydrant flow)
Irrigation Network	No size, dia. or material data available in GIS	Not available	Not available
Water meters	Recycled water meters for customer	End user usage	
Private Assets	Golf course dam Private pipework	N/A	N/A

2.4 Stormwater Systems, Natural Springs and Local Waterways

2.4.1 Overview

The township is slopes from higher areas in the northwest and through the centre of the township, falling away to the lower areas to the west, south and south east. The township is bounded by the perennial Grosvenor Creek to the south, and the perennial Isaac River is some distance to the east of the township.

2.4.2 Local Waterways

Near Moranbah, Grosvenor Creek varies between incised clay bedding and alluvial sands, with water holes forming during periods of no flow. During infrequent periods of high flow, Grosvenor Creek breaches its banks and floods the nearby land. It is noted that some nearby land is under development for future growth and may be prone to flooding. Grosvenor Creek is also used and valued for recreational activities by the local community.

The Isaac River has predominantly an alluvial bed near the town, with minimal to no surface water flows during the dry season. Figure 8 illustrates Grosvenor Creek, and the direction to Isaac River.

2.4.3 Stormwater Infrastructure

The stormwater drainage system transfers surface flows from the town centre and northwest ridge to multiple outfall points at the outskirts of the towns. From these outfalls the water is dispersed to land and follows natural surface flow paths to the local waterways.

Pipe and pit stormwater infrastructure services the town, and is located along one or both sides of most roads within the township. Subsurface drainage is installed at the sporting grounds and BMX track. Swale drains are around the eastern area of town.

Table 7 summarises GIS stormwater infrastructure data, and Figure 8 illustrates the formal drainage infrastructure (dark green), open swale drains (light green) and surface waters (blue) at Moranbah. The narrower surface waters show in Figure 8 are ephemeral drainage lines that deliver water to Grosvenor Creek via overland flows.

Figure 8: Moranbah Stormwater Network with formal drainage infrastructure (dark green), open swale drains (light green) and surface waters (blue)

A current stormwater infrastructure improvement project on Forrest Drive proposes to relocate the existing DN750 stormwater outlet, which currently discharges to private property. This will be extended along Forrest Drive and discharging beyond this property to land adjacent to the WWTP entrance road, resulting in all flows being diverted through the WWTP land.

There is an opportunity to extend this drain across the Forrest Drive, to discharge to the south side of the WWTP Effluent Storage Ponds. This would provide an opportunity to capture this stormwater in a new retarding basin adjacent to the existing treated effluent storage ponds, to be available for reuse.

Table 7: Moranbah Stormwater Asset Summary (source – IRC GIS Data Set (January 2019))

Asset Type	Asset Description	Additional Information
Drainage Pipework	Total Length: 3,790m	Size: 100 – 1500mm dia. Material types: RCP (fibre or steel reinforced), PVC
Drainage Box Culverts	33 No. Total Length: 630m	Size: 450x450mm to 2700x900mm
Pits	1420 No.	
Outfalls	85 No.	Discharged to overland flows or waterways

2.4.4 Potential to Harvest Surface Flows from Grosvenor Creek

Given the proximity of Grosvenor Creek to the Council's Raw Water Reservoir 3, 3 that supplies the WTP; there is opportunity for Council to investigate the potential to harvest water from the creek during periods of high flow. This investigation should consider at a minimum the optimal location and method of extraction, harvesting potential and its reliability, approvals requirements and likely water quality impacts on the WTP.

The nearest the creek bank comes to the Reservoir is approximately 200m distance. Figure 9 highlights (in yellow) the creek area that may be considered for a suitable extraction point, based on reservoir proximity.

A purpose-built river offtake, pump station and power supply will be required that can operate reliability in normal and flood flow conditions. Environmental restrictions and seasonal silt flows are likely to preclude construction of a weir across the waterway, but other offtake designs can be used.

It is envisioned that pumped extraction will be opportunistic and be limited to flow conditions where extractions do not adversely impact environmental flows in the creek, or the rights of other permitted users.

The available volume and reliability for harvesting flow from Grosvenor Creek would usually be determined through an IQQM review, submitted to DNMRE for approval.

The operational limitations of existing IRC infrastructure may limit how this diversion, if available, can be used:

a) with a 400 ML Raw Water Reservoir providing less than 2 months storage would imply that this potential resource would be suitable for substitution of existing supply from SunWater and BMC not for an additional supply. Additional raw water storage may be required for this to provide additional supply.

b) Water quality issues and blending requirements in the Raw Water Reservoir may determine the flow rate that can be extracted.

c) Drinking water quality risk assessment will be required to assess whether these flows are of acceptable quality given the open catchment and upper catchment land use including mining and agricultural activities

All of these issues can be included in a suitably scoped investigation and feasibility study.

Figure 9: Grosvenor Creek High Flow Water Harvesting Potential Locations (yellow highlight)

2.4.5 Other Potential Local Water Harvesting Opportunities

Other local water harvesting opportunities have been identified in discussions with Council officers.

The available volume and reliability for harvesting from these sources will also be determined through an IQQM review submitted to DNMRE for approval, because otherwise these flows would discharge to Grosvenor Creek.

Council is currently investigating the raising of Sarchedon Drive, adjacent to the Moranbah Racecourse, for flood mitigation, requiring the construction of two retarding basins east of the road (refer Figure 10). This may provide an opportunity to harvest water in the wet season, however water quality issues associated with road drainage, including petrochemicals and gross litter contamination, would need to be investigated and practical mitigation options identified.

The details of the proposed retarding basins are estimated by IRC E&I department, and are anecdotally noted as follows:

Retarding Basin 1	Retarding Basin 2
Q100 flowrate – 6.8 m3/s Outlet pipe – 450 RCBC	Q100 flowrate –2.1 m3/s Outlet pipe – 950 RCP

There is opportunity to harvest this water during wet weather, which may consist of diverting basin 2 flows to basin 1 and diverting this flow to the north east of the racecourse and then south east to the Raw Water Reservoir 3.

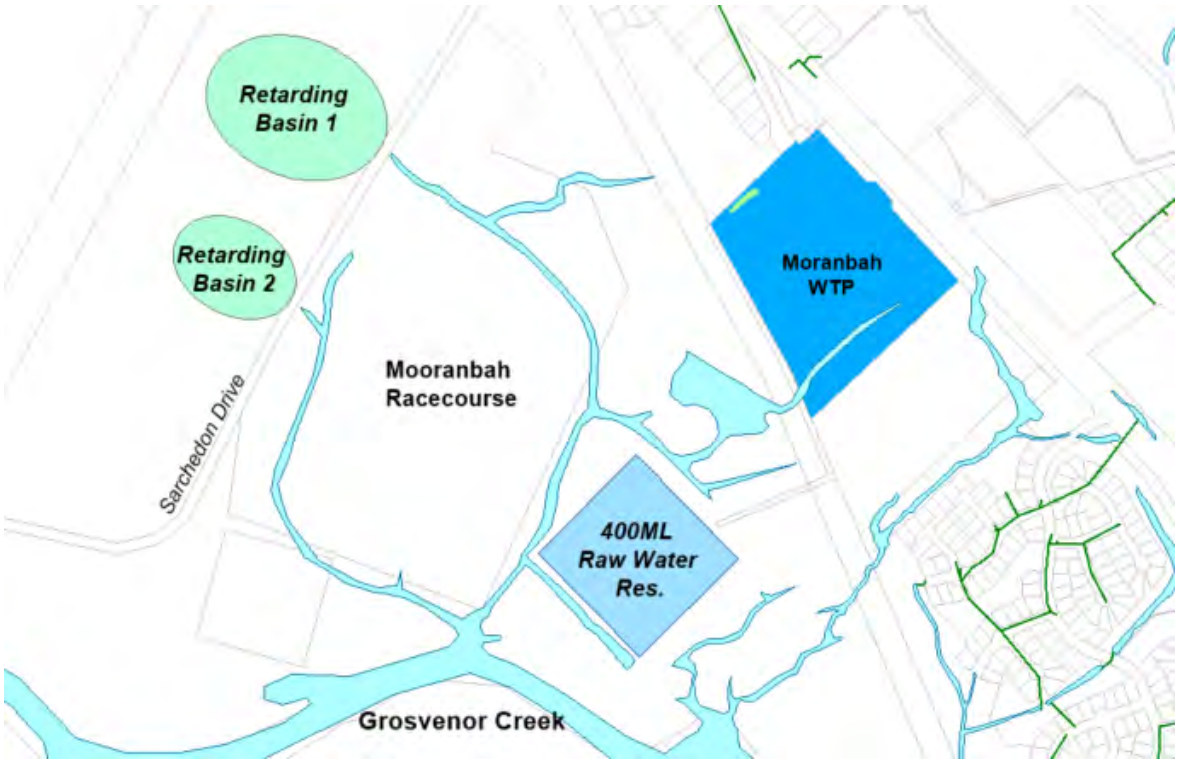


Figure 10: Sarchedon Drive Retarding Basin Water Harvesting Location

2.4.6 Natural Springs

Council is aware of natural springs in Moranbah, one located near the local BMX track, and the other east of Goonyella Road (Moranbah Access Road), near the Grosvenor Creek Bridge and Apex Park. Figure 10 illustrates the location of these springs. No flow measurements are available, however the Grosvenor Creek spring is anecdotally reported to produce flowing waters significant enough to near fill a 100mm diameter pipe under gravity flow", which may notionally be 10 L/s or 1 ML/d. This could be a useful water harvesting

opportunity that could warrant further investigation. Also no investigations have been undertaken to determine if these local springs are linked to river flows and river levels.

Simple water quality testing of local spring water for salinity and for trace heavy metals would provide valuable information for this assessment.

The spring near the BMX was recently identified by Council when the BMX underdrainage was installed to divert groundwater seepage that was compromising the soil strength and effective use of this site. Anecdotal observations noted that the excavated pits filled with groundwater, but did not overflow the pit.

Underdrainage is installed at the main sporting grounds also, due to their relatively low level and to prevent groundwater affecting the playing surface. The extent of seepage is not known.

2.4.7 Summary of Alternate Water Harvesting Opportunities

The following potential opportunities for harvesting stormwater and natural springs water at a number of locations were identified:

- Harvesting of Grosvenor Creek water during high flows, at a suitable location near the 400ML Raw water reservoir
- Harvesting of the natural spring near the Grosvenor Creek bridge and APEX park
- Harvesting of the natural spring/ surfacing at the BMX track
- Stormwater diversion along Forrest Drive to either a new stormwater retarding basin or the BMX track for harvesting
- Stormwater harvesting of proposed retarding basin water at Sarchedon Drive

Figure 11 below shows the location of these alternate water harvesting opportunities.

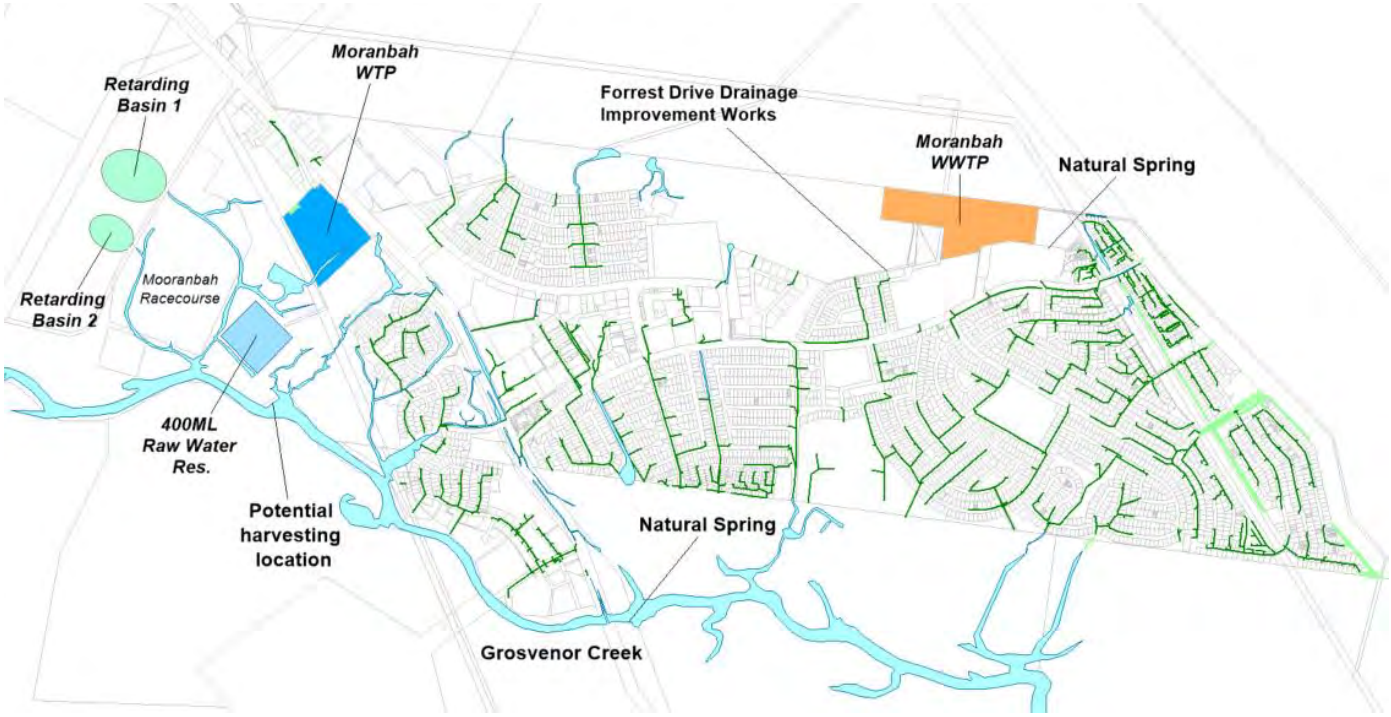


Figure 11: Location of Alternate Water Harvesting Opportunities

Alternate water harvesting opportunities are identified and prioritised in the issues and opportunities table in the following section.

3. Population and Projections

3.1.1 Existing population

The Moranbah township population fluctuates due to the transient mining industry from the resident ("permanent") population of 8,300 to 9100 [10] persons with a non-resident ("transient") population of 2300 to 2465[10] persons in June 2018. The non-resident mining population is dependent on current ongoing mine operations; and the opening or closing of a mine has doubled the town's population previously in a 12-month period from 8,000 to 18,000 people. Changes in the mine operations (ramp up or down) also have a significant impact on the township population.

The 2018 population forecast, of 10,795 persons, including 2,300 non-residents for mining personnel, was provided in the Draft Demand Management Plan (17 December 2018). Population growth rate scenarios in this report do not include specific step-changes for population associated with potential mine start-ups or shut-downs, but assumes a steady growth on the resident and non-resident mining population.

The Australian Bureau of Statistics (ABS) estimate for the Moranbah population was 9,088 persons at 30 June 2018. It does not specify how non-resident populations are incorporated in this estimate.

3.1.2 Future Growth

Historical and projected growth rates are highly variable, because of their dependence on mining activity in the region.

This report has adopted the population forecasts Scenario 2 provided in the Draft Demand Management Plan, 2018; as shown in Table 8. The projected mid residential growth rate to 2036 is 2.1% per annum, and non-residential growth to 2036 of 7% per annum.

Non-residential growth will be sporadic being highly mining industry dependant, and a projected steady growth rate may not adequately represent short term step changes in population. Council will need to be proactive in planning long lead time infrastructure such as water supply, sewerage and stormwater drainage to avoid step change sin population over-extending infrastructure capacity. For example, a new mining camp of approximately 8000 persons is being considered currently (March 2019) by external parties. These reports indicated that the camp could potentially be located along Goonyella Road (Moranbah Access Road), to the south of the town. For this reason, a sudden growth scenario involving the accommodation of 8,000 persons is also included in the infrastructure analysis in this report.

[10] Permanent population varies between reports, including ABS, IRC Draft Demand Management Plan (17 December 2018), IRC Draft System Leakage Management Plan – Phase 1 (14 January 2019), Bowen Basin Population Report (2018).

Table 8: Population forecast for Moranbah township

Population	Growth Rate	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
MORANBAH RESIDENT POPULATION	**2.10%**	8673	8786	8900	9016	9133	9252	9372	9494	9618	9743
MORANBAH NON-RESIDENT POPULATION	**7%**	2343	2507	2683	2871	3072	3287	3517	3763	4026	4308
MORANBAH COMBINED POPULATION	**Scenario 2**	11017	11293	11583	11887	12205	12539	12889	13257	13644	14051

Population	Growth Rate	2028	2029	2030	2031	2032	2033	2034	2035	2036
MORANBAH RESIDENT POPULATION	**2.10%**	9869	9998	10128	10259	10393	10528	10665	10803	10944
MORANBAH NON-RESIDENT POPULATION	**7%**	4610	4932	5278	5647	6042	6465	6918	7402	7920
MORANBAH COMBINED POPULATION	**Scenario 2**	14479	14930	15405	15906	16435	16993	17582	18205	18864

4. Water Cycle Projections

4.1 Raw Water and Drinking Water Supply and Demands

4.1.1 Water Balance for Existing Raw Water Supply and Treated Water Production

Monthly metered raw water inflows to the IRC Raw Water Reservoir No.3, monthly inflows to the WTP and monthly treated water production from CWS to town HL storages are compared in Table 9. These are summaries of IRC records provided by IRC. Daily MiWater consumption records for this period were not available to confirm customer metered consumption.

Table 9: Total Raw and Potable Water Supply to Moranbah in 2017-18

Month	Total Town Consumption (ML)	Total Raw Water Treated (ML)	Total Raw Water Received (ML)	Storage and Treatment Loss* (ML)	Total Customer Meter Usage (ML)
Jul-17	148	261	222	74	*Placeholder*
Aug-17	166	249	200	34	
Sep-17	187	247	165	-22	
Oct-17	135	167	96	-39	
Nov-17	153	162	177	24	
Dec-17	176	234	202	26	
Jan-18	203	285	228	25	
Feb-18	144	208	206	62	
Mar-18	135	206	164	28	
Apr-18	163	242	186	22	
May-18	224	291	199	-25	
Jun-18	162	264	146	-16	
Total 2017-18	**1996**	**2815**	**2190**	**193**	

* Raw Water received less town consumption

4.1.2 Moranbah Rainfall and Evaporation

Meteorological records from Moranbah WTP averaged for the period 1986 to 2007 indicate the mean annual rainfall of 507 mm and mean annual evaporation of 2,384 mm, presumably a net evaporation rate of 1877 mm per annum. This would result in a net average annual evaporation loss from the 40,000 sq.m Raw Water Reservoir No.3 of approximately 75 ML per annum.

The two circular raw water storages at the WTP site have a total area of approximately 11,000 sq.m and would result in a net average annual evaporation loss of approximately 21 ML per annum. Thus, total losses could be around 96 ML/annum.

Table 4.1 Moranbah Water Treatment Plant Rainfall Statistics (Jan 1972 – Dec 2007)

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean monthly rainfall (mm)	100.2	94.3	48.7	37.5	36.8	23	19	23.7	8.1	37.8	68.6	99.2	597.2

Table 4.2 Moranbah Water Treatment Plant Evaporation Rates (Jan 1986 – Dec 2007)

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean monthly evaporation (mm)	257.3	220.4	220.1	177	136.4	108	117.8	151.9	207.7	251	266.6	269.7	2,384

Reference: https://www.bhp.com/-/media/bhp/regulatory-information-media/coal/bhp-billiton-mitsubishi-alliance/caval-ridge/caval-ridge-mine-project-draft-environmental-impact-statement-eis/creislandresources.pdf

4.1.3 Raw Water Supply Water Balance

The very large discrepancies between 2815 ML raw water supplied to Raw Water Reservoir 3 from SunWater and BMA and 2190 ML inflows to Reservoirs 1 and 2, an apparent loss of 625 ML or 22% of volume supplied. Annual net evaporation losses from Reservoir No.3, which is approximately 200 m square (scaled from aerial photos); would be estimated at 75 ML based on a net evaporation rate of approximately 1.9 m per annum. This indicates an unexplained loss of the order of 550 ML or 20% of raw water supplied before it is transferred to RWS No.1 and No.2 and the WTP. B In addition this summary does not account for changes in storage volume between the start and end of year which need to be accounted for.

This is not readily explained unless:

a) The existing bulk meters or site meters are not accurate

b) RWS No.3 has a very large leakage rate

c) There are other uses of water from RWS No.3 other than supply to the WTP

d) Some discrepancy over water balance in the 400ML reservoir between years

This discrepancy warrants a thorough investigation to resolve this apparent major loss in raw water supplied and to establish a reliable water balance that can be monitored on an ongoing basis.

Figure 12 illustrates the trend in monthly raw water supply into RWS No.3, and raw water transferred to RWS No.1 and No.2 at the WTP. The 400 ML RWS No.3 storage capacity is used to balance these inflows and outflows when the raw water supplied falls below town consumption.

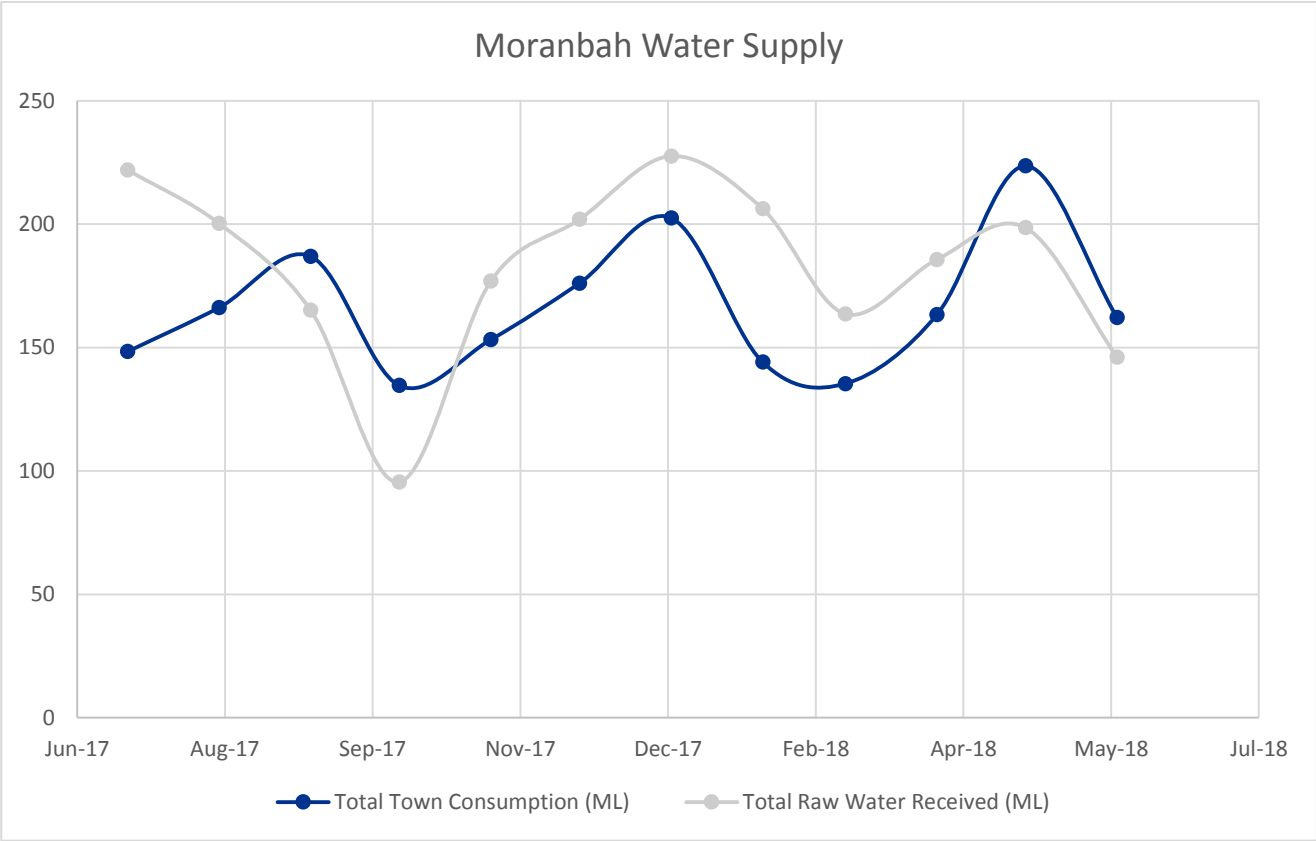


Figure 12: Total Raw and Potable Water Supply to Moranbah in 2017-18

4.1.4 Water Balance for WTP Inflows and Treated Water Production

The discrepancy between 2190 ML inflows to Reservoirs 1 and 2 and WTP treated water production at the WTP of 1996 ML are of the order of 193 ML per annum or 9% of inflow to RWS No.1 and 2.

Annual net evaporation losses from Reservoirs No.1 and 2, which are approximately 70 m diameter and 100 m diameter respectively (scaled from aerial photos); would be estimated at a total of 22 ML based on a net evaporation rate of approximately 1.9 m per annum.

The WTP process uses a significant volume of water ion discharge of waste sludge from clarifiers and to backwash filters; some of which is recovered. An efficient WTP would be expected to consume approximately 4% of the volume of water produced as waste water, in this case 4% of 1996 ML p.a. or 80 ML p.a.

This indicates an unexplained loss of the order of 92 ML or 5% of treated water produced by the WTP. This summary does not account for changes in storage volume between the start and end of year which need to be accounted for.

This discrepancy may be attributed to leakage from RWS No.1 and 2, meter inaccuracies and other uses of water around the WTP not included in these records. However, the volume of process waste water recovered via wetlands to RWS No.3 is not accounted for which would increase this apparent loss.

This discrepancy warrants a thorough investigation to resolve this apparent major loss in raw water supplied to the WTP in producing treated water, and to establish a reliable water balance that can be monitored on an ongoing basis.

4.1.5 Distribution and Reticulation Losses and Average Customer Demand

Until corresponding MiWater records and treated water production records are available, a reliable water balance for the supply of treated water from the WTP via the distribution system, high level storages and town reticulation systems to customer services cannot be evaluated.

This lack of reliable records warrants a thorough investigation to establish a reliable water balance that can be monitored on an ongoing basis; and the volume of "non-revenue water" can be measured.

The WTP treated water production needs to be allocated to revenue water (total volume metered at customer services) and non-revenue water (the difference between treated water delivered into the town drinking water supply and total volume metered at customer services). This record is not available until MiWater data is collated in the same period.

The volume of treated water produced by the WTP divided by the town population estimated by Council shown in Table 10, was an average demand of 496 litres per person (l/p/d) in 2018.

Table 10: Average daily Raw and Potable Water Supply to Moranbah per person for 2017-18

Population Type	Population 2018	Average Town Consumption (L/p/d)	Average Raw Water Received (L/p/d)	Average storage and Treatment Loss (L/p/d)
Permanent population	8673	631	692	61
FTE population	11017	496	545	48

For comparison, the nearby townships in Mackay Regional Council have metered average residential drinking water demands between 170 and 300 l/p/d[11]. The 2018 Moranbah unit consumption rate is high relative to this. However, Moranbah demand has decreased significantly since 2012, when it was estimated to be approximately 800 l/p/d.

However, this comparison is not using wholly similar data, because in 2018:

a) Treated water production at the WTP included non-revenue water losses caused by pipe leaks, pipe bursts, mains cleaning and flushing, storage overflows, meter inaccuracies, etc.; and MiWater data was not available for the same period to provide a sound estimate of non-revenue water.

b) Mackay Regional Council towns are closer to the coast with lower average temperatures and higher annual rainfall.

c) Mackay Regional Council towns have meters on each customer services and pay for use supply, which encourage efficient use of water in the house and on gardens.

d) Relevant data is needed to compare the extent to which water efficient appliances, plumbing fittings and garden watering systems (e.g. micro-irrigation) have been implemented in each town. The introduction of customer service metering and pay for use tariffs are usually an important incentive to adopt these water savings measures. Council can provide incentives also in providing water efficient plumbing fittings free or at a significant discount to customers.

4.1.6 Future Demands

Adopting the above typical demands, and referencing previously developed population growth data, the future demands are calculated for the following three scenarios:

1) Business as usual (BAU) – with no demand reduction strategy

2) Demand reduction strategy (230L/p/d)

[11] Mackay Regional Council, Engineering & Commercial .Infrastructure, Monthly Review > February 2019

3) BAU + new mining camp (8000 persons) in 2020

4) Demand reduction strategy + new mining camp (8000 persons) in 2020

The Water demand trend for the above scenarios is illustrated in the chart provided in Figure 13 below, and the associated tabulated data is provided in Appendix B. This chart illustrates an indicative reduced demand based on the Queensland average water demand of 230 L/p/d.

The WTP has a capacity of around 21ML/D[12], though the flash mixing unit may need upgrading to achieve this flowrate (flowrate capacity of this process unit not specified). Network limitations were not analysed, though were previously assessed in the Moranbah Water Master Plan, 2012, where high level reservoirs were noted to be significantly undersized, and aspects of the network could not achieve adequate peak hour pressure or fire flows. The CWS and distribution reservoir storage requirements were conservatively checked and are less than the available storage for BAU beyond 2036, though may exceed available storage after 2033 for BAU plus the mine camp (this requires confirmation using currently township demands).

As the township population has not significantly changed, previous water system investigations and strategies remain relevant today. These strategies however do not incorporate demand reduction, leakage management or imminent potential mining growth.

Some road and serving infrastructure has been constructed to service the potential 8000 person mining camp, however existing networks have not been augmented to accommodate the doubling of water demands and sewerage flows.

Some of this area under development is prone to flooding from Grosvenor Creek, and this will be exacerbated by the development of this land, associated impervious areas and stormwater network.

The fluctuation of population has a significant impact on the ability of infrastructure to provide the agreed level of service (LOS) to all customers.

Water meters are recently installed in the township and water usage charging is a recent policy implementation by IRC. Comprehensive water meter data will provide consumption at the customer meter and indicate network losses and total non-revenue water. Demand management and leakage management plans are underway, with recommendations that assist with identifying total non-revenue water and lowering the current demand rate.

4.1.7 Benefits of Improvements in all Water Balances to Reductions in Losses

BMA provides bulk raw water to the Moranbah RWS No.3 at a significantly discounted price for the first 1,825 ML p.a, compared to the higher price per ML in excess of 1,825 ML p.a. This agreement began on 2 March 2016 and runs until 2040. Current Moranbah raw water usage typically exceed 1,825 ML p.a. prior to May of each year. Very significant savings can be made by reducing the 2018 raw water supply volume of 2815 ML p.a. to a much lower volume by reducing all the losses indicated above.

Two scenarios provide estimates of possible water savings in Moranbah are illustrated in Table 11. In both cases Scenario 1 with customer average usage reduced to 300 l/p/d and significant savings or resolution of discrepancies in measured flows; and Scenario 2 with customer average usage reduced to 300 l/p/d, with similar savings; both Scenarios reduce the necessary raw water supply in 2018 to less than the BMA Agreement trigger of 1,825 ML p.a. for increased raw water price per ML.

Table 11: Estimate of Possible Water Savings

	2018 Consumption	Scenario 1	Scenario 2
Population	11017	11017	11017
Average Demand (l/p/d)	451	300	200

[12] Moranbah Water Treatment Plant

Annual Customer Demand (ML p.a.)	1814	1206	804
Distribution losses 10%	181	121	80
WTP Production	1995	1327	885
WTP Waste Water 4%	80	53	35
Evaporation RWS No.1 and 2 - ML p.a.	22.0	22.0	22.0
Other WTP/RWS 1 and 2 losses - ML p.a	92.2	4	3
Total inflow to RWS 1 and 2	2189	1406	945
Evaporation RWS No.3	75	75	75
Other losses RWS No,3 ML p.a.	551	70	47
Total Raw Water Supply	**2815**	**1551**	**1067**

The development of an effective Integrated Water Cycle Management (IWCM) strategy for Moranbah requires Council to:

a) adopt justifiable population growth targets

b) adopt realistic customer demand targets

c) implement effective water savings measures to bring Moranbah unit demands within expected targets

d) implement a reliable water accounting basis and water balances for each section of the supply that can be monitored on an ongoing basis and provide reliable triggers with sufficient lead time for improvement of water supply assets, operations and performance to service the development of the town

Adopting the above typical demands, and referencing previously developed population growth data, future demands have been calculated for the following four scenarios:

1) Business as usual (BAU) – with no demand reduction strategy

2) Demand reduction strategy (300L/p/d)

3) BAU + new mining camp (8000 persons) in 2020

4) Demand reduction strategy + new mining camp (8000 persons) in 2020

The Water demand trend for the above scenarios is illustrated in the chart provided in Figure 13, and the associated tabulated data is provided in Appendix B. This chart illustrates an ambitious reduced demand based on nominal average water demand of 300 L/p/d.

The WTP has a capacity of around 21ML/D[13], though the flash mixing unit may need upgrading to achieve this flow rate (flow rate capacity of this process unit not specified). Network limitations were not analysed, though were previously assessed in the Moranbah Water Master Plan, 2012, where high level reservoirs were noted to be significantly undersized, and aspects of the network could not achieve adequate peak hour pressure or fire flows. The CWS and distribution reservoir storage requirements were conservatively checked and are less than the available storage for BAU beyond 2036, though may exceed available storage after 2033 for BAU plus the mine camp (this requires confirmation using currently township demands).

As the township population has not significantly changed, previous water system investigations and strategies remain relevant today. These strategies however do not incorporate demand reduction, leakage management or imminent potential mining growth.

[13] Moranbah Water Treatment Plant

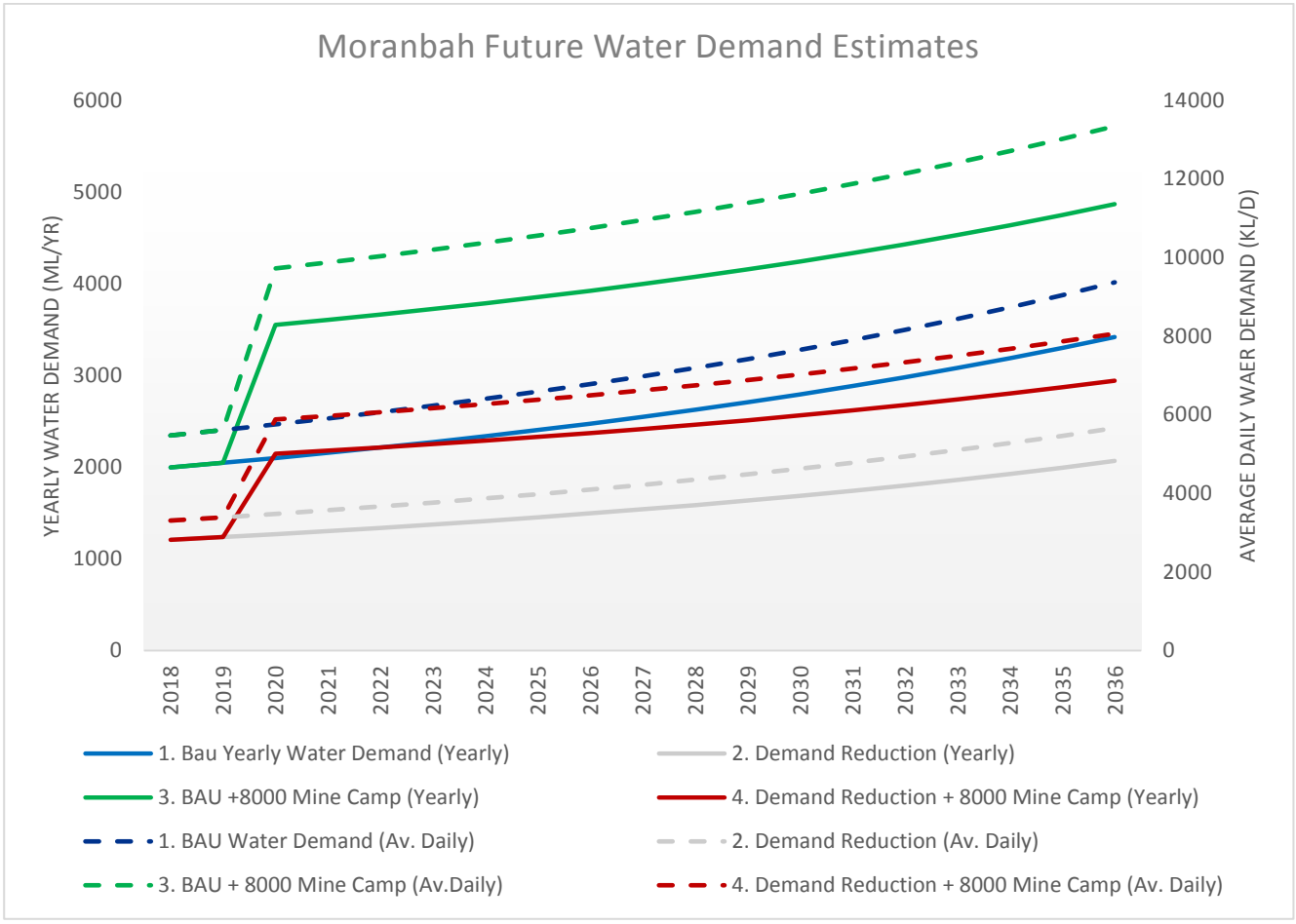


Figure 13: Moranbah Water Demands for the four future scenarios

4.2 Sewerage System

4.2.1 Existing Flows

The WWTP inflows are metered. The treatment plant is licenced to treat sewage for 10,000 to.50,000 Eps. The nominal treatment capacity for Plant 3 is 2,800kL/d and 780kg BOD/d assessed by IRC as sufficient to service 14,000 EP. With Plant 2 online, the total treatment capacity increases to 3600 kL/d and 1000kg BOD/d and is rated to service 18,000 EP)[14].

Inflows to the WWTP were 790ML/yr for 2017-18, which is an average flow of 196 L/p/day flows for a population of approximately 11,040 persons. Comparable inflow measurements in 2015 indicated this has reduced from around 250-290L/p/d[15] which was considered high, and was at a time when the estimated water usage was between 700Lp/d and 1000L/p/d. This also indicates that groundwater infiltration is a relatively low proportion of flow because an average flow rate of 196 L/p/day is not excessive.

WWTP inflows were 39.5% of township treated drinking water consumption for 2017-18.

Treatment process losses are presumed to be minimal, however the combined treatment and evaporation losses from the effluent reservoirs, for a surface area of 100,000 sq.m and net evaporation of 1900 mm per year, are around 190ML if the reservoirs are full all year round. It will be less if they are empty for any significant period.

Current treatment plant volumes are estimated to be indicatively as per the following table.

Table 12: Indicative Total Yearly and Average Daily Sewer flows and Treated Effluent flows for 2017-18

Population Type	Population 2018	Average WWTP inflow (L/p/d)	Total WWTP Inflows (ML)	Total recycled water supplied (ML)
FTE population	11,017	196	788	696

4.2.2 Future WWTP Inflows

The WWTP inflow trend for each of the four population growth scenarios identified in Section 4.1.7 is illustrated in the chart provided below, and the associated tabulated data is provided in Appendix C. WWTP Plant 2 capacity is nominally 2.8 ML/D (14,000 EP using above per capita rate).

Peak wet weather flows have not been investigated in this report but have been reported to be 1.5 to 2 times Average Dry Weather Flows[16].

Network limitations were not analysed, noting that pumping flowrates and capacities are not well understood. Council considers it is likely that Pump Station 1 is at or near capacity.

The following chart indicates the Plant 3 capacity will be exceeded by 2027 (based on projected EP) for BAU scenario, or 2020 if the additional 8000 EP mine camp proceeds immediately.

[14] Moranbah Sewerage Treatment Plant Operation and Maintenance Manual, 2012
[15] Moranbah Sewerage Treatment Plant Audit Report, 2015
[16] Not revised in this report, though indicated to be around 1.5 x ADWF for 2014-15 plant inflow analysis, Moranbah STP Audit Report 2015

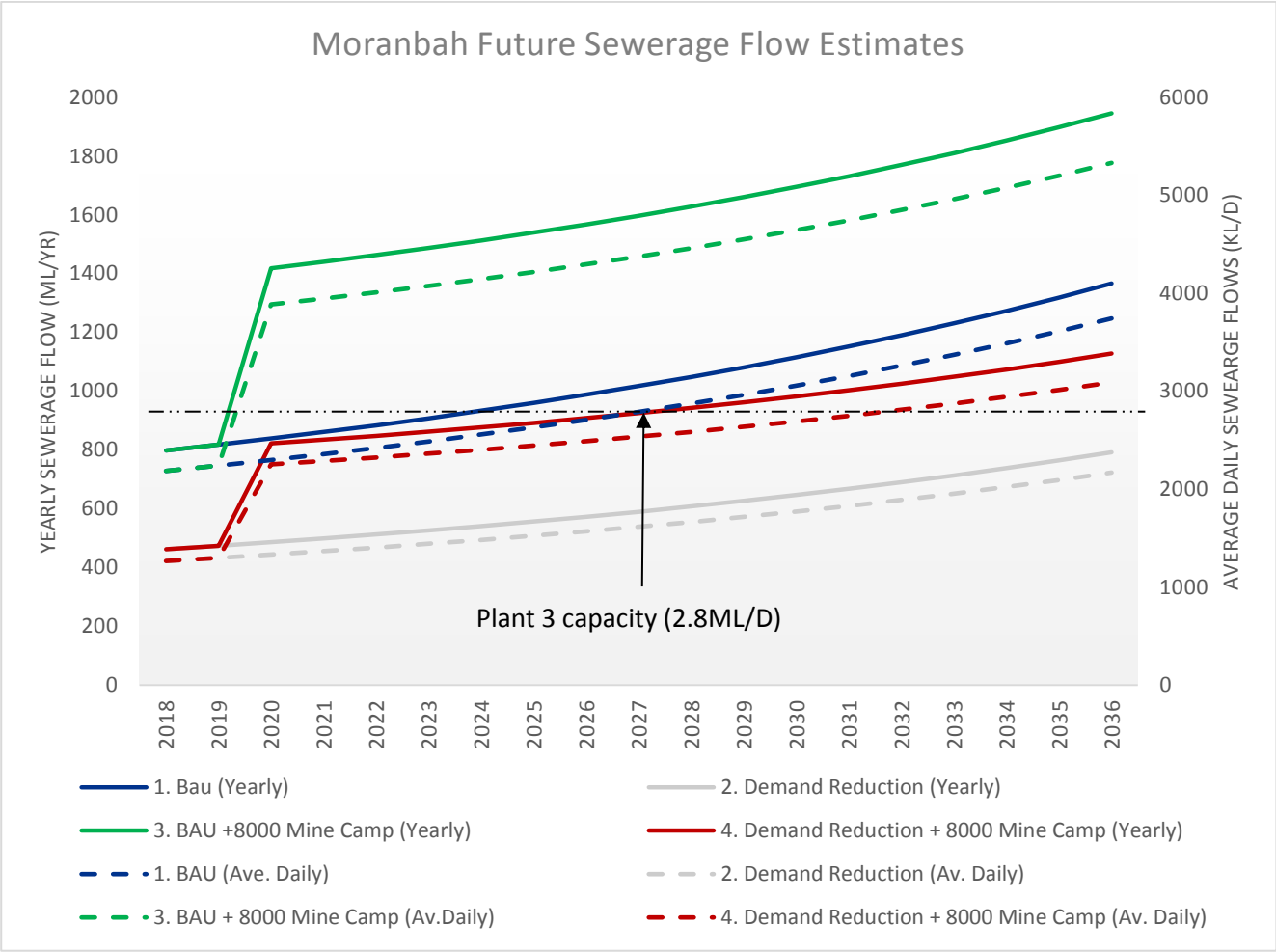


Figure 14: Moranbah Sewerage Flows for the four future scenarios

4.3 Recycled Water System

The recycled water system has only recently begun to be metered. Table12 summarise the volume of recycled water pumped from the WWTP, between 28/10/18 – 27/1/19, recorded across an unusually dry wet season.

Water allocations are controlled by the IRC document *Moranbah Allocation – Recycled Water (V9)*, which indicates tiered extraction limits for each user based on the availability of Treated Effluent water for polishing and distribution. These limitations are also reflected in the End User Agreements (EUAs).

To allow for network capacity constraints, irrigation water scheduling is rationed between users, which is usual practice in irrigation systems and cost effective in terms of capital asset expenditure.

There are anecdotal reports that some recycled water customers are using far more water than is allowed for in their EUAs or taking supply outside their scheduled extraction times. Conversely other recycled water allocations are only partially used each year, well below their allocation. This has an impact on available irrigation water supply and potentially the available network capacity.

It is apparent that Council could reconsider the allocation volumes and extraction times to mitigate impacts on wet season storage, and available supply during the dry season, and enable effective management of the recycled water irrigation water supply system.

Assuming the recently metered wet season irrigation demands in Table 13 are representative of average demands, (780 kL/d) the total yearly demand for 2018-19 is predicted to be 284ML. This is far less than the

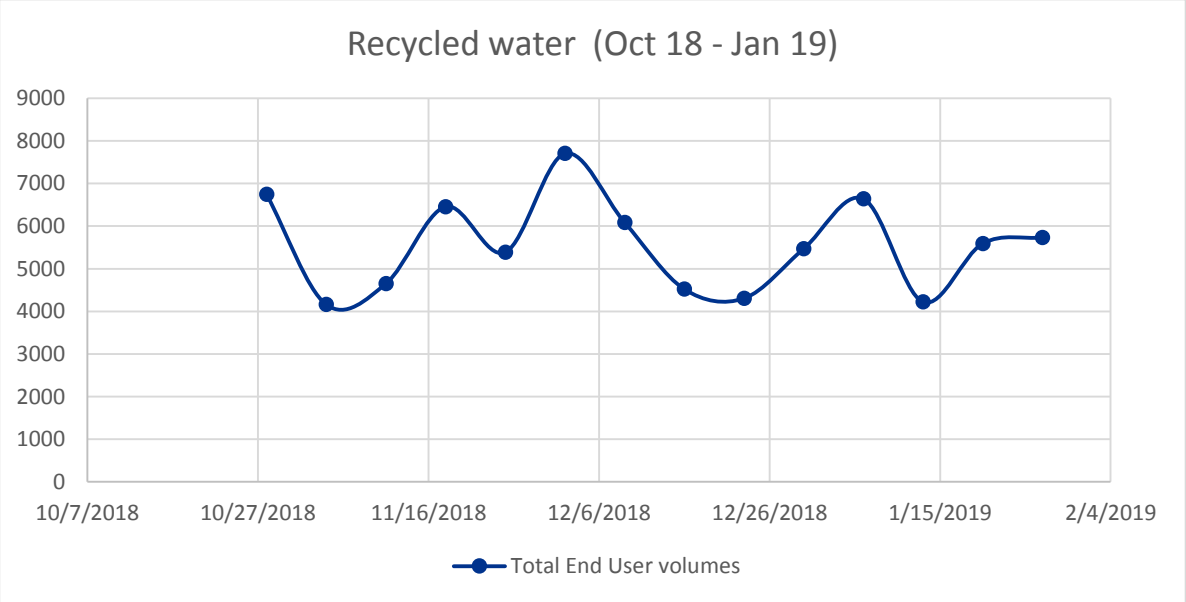
current treated effluent water available for treatment and reuse of approximately 790 ML p.a. It is reported that supply runs low during the dry season and there is significant excess water discharged from the WWTP during the wet season. If the mining accommodation expansion proceeds in the short term, significantly more Recycled Water would become available.

Additional effluent storage would assist with balancing the seasonal flows and demands, and it is proposed that the potential cost- benefit of additional storage be established prior to new works proceeding.

Table 13: Recycled Water Demand in Moranbah 2018-19

Week ending	Total End User volumes (kL)
Total for 4 months (28/10/18 – 27-1/19)	77, 676
Average daily	779
Estimated Yearly	284,000

Figure 15: Seasonal Recycled Water Supply to Moranbah in 2018-19



There is no secure Recycled Water storage for network security in the event of ESP effluent quality or the WWTP process were compromised. Operational measures are used to minimise the impact of algal blooms on the extracted water quality. The EUA restricted allocation measures can be implemented if necessary.

The level of service and reliability of the irrigation network should be revisited to determine customer needs and potential for increased Recycled Water use, pa4rticukaklry to substitute drinking water use for non-drinking water purposes. The requirement for dedicated Recycled Water storage can be investigated at this time also.

4.3.1 Future Demands

Future demands for the Recycled Water as an irrigation supply are unlikely to change significantly with population growth unless third pipe reticulation is added to future developments. They will be potential increase in demand due to climate change influences for existing customers. At this stage future growth is unable to be planned for until future development of mining accommodation is determined.

The availability of Class A, or even class B/C water provides limited opportunities for use in agriculture, for farmland within a few kilometres of the plant because the volume of water available is relatively small in terms of broad acre irrigation and may have more application in some form of horticulture.

It is noted the network components, and possibly the treatment components have limited capacity to service substantial additional demands without augmentation.

A detailed study and economic analysis for potential growth in the use of available recycled Water resources is warranted as part of the IWCM strategy development.

4.4 Alternative Water Supply

The total yield of potential and suitability of water quality from stormwater harvesting or other identified alternate water harvesting opportunities, is yet to be determined. This seasonal opportunity requires further investigation, and it is anticipated that this will be completed in a collaborative approach as part of the IWCM strategy development.

The two main opportunities with the highest yield potential are:

- Grosvenor Creek high flow harvesting, and
- Proposed Sarchedon Drive stormwater retarding basin - opportunistic harvesting,

An IQQM model should be obtained from DES, the potential yield identified, the IQQM updated with the proposed extractions, and then sent to DNMRE by IRC. This is required to begin discussions with DNMRE and the approvals process for water harvesting.

Investigation for groundwater sources (natural springs) should also consider potential impacts of recycled water volumes and frequency on groundwater levels through infiltration, as this may impact the water quality and end use.

5. Levels of Service

IRC Customer Service Standards (CSS) are intended to align with industry best practice aim to achieve standard of service that are acceptable to customers and achieve IRC's regulatory compliance obligations. The CSS for Water and Wastewater focusses on water quality, and prevention of service outages, the issues with greatest customer impact.

Levels of service for drinking water and sewer services conform to Queensland Government requirements and may be found at https://www.isaac.qld.gov.au/water-quality.

Levels of service for recycled water customers are in accordance with the individual IRC - customer agreements, which includes a set water allocation volume that varies based on available treated effluent water, set times for irrigation water extraction. There is no guarantee of water quality beyond the network directly connected to the polishing plant.

Levels of service for stormwater and drainage were not identified in these documents, though are understood to be in accordance with relevant Queensland Government requirements.

Table 14 below summarises the Water and Wastewater Customer Service Standards.

Table 14: IRC Moranbah Water and Wastewater Customer Service Standards

Customer Service Parameter	Standard
Total water main breaks	<30 per 100km/year
Incidence of unplanned interruptions - water	<50 per 1,000 connections/ year
Average response time for water incidents (burst and leak)	<4 hours
Drinking water quality compliance	100%
Water quality complaints	<20 per 1,000 connections/ year
Total sewerage main breaks and chokes	<20 per 100km/year
Average response time for sewerage incident (including main breaks and chokes)	<4 hours
Total water and sewerage complaints	<50 per 1,000 connections/year

6. IWCM Issues, Opportunities and Options

6.1 Issues and opportunities

A preliminary list of issues, opportunities and options for development of the IWCM strategy for Moranbah have been identified in consultation with key representatives from the IRC's water and wastewater (Operations, Planning & Projects), and Environment (Stormwater) departments in a meeting on 5th March 2019, and through interrogation of system and metered usage data provided by IRC. These issues are listed in Table 15 below.

Potential actions for solution development have been identified and their relative priority has been indicated, for consideration. Items explicitly identified as of highest concern are identified with a high-high priority, with other opportunities marked as high, medium and low (no low-low items on the list). The prioritisation of items was reviewed and reassessed by IRC representatives, Neville Bell and Tom Dippel, on Thursday, 9 May 2019.

The highest priority management issues identified are drinking water supply security, quality and affordability.

Table 15: Issues and Opportunities for Investigation and Actions for Resolution

	Issue / Opportunity	Actions to resolve the Issue	Priority
	General		
G1	Data gaps as listed in Appendix C	Address data gaps to enable completion of the IWCM for Moranbah	High
	Water Supply		
W1	Raw Water reliability – Supply Security *Water Supply from the Mining allocations is not mandated by government to be the highest supply priority, thus there is a critical risk of Mining allocations being provided for first. Dams may not have enough water or infrastructure may not have enough capacity to meet competing demands – some townships in Qld have not received supply for weeks.*	Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses Establish "water order" schedule so water supply delivery is planned, and 400 ML Res 3 provides some backup for short term short fall Proactively engage DNMRE and other key State Government departments to establish guaranteed raw water supply governance rules for the township as the highest priority.	High-High
W2	Raw Water reliability – Quality & Quantity *Quality issues with source waters and Raw Water network operations has identified a vulnerability to supply quality failures*	Investigate alternate raw water sources, including stormwater harvesting, Negotiate control of receiving waters, so that poor water can be bypassed to BMA or halted, and received waters isolated and managed between the three raw water reservoirs. Conduct detailed study of raw water quality data and WTP performance to identify WTP improvements and raw water management improvements needed to provide reliable WTP performance. Develop a risk management plan for the WTP and adequate upstream monitoring to inform treatment process operations to manage changes in quality	High-High
W3	Raw Water Supply Risk – BMA supply affordability	Investigate alternate supply opportunities.	High

	Risk of BMA supply reliance becoming unaffordable for local residents	Implement demand management plan, (including high user demand management) Complete leakage management investigation (confirmation of network losses – using MiWater data, H/L reservoir flows and levels, and WTP outlet flows) and identify mitigation works, Incorporate into Leakage Management Plan. Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses	
W4	Potable Water Demand reduction from 496L/p/d to 230-300L/p/d (nominal) *Reduction in demand increases system capacity and some supply security, deferring system augmentations.* (note: demand reduction from 800L/EP/d in 2012)[17]	Refer IRC Demand Management Plan for continued actions. Establish reliable water balance to prove monthly demands and targets to minimise water demand in terms of preventable losses	Med
W5	Potable water supplementation for non-potable use *As above*	Investigate alternate water sources for residential and major use customers and per the IRC Demand Management Plan. This may include rainwater tanks, or class A third pipe network to residential properties. This supports W1, W2, W3 and W5.	Med
W6	Water Network optimisation	Revisit network layout and operation philosophy, and identify optimisations which consider asset life expectancy, LOS, energy use and operational cost, future growth (W5) and demand offsets (W3, W2, R4).	Med
W7	Future Growth – Inclusive of dramatic population influx from mine operation increase	Identify capacity issues in the existing township network and treatment plants for water, (plus wastewater and drainage). This includes confirming EP inclusive of non-residential demands, network augmentations for pressure and fire flows, high level reservoir redundancy via bypass pumping, and review of storage capacity and WTP process component constraints. Negotiate contributions for capacity upgrades in existing network and treatment plant infrastructure. Consider negotiations for raw water supply, with support from DNMRE and State Government to guarantee raw water to the township as the highest priority. Consider water sensitive design in new development areas to enhance water storage in soils and reduce potable water demand for private and council irrigation.	Med (this will be high where significant mining population influx is confirmed)
	Sewerage		

[17] Moranbah Water Supply Strategy 2012

S1	Network asset condition - failures increasing due to end of life, high corrosion and H2S attack on susceptible materials (including maintenance holes).	Investigate the condition of the network via CCTV condition assessment and other inspections if needed. Develop a prioritised capital works program targeting high risk and synergistic projects, This relates to network optimisation study (S2) and capacity planning (S3, S4)	High
S2	Network optimisation – capacity risks and asset renewals provide an opportunity to rethink the operation of Moranbah network. Scheduled CCTV inspections will highlight H2S attack and main replacements	Review of existing system, including pump operations and connection to the gravity system or other pump stations, review of energy use in potential configurations and operation scenarios. This relates to network asset condition (S1)	Med
S3	Treatment Optimisation – capacity risks may require the review of the existing treatment process to extend capacity	Review by specialist for maximising the capacity of the existing treatment trains and potentially inclusive of sludge treatment. This is to minimise odour issues and extend the current treatment capacity. This may include pilot trial of varying treatment configurations/settings.	Med
S4	Future Growth – Inclusive of dramatic population influx from mine operation increase	Develop reliable sewer network, pump station and pressure mains model to accurately determine the impact of flows from additional 8000 population and identify the system components that must be upgraded before this increase occurs Refer W1 This should be considered in relation to S1 and S2	Med (this will be high where significant mining population influx is confirmed)
	Recycled Water		
R1	Quality of effluent water leaving WWTP effluent storage ponds, impacts on polishing plant performance	Investigate the risk of known poor water quality and its variations on the performance of the polishing plant to meet Class A standards consistently. Investigate process mitigation measures. Consider the opportunity and benefit of mitigating pond related contamination by installing a small treated effluent tank to directly feed the polishing plant in this investigation.	Med
R2	Greater supply of recycled water than demand, and seasonal demands *Of concern is the treated effluent storage capacity, and Plant 3 treatment capacity which is exceeded upon connection of 8000EP or by 2027 for BAU.* *In addition, the 8000EP increase recycled water supply by over 40%, requiring significant additional recycled water users, or other effluent disposal options.*	Obtain approvals for additional irrigation areas, investigate future irrigation areas including irrigated agriculture opportunities, identify any consistent (non-seasonal) supply opportunities, or private onsite storage opportunities Develop greater structure around Recycled Water governance, to encourage onsite storages so as to offset any future storage requirements (especially considering potential significant growth	Med
R3	Lack of post treatment storage, with only private storage at Golf course	Investigate other options for supply quality reliability	Low

	Storage of (some) Class A irrigation water is at the Golf course, which compromises water quality and supply for other customers taking from this storage dam. *There is no other storage of treated irrigation water at the WWTP, which limits supply security*		
R4	Class A water use as 3rd pipe scheme in proposed mine camp and new development areas This will reduce demands on the Drinking Water supply	Investigate the requirements to mandate third pipe network in to new development, and any additional requirements for Class A distribution scheme.	Med
	Stormwater and Drainage		
D1	Surface water harvesting opportunity – Grosvenor Creek: Water extraction from Grosvenor Creek during high flows typically occurring during normal to wet 'wet seasons' (above minimum extraction flowrate threshold – to be determined). .	Complete feasibility study on the stormwater harvesting opportunity at Grosvenor Creek. Investigate infrastructure capacities and requirements for diversion and transfer to storage, water quality impacts on the WTP. Determine harvesting yield - Timing, availability and reliability, investigate extraction and infrastructure impacts on waterways, and on other uses. Consider risks associated with any upstream discharge by mines/ industry. Consideration of Water Quality and thus treatment process impacts to be explored Complete IQQM for submission to DNMRE extraction approvals.	High
D2	Stormwater harvesting opportunity – proposed road elevation and retarding basin	Complete feasibility study to concept design with appropriate hold points in conjunction with the drainage department at IRC. Study to include harvesting yield potential, water quality risks, WTP performance impacts and ROI for original project augmentations	Med
D3	'Natural springs' and associated disused standpipes These natural water sources may provide	Investigate the source cause, reliability and potential for harvesting of the multiple small 'springs' around town, including the BMX area, the large sports fields and the higher flow spring near Apex park.	Med
D4	Drainage works at Forest Road for outfall diversion near STP	Work with drainage department to ensure deviation project does not result in flows being diverted onto the WWTP site. Flows may able to be diverted to the south side of the effluent treatment ponds or a separate new stormwater pond adjacent to the WWTP.	Med
D5	Future Growth – Inclusive of dramatic population influx from mine operation increase	Identify capacity issues in the existing township network for drainage. Negotiate contributions for capacity upgrades in existing network infrastructure.	Low

		Consider implementing water sensitive design to enhance water storage in soils, and reduce impermeable surfaces so as to reduce peak flood impacts. This will become important in the proposed mine camp development area. Investigate impacts on surface flows and flooding, especially along Grosvenor River.	
D6	Environmental Flow contributions from WWTP Class B/C storage ponds to assist the natural	Investigate the possibility of contribution to environmental flows using excess Class B/C water (treated effluent). This may be an option – however must be considered carefully with relation to the higher priority stormwater harvesting from Grosvenor River to the Raw Water storage reservoir.	Low
D7	Stormwater Harvesting to treated effluent ponds, to offset Grosvenor River peak flows and provide some flood mitigation.	Investigate whether the available capacity in the treated effluent pond can be used to collect local stormwater, to offset Grosvenor River peak flows. The available capacity will be both real and licence condition related. To create extra capacity, investigate the potential to discharge effluent waters from the storage reservoirs to Grosvenor Creek, particularly before significant wet weather events, or anticipated wet weather events. This may be an option – however must be considered carefully with relation to the higher priority stormwater harvesting from Grosvenor River to the raw water storage reservoir.	Low

6.2 Opportunities Review and Preferred Options for Development

This section is a place holder for investigations and studies (aka. options) development, assessment (via MCA, TBL and/or Risk/Opportunity) and identification of the preferred option(s) to take forward, and when. Typically, these investigations are completed in a separate planning report, with an outline of considered options and assessment outcome provided here.

6.3 IWCM Scenario Development

This section is a place holder for the description of the bundled solutions, and identifies where complimentary or competing solutions occur. Synergies in combined solutions will develop a greater benefit to the community and its service provider, and alignment in the future direction of the IWCMS should be detailed and confirmed here.

7. Consultation /Feedback Outcomes

The consultative process is to be completed here, and should include internal, external stakeholder and greater community consultation.

The following consultation was completed in the development of the IWCM template and Moranbah Strategy:

- Proposal development meetings (multiple 2018), with Greg Searle and others
    - Outcome: refined the outcome to meet client requirements
- Kick off meeting – 12/12/2018, Greg Searle, Neville Bell, and others
    - Outcome: defined expectations and timings of project, project contact and concerns
- Conversation with GIS (Terese) – February 2019
    - Outcome: GIS data supplied
- IRC office and site visit - 4-6 March 2019, met with managers and multiple team members for compliance, operations, planning and projects, drainage & surface waters
    - Outcome: identification and collection of data sets, collection of tacit information, development of issues and opportunities, engagement of key stakeholders in the IWCMS development.
- IRC Stakeholder I&O list prioritisation (Neville Bell, Tom Dippel) – 9 May 2019
    - Outcome: refined and prioritised list of actions associated with identified Opportunities and Issues.

8. Recommendations

It is recommended that the Council undertake the following components of the IWCM strategy:

- Complete and finalise this IWCMS, including
    - Use existing studies to minimise rework
    - Completion of the data gaps rectifications – refer appendix D. This includes review of EPs including non-residential flows, identifying missing asset information.
    - Revise Issues and opportunities list (table 15) and re-rank priorities as necessary.
- Develop a IWCM Plan of actions based on the I&O list (table 15)
- The recent completion of the MiWater program provides the basis to systematically address the apparent large system losses between the raw water supply volume and the volume of water metered at customers' services. This warrants a thorough investigation to establish a reliable water balance that can be monitored on an ongoing basis to set targets for improved performance and provide the data to measure that performance.
- Action highest priority items in I&O list including:
    - Secure Raw Water supply prioritisation, via State Government negotiations
    - Investigate key stormwater harvesting opportunities, including
        - completing an IQQMs for Grosvenor Creek extraction and retarding basin extraction.
- Complete investigations and an options assessment for the identified issues and opportunities that rank high priority, and any complimentary medium opportunities where this is deemed efficient. Use previous applicable studies and local knowledge to minimise rework.

Appendix A. Population Growth Scenarios

Table A-1: Moranbah Population Growth Scenarios (source: Draft Demand Management Plan, December 2017)

MORANBAH RESIDENT POPULATION																			
Growth Rate Scenarios	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**
1.30%	8495	8605	8717	8831	8945	9062	9180	9299	9420	9542	9666	9792	9919	10048	10179	10311	10445	10581	10718
2.10%	8673	8786	8900	9016	9133	9252	9372	9494	9618	9743	9869	9998	10128	10259	10393	10528	10665	10803	10944
2.31%	8874	8989	9106	9224	9344	9466	9589	9713	9840	9968	10097	10228	10361	10496	10633	10771	10911	11053	11196
MORANBAH NON-RESIDENT POPULATION																			
Growth Rate Scenarios	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**
5%	2300	2414	2535	2662	2795	2935	3082	3236	3397	3567	3746	3933	4130	4336	4553	4780	5020	5270	5534
7%	2343	2507	2683	2871	3072	3287	3517	3763	4026	4308	4610	4932	5278	5647	6042	6465	6918	7402	7920
9%	2387	2602	2836	3091	3370	3673	4003	4364	4756	5185	5651	6160	6714	7318	7977	8695	9478	10330	11260
MORANBAH FTE POPULATION																			
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**
Scenario 1	10795	11020	11253	11493	11740	11997	12261	12534	12817	13109	13412	13725	14049	14384	14732	15092	15465	15851	16253
Scenario 2	11017	11293	11583	11887	12205	12539	12889	13257	13644	14051	14479	14930	15405	15906	16435	16993	17582	18205	18864
Scenario 3	11261	11591	11942	12316	12714	13139	13592	14077	14596	15152	15748	16388	17076	17815	18610	19466	20388	21383	22457

Appendix B. Asset Information

Table B-1: Moranbah Potable Water Network Pipeline Details (source – IRC Draft System Leakage Management Plan – Phase 1 (14 January 2019), IRC GIS data set (January 2019))

Pipe diameter	Length of pipe (m)	Average age of pipes (years)
50 mm	436	36
100 mm	28,983	38
150 mm	13,291	35
200 mm	3,129	33
225 mm	575	40
250 mm	2,782	41
300 mm	265	35
375 mm	2,908	38
450 mm	34	36
525 mm	3,854	37
Overall pipe summary	**56,257**	**37**

Table B-2: Moranbah Sewerage Network Pump Station Details (source – IRC STP table data (provided 6 March 2019) and IRC GIS Data Set (January 2019))

Pump station	Capacity and Typical Operation *	Wet Well	Rising Main
Pump Station 1 (SPMBH001)	Flowrate: Lift: Ave. daily pumped volume: 1028 kL/day Odour Control: TBC Note – potential capacity issues current and future	Operating Volume: 5.0 kL Depth: 0.8m Diameter: 2.28 m	Length: 932 m Diameter: 250 mm Connect to: Gravity network to WWTP
Pump Station 2 (SPMBH002)	Flowrate: Lift: Ave. daily pumped volume: 308 kL/day Odour Control: TBC	Operating Volume: 3.0 kL Depth: 0.8 m Diameter: 2.18m	Length: 1013 m Diameter: 150 mm Connect to: Gravity network to WWTP
Pump Station 3 (SPMBH003)	Flowrate: Lift: Ave. daily pumped volume: TBA kL/day Odour Control: TBC Commissioned 2016	Operating Volume: - kL Depth: 0.6 m Diameter: - m	Length: 1118 m Diameter: - mm*** Connect to: SPS 1
Pump Station 4 (SPMBH004)	Flowrate: Lift:	Operating Volume: 2.6 kL Depth: 0.4 m	Length: 248 m Diameter: 150 mm

Pump station	Capacity and Typical Operation *	Wet Well	Rising Main
	Ave. daily pumped volume: 3kL/day Odour Control: TBC	Diameter: 2.88 m	Connect to: Gravity Main to SPS 5 (TBC)**
Pump Station 5 (SPMBH005)	Flowrate: Lift: Ave. daily pumped volume: 90 kL/day Odour Control: TBC	Operating Volume: 2.3 kL Depth: 1 m Diameter: 1.7 m	Length: 1777 m Diameter: 100 mm Connect to: Gravity Main to SPS 1
Pump Station 6 (SPMBH006)	Flowrate: Lift: Ave. daily pumped volume: 72 kL/day Odour Control: TBC	Operating Volume: 2.0 kL Depth: 0.8 m Diameter: 1.78 m	Length: 479 m Diameter: 100 mm Connect to: SPS 7
Pump Station 7 (SPMBH007)	Flowrate: Lift: Ave. daily pumped volume: 29 kL/day Odour Control: TBC potential capacity issues - future	Operating Volume: 2.2 kL Depth: 0.6 m Diameter: 2.14 m	Length: 772 m Diameter: 250 mm Connect to: Gravity Main to SPS 1
Pump Station 8 (SPMBH008)	Flowrate: Lift: Ave. daily pumped volume: TBA kL/day Odour Control: TBC	Operating Volume: 0.9 kL Depth: 0.8 m Diameter: 1.2 m	Length: 242 m Diameter: 50 mm Connect to: Gravity Main to WWTP
Pump Station 9 (SPMBH009)	Flowrate: Lift: Ave. daily pumped volume: 126 kL/day Odour Control: TBC	Operating Volume: 2.2 kL Depth: 0.8 m Diameter: 1.86 m	Length: 412 m Diameter: - mm Connect to: Gravity Main to SPS 4
Pump Station 10 (SPMBH010)	Flowrate: Lift: Ave. daily pumped volume: 9 kL/day Odour Control: TBC	Operating Volume: 0.2 kL Depth: 0.4 m Diameter: 0.8 m	Length: 672 m Diameter: 150 mm Connect to: Gravity Main to SPS 1 (TBC)**
Pump Station 11 (SPMBH011)	Flowrate: Lift: Ave. daily pumped volume: TBA kL/day Odour Control: TBC	Operating Volume: Depth: Diameter:	Length: 124 m Diameter: - mm Connect to: Gravity Main to SPS 14
Pump Station 12 (SPMBH012)	Flowrate: Lift: Ave. daily pumped volume: 15 kL/day	Operating Volume: 3.8 kL Depth: 0.4 m Diameter: 3.49 m	Length: 2412 m Diameter: 200 mm Connect to: Gravity Main to SPS 5

Pump station	Capacity and Typical Operation *	Wet Well	Rising Main
	Odour Control: TBC		
Pump Station 13 (SPMBH013)	Flowrate: Lift: Ave. daily pumped volume: 3kL/day Odour Control: TBC	Operating Volume: 2.6 kL Depth: 0.4 m Diameter: 2.88 m	Length: 248 m Diameter: 150 mm Connect to: Gravity Main to SPS 5 (TBC)**
Pump Station 14 (SPMBH014)	Flowrate: Lift: Ave. daily pumped volume: 90 kL/day Odour Control: TBC	Operating Volume: 2.3 kL Depth: 1 m Diameter: 1.7 m	Length: 1777 m Diameter: 100 mm Connect to: Gravity Main to SPS 1
Pump Station 15 (SPMBH015)	*Flowrate:* *Lift:* Ave. daily pumped volume: nil *Odour Control: TBC* *Note – not yet commissioned*	*Operating Volume:* *Depth:* Diameter:	*Length: 799 m* *Diameter: 250 mm* *Connect to: not commissioned* *Connects to SPS 9*

Note:

* Pump average daily pumped volume, wet well diameter, operating volume and depth are from IRC's Pump Station Details.pdf file, which captures measured values and estimates.

** incorrectly shown on GIS - actual connections TBC by IRC

*** data unavailable

Table 16: Moranbah Sewerage Network Pipeline Details (source – IRC GIS Data Set (January 2019))

Pipe diameter	Length of pipe (m)
100 mm	21
150 mm	81,679
225 mm	3530
300 mm	1601
375 mm	1398
450 mm	734
500 mm	17
525 mm	1.2
600 mm	122
Overall pipe summary	**89106**

Appendix C. Water Use Data and Future Demand and Flow Estimates

Table C-1: Total Raw and Potable Water Supply to Moranbah in 2017-18

Month	Total Town Consumption (ML)	Total Raw Water Treated (ML)	Total Raw Water Received (ML)	Storage and Treatment Loss* (ML)
Jul-17	148	261	222	74
Aug-17	166	249	200	34
Sep-17	187	247	165	-22
Oct-17	135	167	96	-39
Nov-17	153	162	177	24
Dec-17	176	234	202	26
Jan-18	203	285	228	25
Feb-18	144	208	206	62
Mar-18	135	206	164	28
Apr-18	163	242	186	22
May-18	224	291	199	-25
Jun-18	162	264	146	-16
Total 2017-18	**1996**	**2815**	**2190**	**193**

* Raw Water received less town consumption

Table C-2: Total Inflow to Sewerage Treatment Plant and Treated Effluent Storage for Moranbah, 2017-18

Month	Total Inflow to Plant (ML)	Total Flows to Effluent Storage (ML)	Treatment Loss* (ML)
Jul-17	67	75	-8
Aug-17	65	3	61
Sep-17	60	74	-13
Oct-17	68	47	22
Nov-17	66	69	-3
Dec-17	67	64	3
Jan-18	59	55	5
Feb-18	67	37	30
Mar-18	72	46	26

Month	Total Inflow to Plant (ML)	Total Flows to Effluent Storage (ML)	Treatment Loss* (ML)
Apr-18	64	47	18
May-18	66	50	16
Jun-18	67	48	18
Total 2017-18	**788**	**614**	**174**

* Total Inflows received less Flows to Effluent Storage

Table C-3: Max Daily Inflow to Sewerage Treatment Plant for Moranbah in 2017-18

Month	Max Daily Inflow to Plant (ML)
Jul-17	3.2
Aug-17	2.5
Sep-17	2.7
Oct-17	3.5
Nov-17	2.6
Dec-17	2.7
Jan-18	2.6
Feb-18	3.3
Mar-18	2.9
Apr-18	2.6
May-18	3.1
Jun-18	2.6
Total 2017-18	**34**

Table C-4: Average daily Recycled Water Demand in Moranbah 2018-19

Week ending	Total End User volumes (ML)
28/10/2018	6,748
4/11/2018	4,161

Week ending	Total End User volumes (ML)
11/11/2018	4,650
18/11/2018	6,457
25/11/2018	5,386
2/12/2018	7,705
9/12/2018	6,087
16/12/2018	4,521
23/12/2018	4,305
30/12/2018	5,469
6/01/2019	6,642
13/01/2019	4,220
20/01/2019	5,592
27/01/2019	5,733
Total for 4 months (28/10/18 – 27-1/19)	77, 676
Average daily	779
Yearly	284,000

Table C-3: Average daily and Yearly Water Demand Estimates - Moranbah 2018-2036

	Growth Rate	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
MORANBAH COMBINED POPULATION	Scenario 2	11017	11293	11583	11887	12205	12539	12889	13257	13644	14051	14479	14930	15405	15906	16435	16993	17582	18205	18864
1) Business as usual																				
Average Daily Water Usage (kL/d)	0.496	5470	5607	5751	5902	6060	6225	6399	6582	6774	6976	7189	7413	7648	7897	8160	8437	8729	9039	9366
Yearly Water Usage (ML/Y)	0.181	1996	2047	2099	2154	2212	2272	2336	2402	2473	2546	2624	2706	2792	2882	2978	3079	3186	3299	3419
2) Demand reduction strategy (230 L/p/d)																				
Average Daily Water Usage (kL/d)	0.230	2534	2597	2664	2734	2807	2884	2964	3049	3138	3232	3330	3434	3543	3658	3780	3908	4044	4187	4339
Yearly Water Usage (ML/Y)	0.084	925	948	972	998	1025	1053	1082	1113	1145	1180	1216	1253	1293	1335	1380	1427	1476	1528	1584
3) BAU + New 8000 Mine Camp 2020	8000																			
Average Daily Water Usage (kL/d)	0.496	5470	5607	9723	9874	10032	10197	10371	10554	10746	10948	11161	11385	11620	11869	12132	12409	12701	13011	13338
Yearly Water Usage (ML/Y)	0.181	1996	2047	3549	3604	3662	3722	3785	3852	3922	3996	4074	4155	4241	4332	4428	4529	4636	4749	4868
4) Demand reduction strategy (230 L/p/d) + 8000 mine Camp																				
Average Daily Water Usage (kL/d)	0.230	2534	2597	4504	4574	4647	4724	4804	4889	4978	5072	5170	5274	5383	5498	5620	5748	5884	6027	6179
Yearly Water Usage (ML/Y)	0.084	925	948	1644	1670	1696	1724	1754	1785	1817	1851	1887	1925	1965	2007	2051	2098	2148	2200	2255

Table C-4: Average daily and Yearly Sewerage Flow Estimates - Moranbah 2018-2036

	Growth Rate	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
MORANBAH COMBINED POPULATION	Scenario 2	11017	11293	11583	11887	12205	12539	12889	13257	13644	14051	14479	14930	15405	15906	16435	16993	17582	18205	18864
1) Business as usual																				
Average Daily Sewerage Flows (kL/d)	0.198	2186	2241	2298	2358	2421	2488	2557	2630	2707	2788	2873	2962	3056	3156	3261	3371	3488	3612	3743
Yearly Sewerage Flows (ML/Y)	0.072	798	818	839	861	884	908	933	960	988	1018	1049	1081	1116	1152	1190	1231	1273	1318	1366
2) Demand reduction strategy (230 L/p/d)																				
Average Daily Sewerage Flows (kL/d)	0.161	1774	1818	1865	1914	1965	2019	2075	2134	2197	2262	2331	2404	2480	2561	2646	2736	2831	2931	3037
Yearly Sewerage Flows (ML/Y)	0.059	647	664	681	699	717	737	757	779	802	826	851	877	905	935	966	999	1033	1070	1109
3) BAU + New 8000 Mine Camp 2020	8000																			
Average Daily Sewerage Flows (kL/d)	0.198	2186	2241	3885	3946	4009	4075	4144	4217	4294	4375	4460	4549	4644	4743	4848	4959	5075	5199	5330
Yearly Sewerage Flows (ML/Y)	0.072	798	818	1418	1440	1463	1487	1513	1539	1567	1597	1628	1660	1695	1731	1769	1810	1853	1898	1945
4) Demand reduction strategy (230 L/p/d) + 8000 mine Camp																				
Average Daily Water Usage (kL/d)	0.161	1774	1818	3153	3202	3253	3307	3363	3422	3485	3550	3619	3692	3768	3849	3934	4024	4119	4219	4325
Yearly Water Usage (ML/Y)	0.059	647	664	1151	1169	1187	1207	1228	1249	1272	1296	1321	1347	1375	1405	1436	1469	1503	1540	1579

Appendix D. Data Gap Analysis

Through the development of the IWCMS for Moranbah the following data gaps were identified:

- Non-residential property types and water use (for equivalent population estimates)
- MiWater water consumption data
- Recycled Water Network asset data, including pipe diameter, material and age, missing from GIS
- Sewer pump station flowrates, lift and capacities
- Stormwater flows, particularly around harvesting locations, flood areas
- Stormwater planning studies
- Information on ‘natural springs’, subsurface waters to surface

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MEETING DETAILS	**Water and Waste Standing Committee** Wednesday 14 July 2021
AUTHOR	Linda Roberts
AUTHOR POSITION	Acting Director Water and Waste

6.1 WATER AND WASTE INFORMATION BULLETIN – JULY 2021

EXECUTIVE SUMMARY

The Water and Waste Directorate Information Bulletin for July 2021 is provided for Committee review.

OFFICER'S RECOMMENDATION

That the Committee:

1. Note the Water and Waste Directorate Information Bulletin for July 2021.

BACKGROUND

The attached Information Bulletin for July 2021 provides an operational update for Committee review on the Water and Waste Directorate.

IMPLICATIONS

Any specific implications or risks will be outlined in the Information Bulletin.

CONSULTATION

Water and Waste Directorate Managers and Staff.

BASIS FOR RECOMMENDATION

This is an information only report.

ACTION ACCOUNTABILITY

Information only report.

KEY MESSAGES

Operational update to Elected Members.

Report prepared by:	**Report authorised by:**
LINDA ROBERTS **Acting Director Water and Waste**	JEFF STEWART-HARRIS **Chief Executive Officer**
Date: 7 July 2021	Date: 8 July 2021

ATTACHMENTS

- Attachment 1 – Water and Waste Information Bulletin – July 2021

REFERENCE DOCUMENT

Nil

DATE: July 2021

WATER AND WASTE

DIRECTORATE HIGHLIGHTS

The Water and Waste Management Team would like to acknowledge the contribution of Councillor Lyn Jones to the Water and Waste Standing Committee. Her passion and energy for the community and council she served significantly influenced the outcomes of this committee through her advocacy for continuous improvement and ensuring the best outcomes for our communities. Cr. Jones brought a high level of professionalism and honesty to the table and she will be sincerely missed. Support to Councils expression of sympathy to her family and friends is offered at this time.

- Director attendance in Brisbane for *qldwater* Strategic Priorities Group Meeting on Friday 4 June 2021.
- Director attendance in Brisbane for LGAQ Water & Sewerage Advisory Group Meeting on Friday 11 June 2021.
- Roll out of the final W&W Leadership Team Introductory Roadshow (Cultural Leadership Program) with W&W Directorate Staff in Middlemount on Thursday 24 June 2021. The third and final phase will be to hold a session for the W&W OLT (comprising all managers, leaders, supervisors, mentors and key influencers).
- Planning Engineer, Sandra Atkinson commenced on 7 June 2021.
- Treatment Plant Supervisor – South, Allan Law commenced on 21 June 2021 based in Middlemount.
- Wider employee engagement begins within the W&W Directorate regarding the W&W Functions Review.

Emerging Risks

- Waste Levy – potential for the discontinuation of the advance payment.
- Water Restrictions St Lawrence – projected to reach L1 Water Restrictions in St Lawrence from 19 July 2021. Public Notice prepared to be issued 9 July 2021.
- Moranbah Landfill Project continues to be managed closely with risks identified in project area.

Operational Projects 2021/2022

PROJECT TITLE	RESPONSIBLE OFFICER	PROJECT SCOPE	PROJECT OUTCOMES
Implement Clermont Water Quality Response Plan and associated Communication Plan	Manager Operations & Maintenance Manager Planning & Projects Manager Business Services	Finalisation of actions detailed within the Response Plan and providing regularly updates to the community via several platforms as per the Communication Plan.	Increased water quality visibility at the Clermont WTP. Reduced discolouration events in Clermont. Continuous community consultation and communication on changes. Increased visibility and community trust.

IMS surveillance audits (External) and 3-year re-certification audit	Manager Business Services	External IMS Surveillance Audit at the Carmila WTP and Waste Facility, St Lawrence WTP and Waste Facility, Greenhill Waste Facility and Moranbah WTP - 1 Week in October. 3-year Re-Certification Audit in June 2022 on the 3-year anniversary since W&W received certification for their IMS.	To maintain IMS certification, W&W must participate in annual surveillance audits to spot check different areas of the IMS and a complete re-certification audit every 3 years.
Options analysis for suitable water source level indicators and data	Manager Planning & Projects	review industry standards for the provision of data, need to consider real time requirements versus more static.	Recommendation on the methodology to be used for each asset location.
Hydraulic Modelling of both water and sewer networks	Manager Planning & Projects	compilation of hydraulic modelling already completed. Finalisation of the Moranbah Sewerage Hydraulic Model.	Better understanding of hydraulic performance. Recommendation on strategy for ongoing hydraulic modelling.
3-year Meter Reading Strategic Plan	Manager Business Services	During 21/22 the following 8 of 26 Actions are due for completion: 1.1 Continue to develop robust working relationships with Taggle Systems and Tyeware. Review and monitor contractual arrangements to ensure they are upheld and remain fit for purpose. 1.2 Build a good working relationship with housing entities across the region. 2.1 Takes steps to rectify system fault which rounds meter reads up to the nearest kilolitre instead of down to the nearest kilolitre. 2.2 Review and monitor Mackay Regional Council's trial of Taggle Systems new v200 smart meter. 3.1 Review and install taggles on internal W&W infrastructure for greater availability to track inflows and outflows at different areas within the plant and network. 4.1 Review the operational impact of activities related to fixing, replacing and checking taggles against current workforce and resources. Find efficiencies in our processes to reduce workloads for meter reading checks. 4.2 Develop a proposal to address legacy issues and problematic taggles. Seek external support as required with consideration to asset warranty timeframes.	Maximising our relationships with suppliers, support services, internal departments and stakeholders. Build trust with community through advice, support and procedural consistency. Stay abreast of technological advancements. Commit to ongoing system corrections and upgrades. Collect and utilise data to its full potential. Attract more users and increase property registrations. Collaborate with other users – learn from their mistakes and triumphs. Understand required functions, review current resources, outline gaps and investigate possible efficiencies. Establish asset management and maintenance program. Resolve historic legacy issues and problematic taggles.

Concept plan for Clermont Waste Management Facility Weighbridge and site reconfiguration	Manager Waste Services	Investigation into need, practicality, costs, layout, potential for funding, for reconfiguration of Clermont Waste Management Facility as a result of the need for a weighbridge by 30 June 2024.	Report which addresses business case, feasibility, outline costs, timelines for site reconfiguration and weighbridge installation by June 2024.
Moranbah Sewerage Strategy	Manager Planning & Projects	Review both treatment and network capacities to accommodate growth. 20-year horizon with a 10-year capital investment program.	Strategy with identification of requirement augmentations to meet the long-term demands.
Water Security Assessments for ST Lawrence and Carmila	Manager Planning & Projects	Undertake a water security assessment of the existing assets to determine the risks associated with long term water security.	Understanding of actions both operationally and if there is any investment required in capital to improve water security.
Five (5) year price path – Wastewater	Manager Business Services	As resolved in January 2021 - an 18-month review of the Sewerage Utility Charge will be completed. This review will take place considering the following 8 principles: 1. Standardise charges across all towns and categories. 2. Consistent categories and rationale for all towns. 3. Avoid price shock. 4. Remove immaterial charges. 5. Ensure any new system is easy to understand. 6. Maintain overall yield. 7. A manageable transition plan which may include concessions. 8. A contemporary approach in line with industry best practice.	Findings from this review will be presented to Council to ensure a 5-year Sewerage Utility Charge Price Path can be determined before 1 July 2022.
Implementation of System Leakage Management Plan	Manager Planning & Projects	Review of both Documents for Leak Management.	identification of clear drivers for business case to implement the leak management plan.
Waste Management Strategy 2020-25 – Strategy Actions identified for 2020-2021 which were deferred due to Covid-19	Manager Waste Services	Kerbside Bin Audit, Landform Plans DYS, GLN, Region-wide landfill Plan, Waste Education.	Better data on waste composition and trends, final landform plans of smaller sites (was mostly achieved as part of waste pricing in 2020), Educating the community on correct waste management / recycling.
Waste Management Strategy 2020-25 – Strategy Actions identified for 2021-2022	Manager Waste Services	Continued Price Modelling, Site Opening Hours rationalisation.	Achievement of Waste Strategy Actions; Site opening hours rationalised.
Groundwater Receptor Pathway Analysis – Dysart Waste Management Facility	Manager Waste Services	Groundwater Receptor Pathway Analysis – as identified in recent groundwater monitoring.	Report on groundwater flow characteristics at DYS Waste Facility.

Consolidate all water supply arrangements and address all supply security deficiencies	Director W&W	An assessment of options for each township. Lowest cost option. Research historical obligations of resource sector.	Formal agreements only entered into if a community benefit achieved. Hold resource sector to account for historical obligations.
SCADA/telemetry Strategy	Manager Operations & Maintenance	Undertake an audit of all existing SCADA/telemetry assets, review industry standards and then write strategy.	Strategy will provide recommendations on business needs, platform decisions, timeframes to implement and costs.
Comprehensive Theresa Creek Dam Safety Review	Manager Operations & Maintenance	This is legislative requirement for the dam being regulated dam. The comprehensive safety review is required every 5 years.	Safety review completed with actions if any defects are identified.
Update of Emergency Action Plan Theresa Creek Dam resulting from Failure Impact Assessment & Terrace Overflow Assessment	Manager Operations & Maintenance	To make any changes required from the outcomes of the FIA and Terrace overflow assessment.	Updated current EAP for TCD.
Develop Asset Management Plans to support the adopted Strategic Asset Management Plan	Manager Projects & Planning	review and update existing drafts of AMPS. Consolidation into water and wastewater AMPS.	Endorsement of Water AMP and Wastewater AMP.
Participation in the Illegal Dumping Management and Intervention Plan	Manager Waste Services	Amnesty Days, Review of pricing.	Achievement of Illegal Dumping Management and Intervention Plan objectives
Site Based Management Plan Review	Manager Waste Services	Review of Site Based Management Plans for all 9 waste sites.	Revised Site Based Management Plans for all 9 sites.
Waste Pricing and Rehab Review	Manager Waste Services	Continued refinement of waste price modelling.	Better data used to inform budget setting process for 2022-23.
Finalisation of Environmental Undertaking Dysart	Manager Operations & Maintenance	The only requirement left is for the audit/inspection by the Regulator.	Acknowledgement from the department that the EU is closed, and council has met all its obligations.
Transitional Environmental Program (TEP) – Nebo Wastewater Treatment Plant	Manager Operations & Maintenance	Progress is in accordance with the TEP which outlines dates and actions.	All actions required to meet compliance at the Nebo Wastewater TP is completed and ongoing compliance is achieved for EC levels.
Moranbah Effluent Pressure Analysis	Manager Operations & Maintenance	Build knowledge of the recycled effluent scheme in Moranbah, determine network capacities to inform customer service levels and review.	Improved understanding of the network may lead to capital if business case is viable.
Moranbah Irrigation Management Plan	Manager Operations & Maintenance	This follows on from the above item.	Once network capacities understood then management plan can be written.

Sludge management at the MBH WTP to meet compliance.	Manager Operations & Maintenance	The volume of sludge generated is the large across the region. Options Analysis and recommendations for handling of the sludge to be in management plan.	Management plan which provides most cost effective and compliant management of sludge materials.
Desilting of Moranbah ESD	Manager Operations & Maintenance	Removal of the build-up of sludge and disposal. The volume of material to be removed is yet to be scoped.	To return capacity to the ESDs.

BUSINESS SERVICES

PREVIOUS MONTH'S ACHIEVEMENTS:

On 16 and 17 June, all members of the Water and Waste Business Services Department attended a Minute Takers Workshop run by Peak Services. This day long course was aimed to give improved skills in preparing for and taking minutes accurately and ensuring they are kept in accordance with the appropriate legislation and policies. Topics covered included meeting preparation, the agenda, roles and responsibilities and minute taking tips. Our degree of minute taking knowledge varied within the group and this workshop covered the basic tools required to take meeting minutes successfully. A further workshop is scheduled later this month for the team to finalise what aspects of the training will be incorporated and updated into our current processes.

Approximately 9206 meter reads were completed in June across the Isaac Region. 1792 meters were read manually, with automatic meter reads calculated for the remaining meters. Meter reads commenced on the 16 June and were completed in just over one week across the entire region. All skipped reads and checks will be completed by the 14 July. Water Notices are to be mailed out by the 10 August with payment due September 9.

A critical element of the IMS is the Annual Management Review, which takes a proactive approach to reviewing documentation. This month W&W reviewed and identified all W&W documentation current, expiring and expired and will now implement a priority-based action plan to review and update documents in line with Council's requirements.

PREVIOUS MONTH'S ISSUES:

Not applicable.

FINANCIAL REPORT:

End of month billing has been completed early this month for the end of financial year and officers will continue to contact suppliers to seek invoices to ensure they can be allocated to the correct year. A complete 20/21 budget review will be completed once this has been done however noting that final 20/21 budget analysis cannot be completed until the 2nd water notice for 20/21 is issued and payments are received in September 2021.

DEVIATION FROM BUDGET AND POLICY:

Not applicable.

OPERATIONAL PLAN / BUSINESS PLAN – EXCEPTION REPORTING 20/21 CLOSE-OUT

PROJECT TITLE	COMMENTS

Implement Clermont Water Quality Response Plan and associated communication Plan	Phase 1 and 2 of the Communication Plan has been completed as works continue to be finalised as per the Response Plan. This project will continue into 21/22 and will be finalised upon completion of Phase 3.
Audit to ascertain what assets are affixed to W&W infrastructure	An external audit has been completed. This audit has discovered, located and provided evidence of 117 assets affixed to W&W Infrastructure as per the following table. Significant further analysis is now required to find the owners of the unlabelled assets, develop a Policy position and progress lease agreements. 
MiWater/Taggle system review and improvements	A 3-year Meter Reading Strategic Plan has been developed with 26 actions to be completed by 30 June 2024.

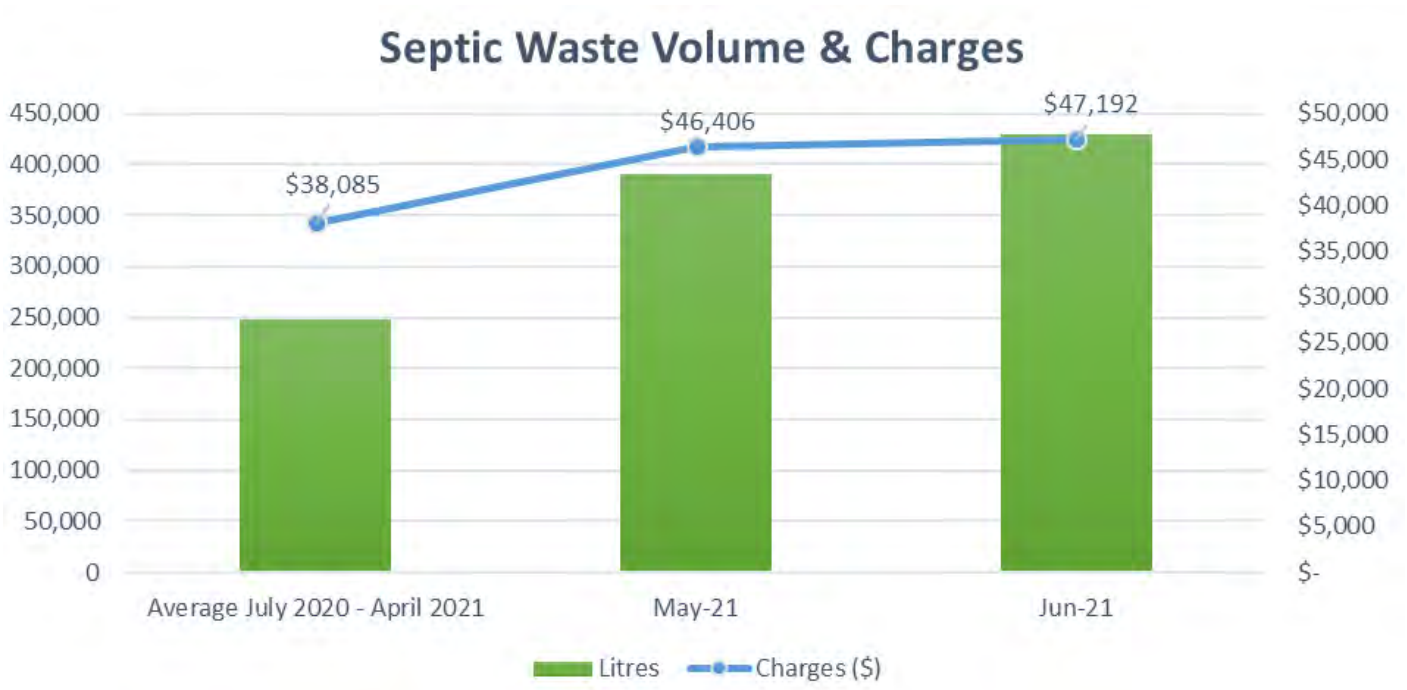
NEXT MONTH'S PROGRAM:

- Finalisation of the Water Restrictions suite of documents including updated Policy and new Procedure.
- Interviews in Middlemount for the vacant Customer Administration Officer role.
- W&W Management Team meeting and sites visits in Nebo.
- Wider employee engagement begins within the W&W Directorate regarding the W&W Functions Review.
- Development of the 21/22 water charges booklet and FAQ following the endorsement of the 21/22 Council Budget.

DEVELOPING INITIATIVES / ISSUES:

Septic Disposal

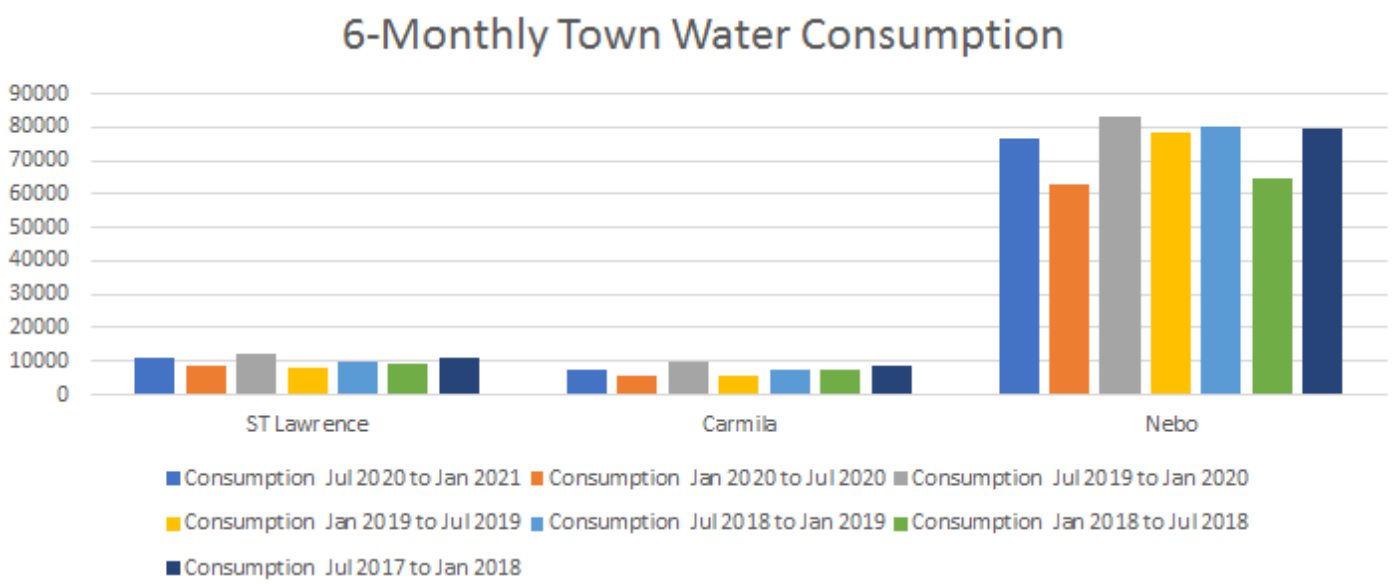
On 1 May 2021, an amendment to the septic waste disposal fee was introduced. Customers are charged $0.15 per litre of septic waste however, customers with combined disposals over 200,000 litres per billing month incur a discounted fee of $0.10 per litre. The graph below illustrates trends in disposal rates and revenue following the fee amendment and incorporation of this discounted rate. The data depicts an increase to disposal quantities and associated revenue, which are expected to continue throughout 2021/2022.

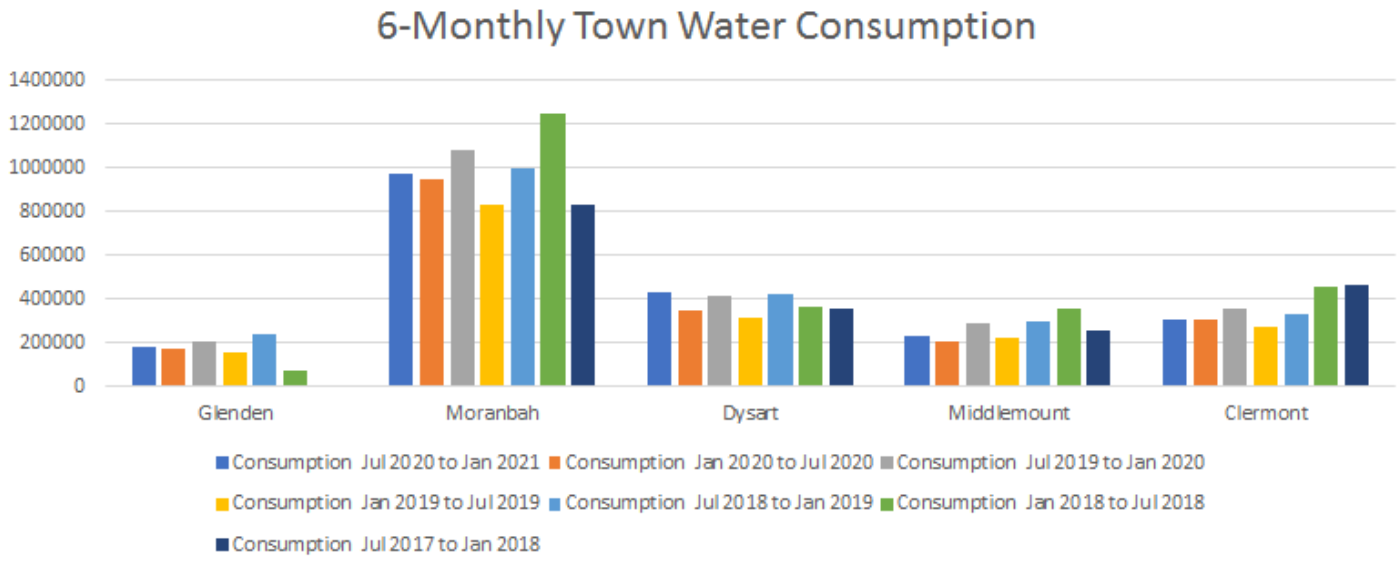


Water Consumption

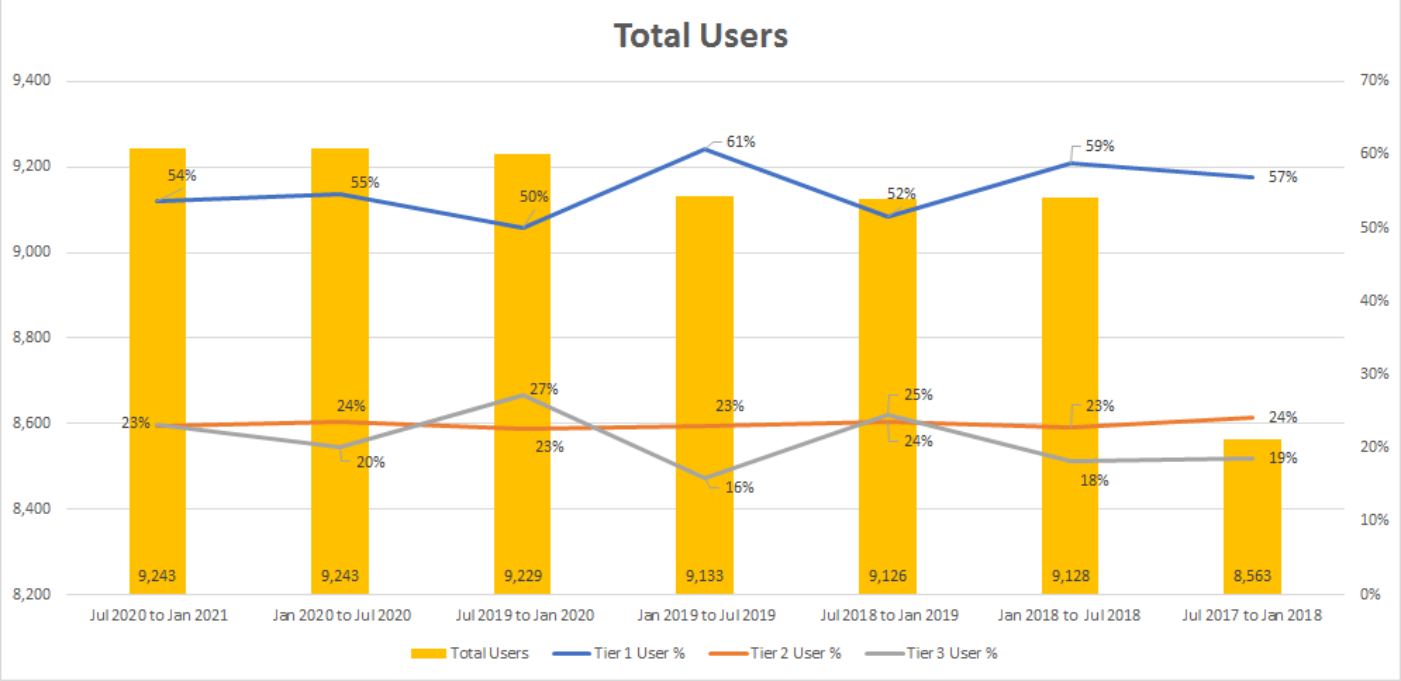
Since 2017, each town has recorded the below water consumption during each 6-monthly billing cycle. The July 2017 to January 2018 period was only partially recorded in most towns and Glenden did not start recording consumption until early-to-mid 2018. Consumption is generally higher during the July to January (Summer) time compared to the January to July (Winter) time.

Of significance, water consumption is trending downwards in almost all locations.





The total number of water users for each period can be seen below as well as the % all users are spread across the water billing Tiers 1, 2 and 3.



Water Restrictions

CURRENT & PROJECTED	LEVEL 1		LEVEL 2		LEVEL 3	
Location	**Start Date**	**End Date**	**Start Date**	**End Date**	**Start Date**	**End Date**
Middlemount	16/03/2019	18/11/2019	18/11/2019	10/01/2021	11/01/2021	
St Lawrence	19/07/2021					

WATER AND WASTEWATER

PREVIOUS MONTH'S ACHIEVEMENTS:

Recycled Water Connection for Middlemount Motocross

Consultation with Motocross Club in Middlemount resulted in the understanding that the cost of installing recycled mains to the site was prohibitive. The club expressed thanks for providing inputs into the costs being understood. There may be future conversations regarding accessing recycling from the truck fill point.

PREVIOUS MONTH'S ISSUES:

Raw Water Sources for Isaac Regional Towns

The following diagram provides an update on raw water sources, water levels in dams, water used to date if applicable, and current water restrictions in place for each Isaac Regional town.

Glenden

Raw water for Glenden is provided from the Bowen River which can be refilled from Gattonvale off-stream storage and Eungella Dam.

- Newlands Coal Min (Xstrata) N/A
- Bowen River Weir 102%

No Water Restrictions

Nebo

Nebo's raw water is supplied through six bores. The new water treatment plant and reservoir as part of the Nebo Water Supply Project have 2ML storage on site.

- See graph below for water levels in Bore 2

No Water Restrictions

Carmila

Raw water is supplied from two shallow bores located near the Carmila Creek approx. 1km from the WTP.

- Water is flowing over the weir near the bore

No Water Restrictions

Moranbah

Moranbah's raw water is supplied from two sources:

- Burdekin Dam through to Burdekin to Moranbah pipeline 97%
- Eungella Dam through either BMA or Sunwater's pipelines 83%

Water used to date	2019-2020	2020-2021
BMA	1824 ML	1838 ML
Dyno	50 ML	100 ML
Stanmore	467.8 ML	450 ML
Sunwater	251.5 ML	180 ML
Permbroke	94.4 ML	

No Water Restrictions

St Lawrence

St Lawrence's raw water is supplied through high lift pump from the St Lawrence Creek approx. 500m upstream from the creek weir. 72mm of Rain

- 55cm below weir level

No Water Restrictions

Clermont

Clermont's raw water is supplied from Theresa Creek Dam. 48.5mm of rain.

- 53cm below overflow level

No Water Restrictions

Dysart

Dysart's raw water is supplied from Bingegang Weir in the Mackenzie River which can be re-filled from Fairbairn Dam through Bedford Weir.

- Bingegang Weir 101%

No Water Restrictions

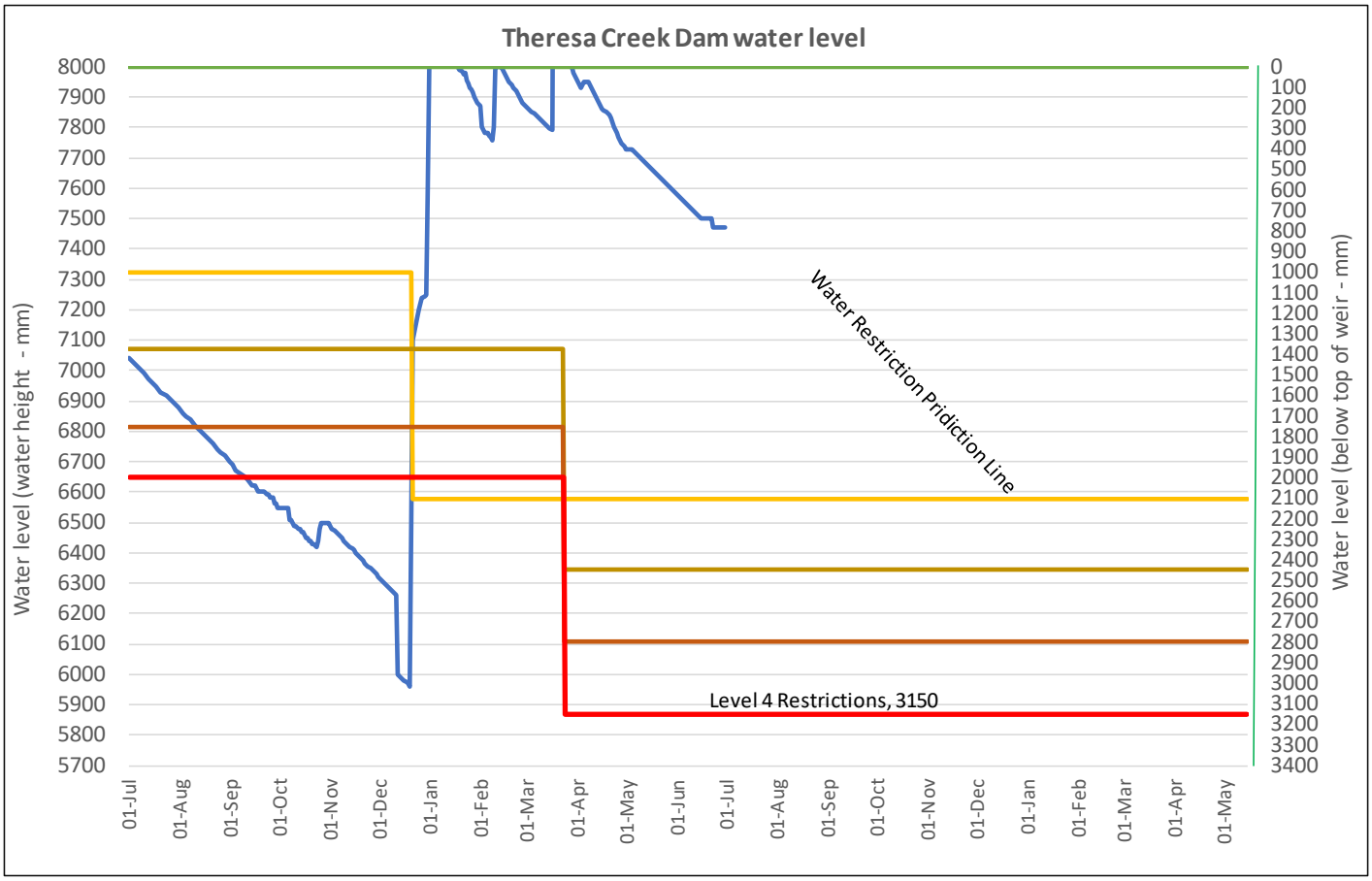
Middlemount

Middlemount's raw water is supplied from the Bingegang Weir on the Mackenzie River approx. 60km away. The weir is re-filled from Fairbairn Dam through Bedford Weir

- Bingegang Weir 101%
- Fairbairn Dam 16%
- Bedford Weir 100%

Level 3 Water Restrictions

Theresa Creek Dam Water Level



Actual water level readings

Date	1/06/2021	4/06/2021	8/06/2021	12/06/2021	16/06/2021	20/06/2021	24/06/2021	28/06/2021
Water Height in mm	7640	7620	7600	7530	7500	7500	7470	7470

Theresa Creek Dam Wall as at 30 June 2021

St Lawrence Weir Water Level

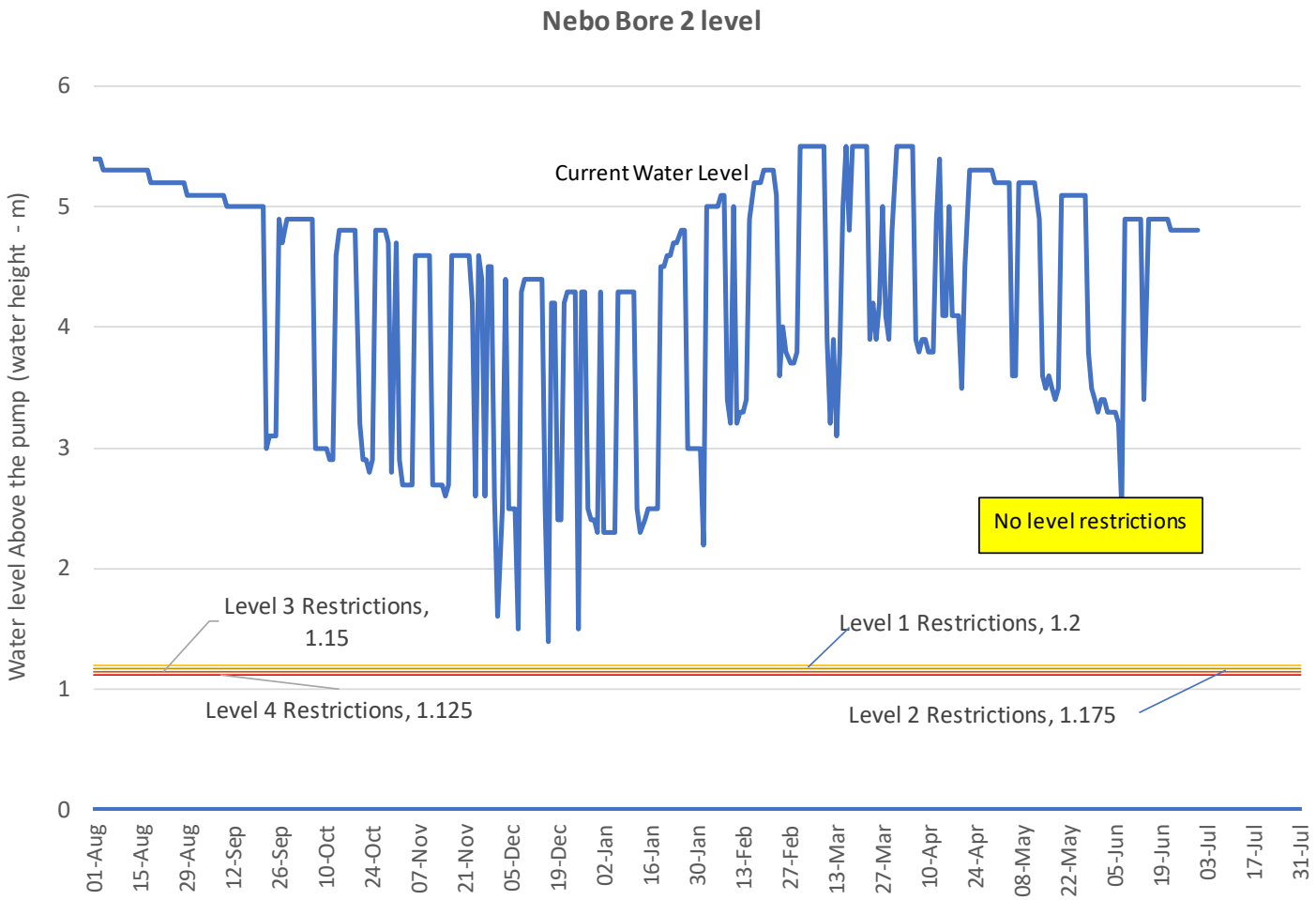
Actual water level readings

Date	1/06/2021	5/06/2021	10/06/2021	15/06/2021	20/06/2021	25/06/2021	28/06/2021
Water Height in m	6.61	6.53	6.4	6.34	6.35	6.37	6.38

St Lawrence Weir as at 30 June 2021

Carmila Raw Water Creek photo from bore pumps as at 30 June 2021

Nebo Bore 2 Level



Actual water level readings

Date	1/06/2021	4/06/2021	8/06/2021	12/06/2021	16/06/2021	20/06/2021	24/06/2021	28/06/2021
Water Height	3.4	3.3	4.9	4.9	4.9	4.9	4.8	4.8

Compliance

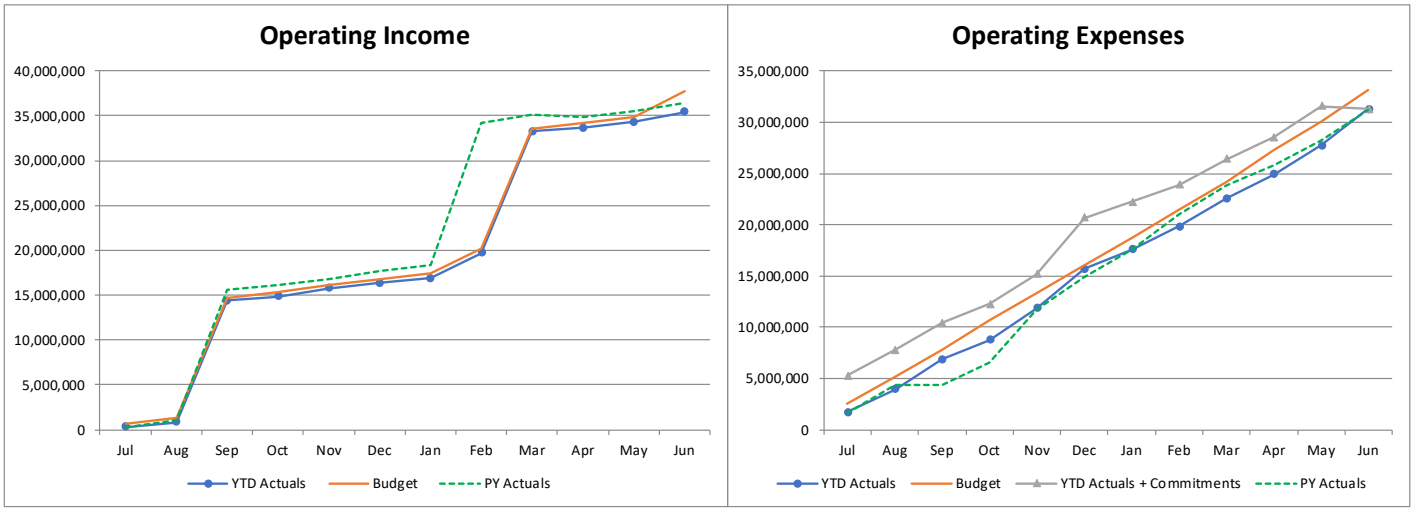
The table below contains current statutory undertakings across all assets.

	TARGET DATE FOR COMPLETION	COMMENTS
Transitional Environmental Program (TEP) Nebo WWTP	Completion of the TEP is as per the notification provided by DES.	In accordance with TEP Action 3.1 and further to recent correspondence, IRC provided DES with two broad Scope of Works based on outcomes from Actions 2.1 and 3.0.
Sewer Overflow at Dysart	DES have asked IRC to respond to 16 April 2021 email breach of condition 5-L1 of EA EPR00791913 in relation to unauthorised release of raw sewage	Warning letter issued by the Department of Environment and Science (DES) pertaining to an overflow of 20,000 litres of sewage from Pump Station 1 into adjacent stormwater drain. The department considered that Council committed an offence under section 430(3) of the *Environmental Protection Act 1994* in that it has

	which overflowed at the Dysart Pumping Station 1, by 7 May 2021.	contravened a condition of the Environmental Authority (EA) EPPR00791913. In this instance, it has been determined that no further action will be taken.
RFQ for SPS and IEMS	Letter of award been issued to successful tenderer.	Project to commence second week of July.
Theresa Creek Dam	Annual safety statement to be submitted to the dam safety regulator by the 1 October 2021.	Ontrack. Failure Impact Assessment report (FIA) has been completed and submitted to the regulator. Subsequent updates, including reduced failure risks are being incorporated into the Emergency Action Plan (EAP). The EAP will be reviewed by the local disaster management group prior to submission to the regulator.

FINANCIAL REPORT:

Interim Report – June 2021



DEVIATION FROM BUDGET AND POLICY:

Not applicable.

OPERATIONAL PLAN / BUSINESS PLAN – EXCEPTION REPORTING

Strategy (i.e., C5)	Service Area	Description	Monthly Status Update	Annual Status Update
I5	Provision of safe and reliable water supply services – monitor performance and undertake remedial action where required.	Incidence of unplanned interruptions – • < 70 per 1000 connections / year Total Water connection in IRC = 8479 Allowable target 20/21 – 593	67	408 (Below target)
I5	Provision of safe and reliable water supply services – monitor performance and take remedial action where required.	Water main breaks – • < 40 per 100 km / year Total Length of water main at IRC = 245 km	34	230 (Above target)

		Allowable target 20/21 – 98		
I5	Provision of safe and reliable water supply services – monitor performance and take remedial action where required.	Water quality complaints – • < 20 per 1000 connections / year Total Water connection in IRC = 8479 Allowable target 20/21 – 170	0	20 (Below target)
I5	Provision of effective sewerage transport and treatment services – undertake / investigate – system condition and functionality, monitor performance and undertake remedial action where required.	Wastewater Mains breaks and chokes – • < 40 per 100 km / year Total Length of wastewater main at IRC = 202 km Allowable target 20/21 – 81	3	42 (Below target)
I5	Provision of effective sewerage transport and treatment services – undertake / investigate – system condition and functionality, monitor performance and undertake remedial action where required.	Wastewater complaints – Overflow on property and odour • < 15 per 1000 connections / year Total Wastewater connection in IRC = 7879 Allowable target 20/21 – 118	0	39 (Below target)
I5	Provision of safe and reliable water supply and effective sewerage transport and treatment services	Total Water and Sewer Complaints (any nature) – • < 100 per 1000 connections / year Total Water connection in IRC = 8479 Allowable target 20/21 – 848	37	246 (Below target)

NEXT MONTH'S PROGRAM:

Organisation Development Plan or Capital Projects Scheduled to Commence During Next Month

PROJECT NAME/ DESCRIPTION	SCHEDULED END DATE	COMMENTS/EXCEPTIONS
Nebo Aquifer water allocation increase	TBA	Draft report is being completed with first draft expected by the end of June.
WTP Site Based Management Plans	Jun 2021	Documents almost finalised and then to progress to approval process.
WWTP Site Based Management Plans	June 2021	Document review underway and is in process beginning with Clermont WWTP.

Waste Site Based Management Plans	December 2021	Next for review after the WWTP site-based management plans are completed.

DEVELOPING INITIATIVES / ISSUES:

- Water and Wastewater Engineer, Thomas Raj commences on 12 July 2021.

WASTE SERVICES

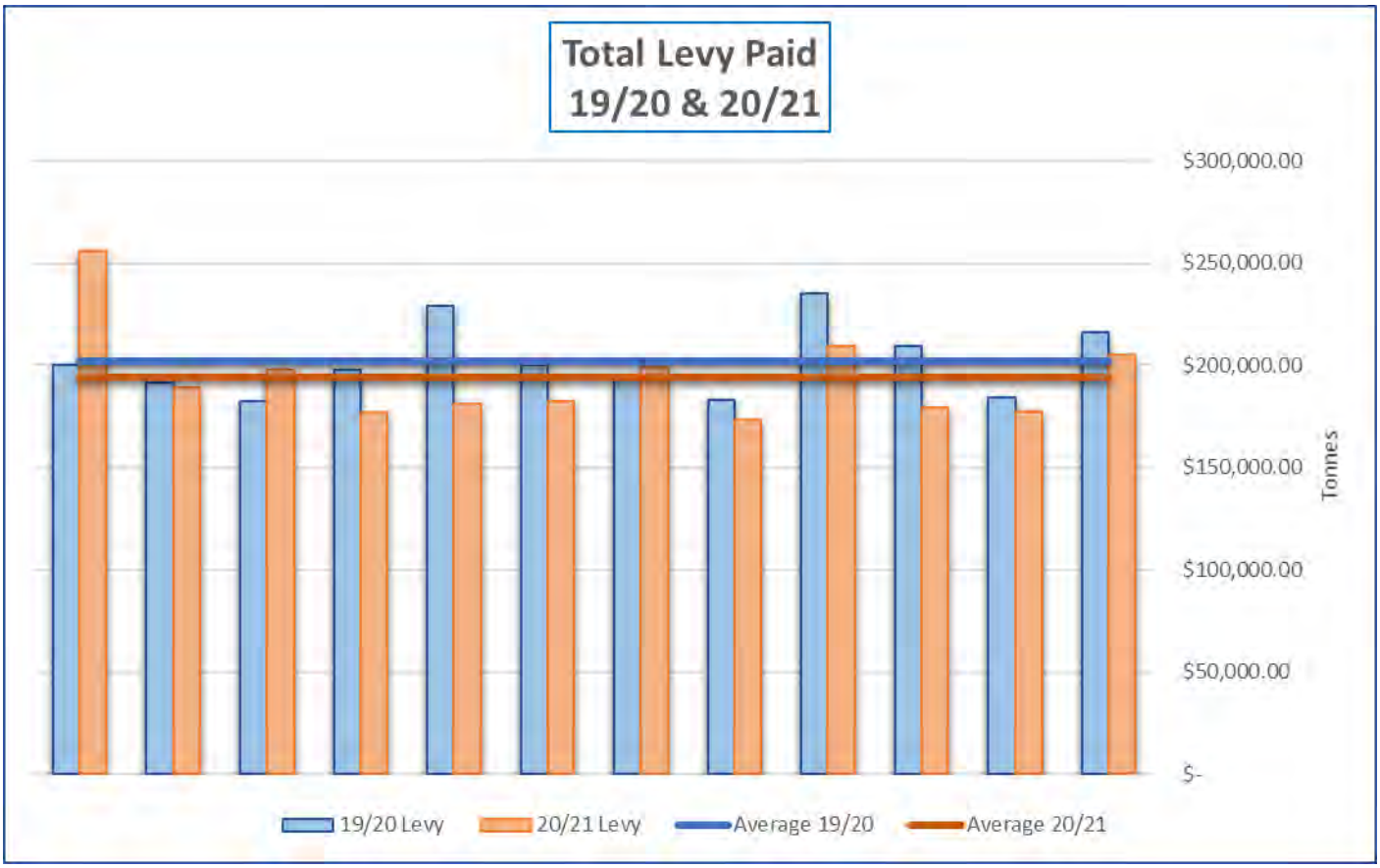
PREVIOUS MONTH'S ACHIEVEMENTS:

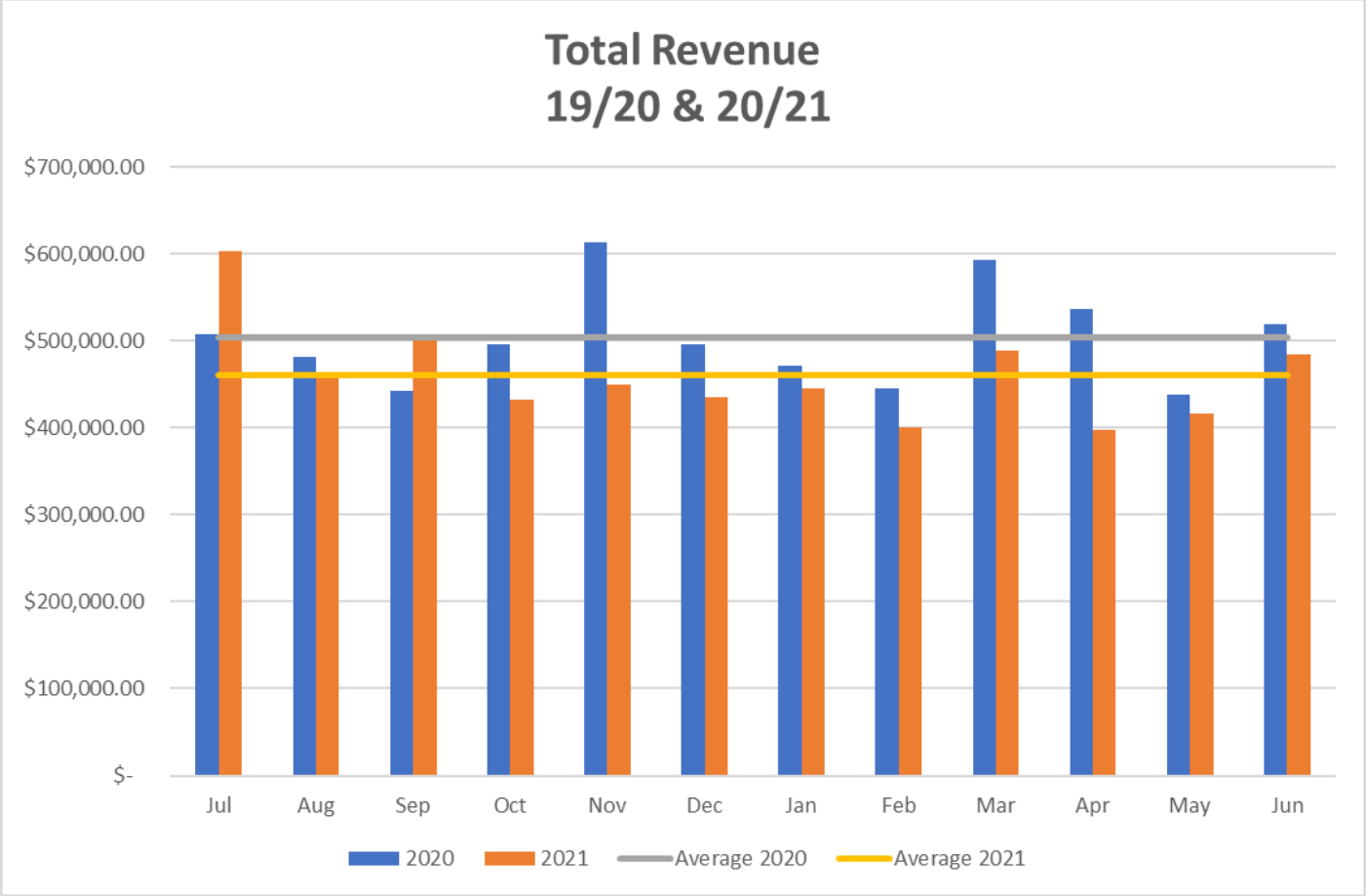
Waste Tonnage and Waste Levy

Total waste landfilled for 2020-21 was 29,592 tonnes (provisional figures), which is approximately 8% less than the 32,215 tonnes in 2019-20.

Total waste levy paid in 2020-21 was $2,324,298, which was 4% less than the $2,422,304 paid in 2019-20, despite the $5 increase in January 2021.

The following diagrams show comparisons of the waste levy paid in 2020-21 compared to 2019-20, and waste facility revenue received in 2019-20 and 2020-21. There has been a significant decrease in both during 2020-21, despite the $5 per tonne increase in waste levy from January 2021.





Future of Waste Levy – Advance Payment

There is growing speculation that the State Government is planning to discontinue the Waste Levy advance payments to councils beyond 30 June 2022. This would appear to contradict earlier government policy on avoiding any impact on Queensland householders. The Waste Levy applies to all waste sent to landfill in Queensland, including domestic (Municipal Solid Waste – MSW) waste. The impact on householders is avoided via the advance payment which government pays to each council on a quarterly basis.

The advance payment is calculated from the tonnage of MSW in the year prior to the previous financial year (i.e. advance payment for 2021-22 was based on 2019-20 tonnage). The payment equates to the tonnage, multiplied by the prevailing levy rate, multiplied by 1.05, multiplied by a population growth factor.

For 2021-22, the advance payment has been worked out as:

- 8,568 tonnes x $85 per tonne x 1.05 x 1.0056 annual population change = $769,008.

Advance Payment amounts for IRC:

- 2019-20 - $ 986,289
- 2020-21 - $ 806,278
- 2021-22 - $ 769,008
- 2022-23 - $ 779,400 (estimated from 2020-21 MSW tonnage, based on 0.5% population growth and waste levy set at $90 / tonne)

Officers have been asked to provide an estimate of the impact on ratepayers should this change eventuate. In short, the impact will amount to the cost of the waste levy to an average household for the landfilled waste which it produces. Officers' best estimate is an increase of approximately $93 per property with a waste collection charge.

The Mayor has signed a joint letter from the LGAQ to the State Government on behalf of all affected councils which requests that the government keeps its commitment to exempting Queensland families from the cost of the State's Waste Levy.

The State Government is required by the legislation (*Waste Reduction & Recycling Act 2011*) to carry out a review of the levy no later than its third anniversary (1 July 2022).

LGM – Risk Matrix

Officers became aware of a Waste Management Guide published by LGM Queensland in 2017. This document looks at common risks associated with waste management services and suggests ways to mitigate them. Officers have carried out an exercise to measure IRC's waste services compliance with the Guide.

An initial review of the Guide's risk produced the following matrix:

Transfer Station & Landfill Risks

Site / Risk Control	Deposition location - minimise interaction with plant	Separate locations for domestic & commercial	Site Rules	Site roadways	Speed Restrictions	Internal Barriers	Signage - directional and warning	Pit Edge Protection	Signs re avoiding risks	Verbal Instructions to users	Landfill Operations exclude non involved persons	Security & Access Controls	Plant & Equipment fit for purpose	Bulk Bin Transport Controlled	Control of Pest Animals
Moranbah	Y	Y	Y	Y	Y	Y	Y	Y	?	Y	Y	Y	Y	Y	Y
Clermont	Y	N	Y	Y	Y	Y?	Y	N/A	?	Y	Y	Y	Y	Y	Y
Dysart	Y	N	Y	Y	Y	Y?	Y	N/A	?	Y	Y	Y	Y	Y	Y
Glenden	Y	N	Y	Y	Y	Y?	Y	N/A	?	Y	?	Y	Y	Y	Y
Middlemount	Y	Y	Y	Y	Y	N/A	Y	Y	?	Y	Y	Y	Y	Y	Y
Nebo	Y	Y	Y	Y	Y	N/A	Y	Y	?	Y	Y	Y	Y	Y	Y
St Lawrence	Y	Y	Y	Y	Y	N/A	Y	N/A	?	Y	?	Y	Y	Y	Y
Carmila	Y	Y	Y	Y	Y	N/A	Y	Y	?	Y	Y	Y	Y	Y	Y
Greenhill	Y	Y	Y	Y	Y	N/A	Y	Y	?	Y	Y	Y	Y	Y	Y

Officers made the following notes to further interpret the common risks and their impact from and IRC perspective:

Notes

1) Internal Barriers - at CLM, DYS and GLN, does this include limiting access to tip face for domestic users whilst trucks are tipping?
2) Separate locations for domestic & commercial - at CLM customers are held back while trucks tip, at DYS there is visibility of tip face from gatehouse
3) Pit Edge Protection - N/A for small landfills since no vertical edges as found at transfer stations. STL has no "pit edge" - customers tip at ground level
4) Signage re risks - partly covered by "Site Rules" signs - needs reviewing
5) Operations exclude non involved perssons . At Glenden there is potential for interaction. All transfer stations other than STL have segregation of public from bulk bin loading areas
6) Conditions of Entry signage is visible upon entry at each site showing Site rules.
7) Work Instuction WW-WI-131 showcases all Traffic Management Plans for sites. Depicts allowable vehicles at Transfer Stations and at Tip faces at Landfills.
8) Column B - Contractors at Dysart/Clermont work after hours to eliminate interaction. Moranbah Landfill has operators working during business hours, Operators control movements of trucks entering, unloading and leaving the cell. Glenden - operators 3 times a week who control all movements at the cell. Sites are set out as per the TMP to reduce vehicular accidents
9) Column E - All sites have a TMP and signage depicting area's for drop off and traffic flow.
10) WW-WI-131 explains the segregation between trucks and light vehicles on site at the same time.
11) Pit Edge protection is present at Nebo, Middlemount, Carmila Greenhils. St Lawrence has above ground bins in place.
12) Sign Audit is currently being undertaken at all sites to identify needs and requirements.

Following further review, officers refined the document, and developed actions to eliminate unacceptable risks and mitigate other less serious risks.

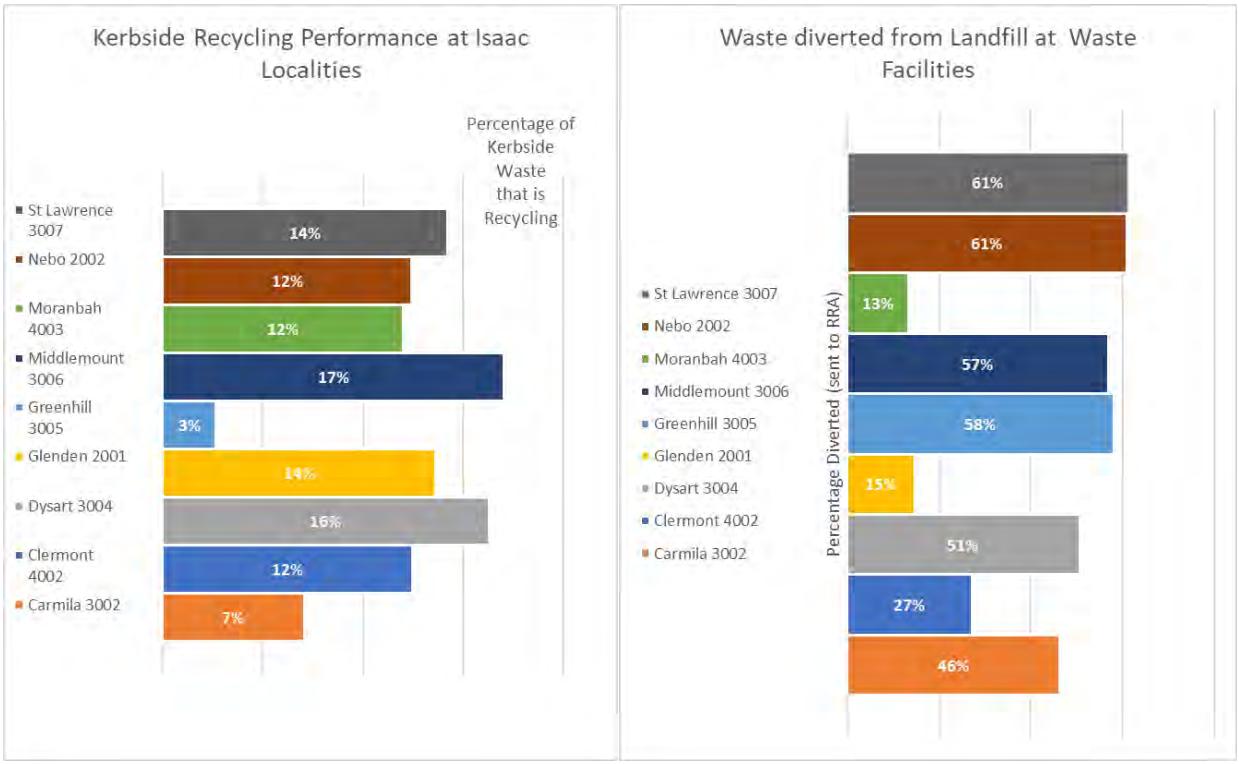
Site / Risk Control	Deposition location – minimise interaction with plant	Separate locations for domestic & commercial	Site Rules	Site roadways	Speed Restrictions	Internal Barriers	Signage – directional and warning	Pit Edge Protection	Signs re avoiding risks	Verbal Instructions to users	Landfill Operations exclude non involved persons	Security & Access Controls	Plant & Equipment fit for purpose	Bulk Bin Transport Controlled	Control of Pest Animals
Moranbah	Large Commercial Vehicles only at tip face	Transfer Station drop off for all small vehicles	Signs with Site Rules at entrance to site	All roads open to small vehicles are sealed, signed and marked. Traffic Management Plan for site	Speed restriction in place at all sites	Weighbridge. Transfer Station drop off for all small vehicles	All Sites are well signed and all have traffic management plans in place	Barriers in place at all transfer station tipping bays	Partly addressed by site rules signs. Signage audit is being undertaken at all sites	Verbal Instructions are given to all users at all sites	Large vehicles at tip face only. 2-way UHF Radio communications	Sites Locked, CCTV	Contractors' tender submissions, Contractor Management site inspections	Waste Collection Contract in place	Carried out by Contractors
Clermont	Contractor does not operate plant during open hours	Consider transfer bins for small vehicles but cost-prohibitive. Will be separate post 2024		Site roads are signed and maintained but not sealed. Traffic Management Plan in place for site		Small vehicles are held back while large commercial are tipping		No vertical edges, but no physical barriers. Sites will change to transfer stations post-2024			Pushing & Covering take place when site is closed			Not Applicable (no bulk Bins)	
Dysart						Good visibility of tip face from gatehouse					Pushing & Covering take place when site is closed				
Glenden	No Plant on site after 30 June 2024	No large commercial vehicles after 30 June 2024				No large commercial vehicles after 30 June 2024					No Plant on site after 30 June 2024				
Middlemount	No Plant used on site during open hours	No large commercial vehicles		All roads open to small vehicles are sealed, signed and marked. Traffic Management Plan for site		No large commercial vehicles		Barriers in place at all transfer station tipping bays			Not Applicable (No Landfill)		Not Applicable (No Landfill)	Waste Collection Contract in place	
Nebo															
St Lawrence				signed and maintained but not sealed. Traffic Management Plan in place for site				N/A						Waste Contract in place but some risk due to position of bins	
Carmila				All roads open to small vehicles are sealed, signed and marked. Traffic				Barriers in place at all transfer station tipping						Waste Collection Contract in place	

Waste Diversion

As previously reported, the target to divert 25% of waste from landfill remains difficult to achieve, finishing the financial year at 20%.

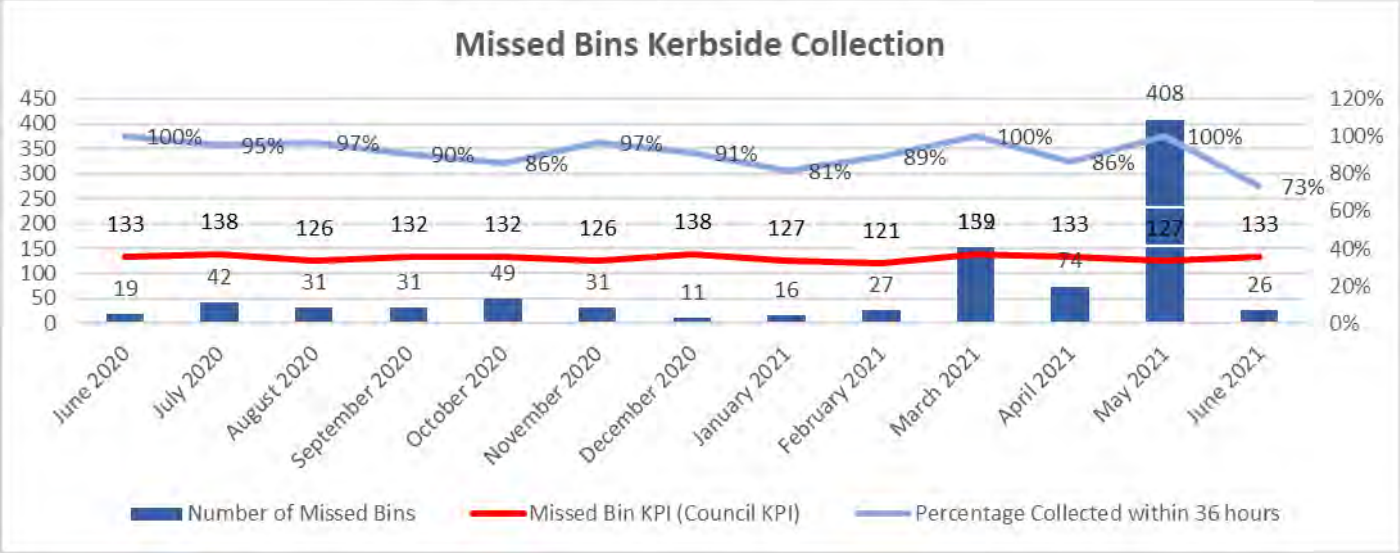
		Cumulative % - Year to Date				
Monthly % Diverted overall		Feb	March	April	May	June
July	15%					
August	17%					
September	19%					
October	17%					
November	18%					
December	16%					
January	23%					
February	22%	18%				
March	23%		19%			
April	18%			19%		
May	20%				19%	
June	22%					19%

As previously reported, there is a range of performance levels in different locations, both with kerbside yellow top bin collection performance, and diversion of waste at waste management facilities, illustrated in the following graphs.

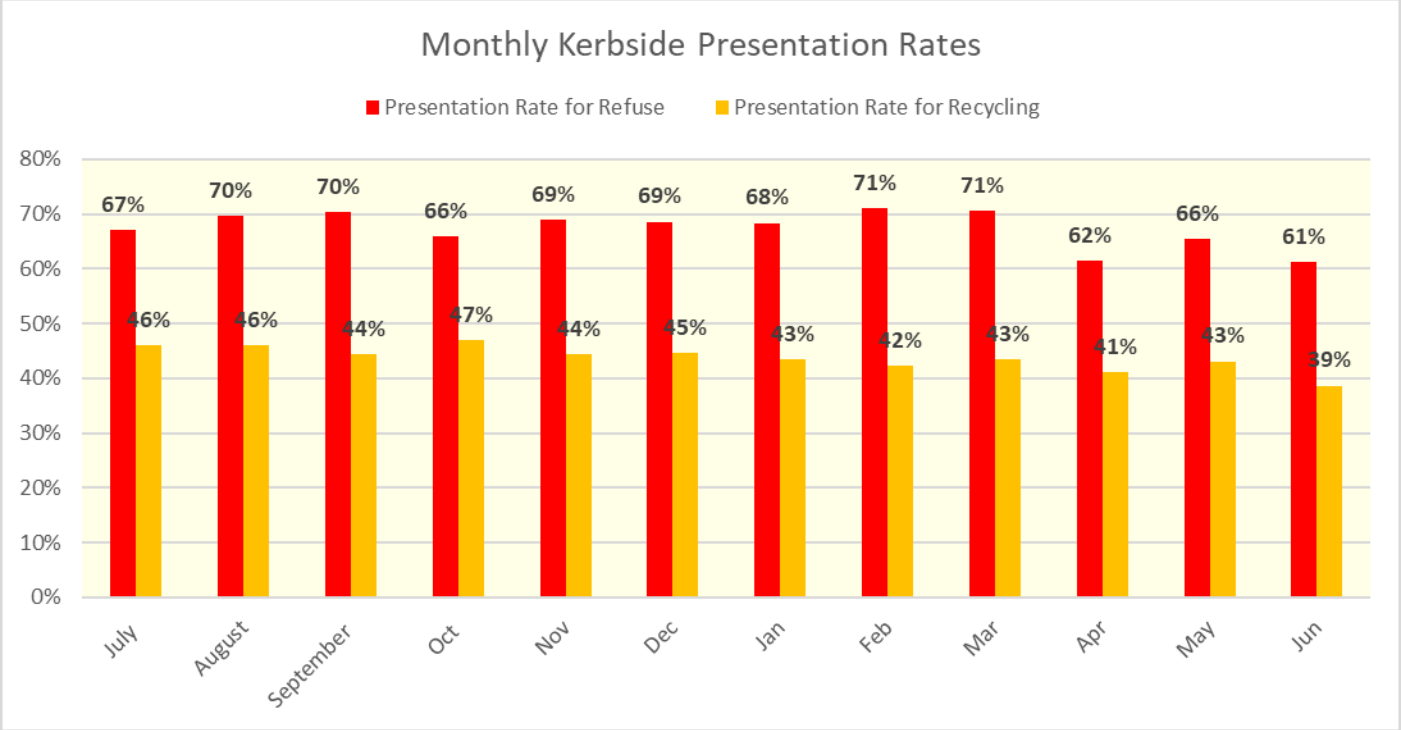


Kerbside Waste Collection

Performance on number of bins being missed improved in June, however only 73% were rectified with the 36-hour rectification period.



Presentation rates for both red and yellow topped bins have dropped during the fourth quarter of 2020-21.



Moranbah Subcell and Separation Layer

A small project comprising two elements was completed at the Moranbah Landfill in June. The elements were:

- Small subcell drainage layer connection – The current landfill cell, cell 1 was constructed as two connected subcells in order to minimise leachate in the initial stages of the cell's life. This left the drainage systems of the two subcells intentionally unconnected. In order to bring the smaller second subcell into use, the two drainage systems require to be connected whilst maintaining the integrity of the cell liner.
- Reinstatement of small subcell separation layer – The uppermost layer of the cell construction is a geofabric layer intended to prevent waste descending into the ballast in the drainage layer, which could ultimately compromise the cell liner. The separation layer in the smaller subcell was extensively damaged during the "supercell" weather event in February 2018. This separation layer has now been re-installed using materials which have been stockpiled since they were purchased via an insurance claim in 2018.

Reinstated Separation Layer in place, Subcell B, Moranbah Landfill Cell 1, June 2021

Drainage systems in Subcell A (left) and B (right) prior to connection

Drainage systems following connection

The completion of these two projects will allow Council to begin landfilling operations in the smaller subcell, commencing 01 July 2021. Officers now refer to the older larger subcell as subcell A and the smaller subcell as subcell B.

Compliance

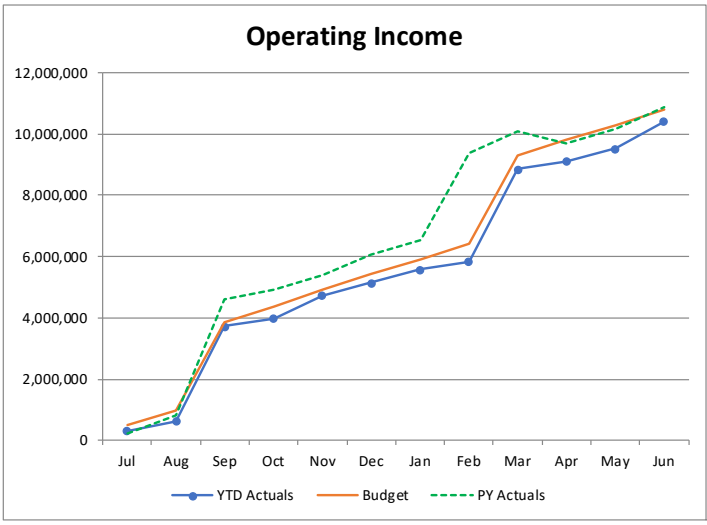
Volumetric analyses of landfill cells and waste stockpiles were carried out by cadastral surveyors in June, in accordance with the *Waste Reduction & Recycling Act*. This is the second year that these surveys have been carried out since the baseline survey was carried out in July 2019. The surveys should provide useful information on landfill performance and projected landfill life expectancy.

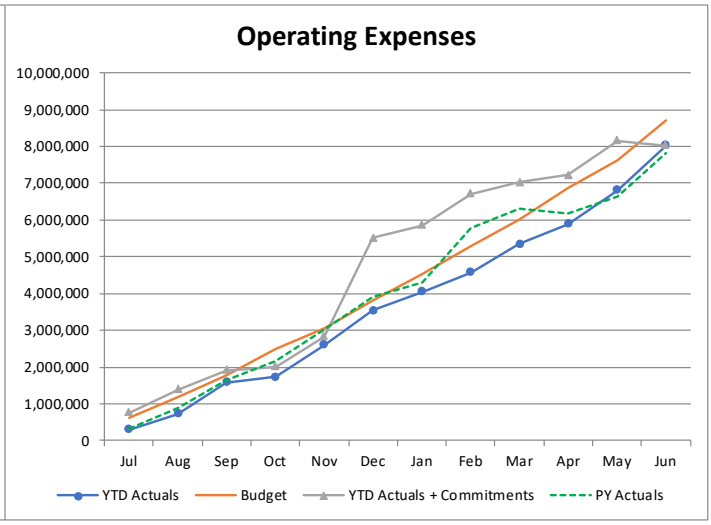
PREVIOUS MONTH'S ISSUES:

Not applicable.

FINANCIAL REPORT:

Interim Report – June 2021





DEVIATION FROM BUDGET AND POLICY:

Not applicable.

OPERATIONAL PLAN / BUSINESS PLAN – EXCEPTION REPORTING

	Waste & Recycling Contract					
	Number of missed services	Collection of Missed Service		Bin Repair / Replacements		
KPI	<10/5000 Services = less than 133 missed services for the month	No of missed bins collected within 36 hours	90% within 36 hours of contractor being notified	No of requests	No of requests completed within 5 working days	90% within 5 working days of request
June	26	19	73%	15	10	67%

	Waste and Recycling Performance					
	Tonnes to Landfill (leviable)	Tonnes to RRA	Tonnes diverted via Kerbside Recycling	Tonnes sent off site for Sale or to processor	% of Waste diverted from Landfill	No of Kerbside *Recycling* Services Vs Presentation rate
KPI	N/A	N/A	N/A	N/A	>25%	
June	3149	737	63	1284t	20%	8935 = 39% -4% on May presentation rate

	Compliance					
	Compliance with Environmental Authority (EA)	Notice of scheduled site closures	Customer complaints non-price related	Nuisance complaints (odour/litter)		No of Transactions
KPI	Compliance with all elements of EA >95%	>7 days notice	Number of complaints / 1,000 transactions / site <10 / annum	Number of complaints / 1,000 transactions / site <20 / annum		N/A
June		0 scheduled site closures	0	1 - dust related complaint Moranbah	5475 transactions 16% lower than May 2021 13% lower than June 2020	

NEXT MONTH'S PROGRAM:

Scheduled to Commence During Next Month

Project Name/ Description	Start Date	Scheduled End Date	Comments/Exceptions
LAWMAC meeting - Barcaldine	22 July 2021	23 July 2021	Presentation / Panel discussion on Regional Transfer Stations

DEVELOPING INITIATIVES / ISSUES:

Waste Levy – discontinuation of Advance Payment.

PLANNING AND PROJECT DELIVERY

PREVIOUS MONTH'S ACHIEVEMENTS:

Significant Projects Update

CW212936 CORP SN Manhole Rehabilitation

The CORP SN Manhole Rehabilitation is to prioritise the rehabilitation and raising of existing sewer manholes in the town of Clermont, as identified during the cleaning and CCTV inspection of the sewer network conducted in 2019-20. This project was awarded to Nixon Plumbing with commencement of the project on site being 4 May 2021.

The works include excavation to expose buried manholes and raising of manholes to a compliant level in accordance with IRC and CMDG requirements and reinstatement of affected areas within private properties and public land throughout the township of Clermont.

To date over 80 manholes have been rectified to date in Clermont.

Figure 1 – Image of existing manhole buried below concrete driveway in Clermont

Figure 2 – Image of manhole attacked by hydrogen sulphide (H2S) gas in Middlemount

CW212864 CORP SN Main Relining Program

The CORP SN Main Relining Program project involves the rehabilitation of the existing buried gravity sewerage pipelines which are in poor condition throughout the sewerage network across the IRC region, utilising the process of in-situ relining. Relining works will prioritise the rehabilitation of pipelines at the highest risk of failure or already failed.

This 2020/21 project is focused on rehabilitation of the network in Clermont and Middlemount and has been awarded to Relining Solutions.

Condition assessment CCTV reports were completed in Middlemount during March 2021. Pipeline relining works are completed in Clermont and Middlemount on 21 June 2021. Installation of top hats to house connection junctions was completed in Clermont and Middlemount on 4 July 2021 including post installation CCTV reports.

Figure 1 – Spiral winding machine installation at Middlemount PS #01

Figure 2 – Low pressure expanding of 225mm fold & form liner Middlemount

Figure 3 – Disintegrated 375 AC main MMT, section of pipe missing

Figure 4 – Completed spiral wound reline of 375 AC main MMT

CW202809 Moranbah Landfill Remediation

Project awarded at Ordinary Meeting 28 April 2021 to Synergy Resource Management. Revised project estimate now $5,500,000 with the current expenditure at $3,003,000.

The contractor has now completed land fill reshaping, supply and placement of cover material, and is in the process of placing the final clay capping areas. IRC has supplied the project's topsoil and top up clay which

will be adjusted in the final close out of the project. Progress continues to be slow with the revised project completion now looking at the end of August 2021.

CW212866 Moranbah Pump Station Renewal Program

The Moranbah Sewerage Pump Station renewal program has been awarded to Re-Pump. The program involves the upgrade to 13 sewerage pump stations in Moranbah. It has been decided to start replacing the existing concrete manholes with a new PVC (plastic based) sewerage manhole which has a longer life expectancy of eighty (80) years. The benefits of using the new PVC manhole is they are light and easy to install compared to the concrete ones which have corrosion issues from the gases released and require a crane to complete the installation. An example of a manhole damaged by gas is shown under project CORP SN Manhole Rehabilitation.

Figure 1 – Image of sewage manholes

Figure 2 – Image of sewage manholes

Clermont Water Quality Action Plan Update

There are several actions which Planning and Projects are responsible for. The below list contains the action and commentary on the action.

Action	Commentary
Inline Analysers for WTP	This package has been awarded and commenced procurement of equipment.
Lighting at WTP	This work has been completed.
Theresa Creek Dam installed VFD	VFD installation is complete, increased reliability of pumping from TCD

Program Activities

- Ongoing development of PAG documents for assessment.
- Development of Strategic Procurement Plan for FY21/22.

Projects Completed

CW Number	Project Name/ Description	Comments/Exceptions

CW212941	DYS WTP Waste Stream Return	Project was 100% completed in June, with full payment in June.

PREVIOUS MONTH'S ISSUES:

Not applicable.

FINANCIAL REPORT:

The following is a report of the Water and Waste Capital Projects delivery highlighting:

a. Progress

b. Exceptions

c. Deviations on the capital projects

As at 30/06/2021, Water and Wastewater actual expenditure totals $9,633,254 representing **71.65%** of amended budget (20-21 - $13,445,060) and a total spend inclusive of tender commitments of $12,523,394 which represents **93.14%** of annual approved budget.

As at 30/06/2021, Waste Services actual expenditure totals $4,675,073 representing **80.13%** of amended budget (20-21 - $5,834,510), and a total spend inclusive of tender commitments of $6,025,333 which represents **103.27%** of annual approved budget.

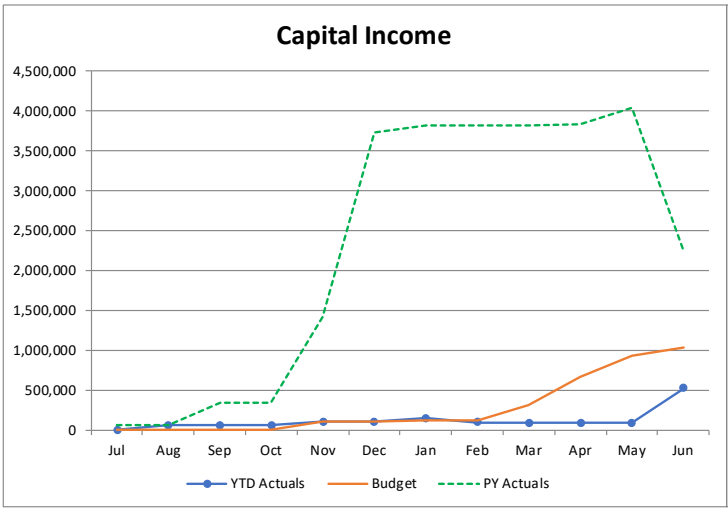
The combined Water & Waste actual expenditure totals $14,308,326 representing **74.21%** of annual approved budget (20-21 - $19,279,570) and a total spend inclusive of tender commitments of $18,548,727 representing **96.21%** of annual approved budget.

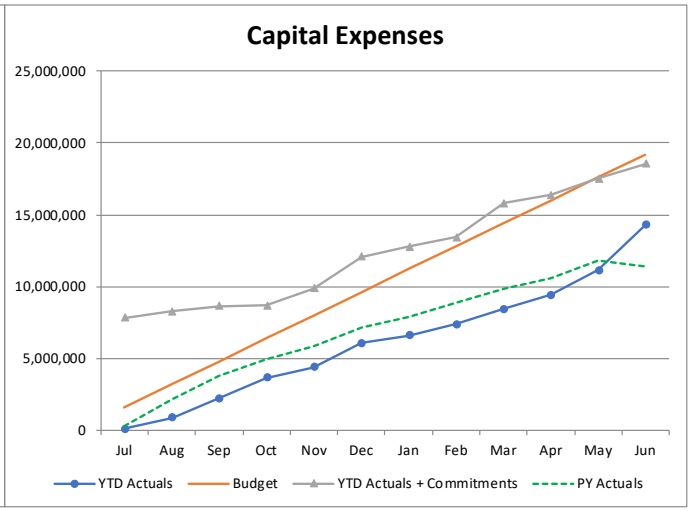
EXPENDITURE SUMMARY

Water & Wastewater	**MAY 2021**	**JUN 2021**
Actual CF plus 19/20 Program Expenditure to date	$7,851,931	$9,633,254
Actual Program Expenditure including Tender commitments to date	$11,818,491	$12,523,394
Waste		
Actual CF plus 19/20 Program Expenditure to date	$3,286,060	$4,675,073
Actual Program Expenditure including Tender commitments to date	$5,707,767	$6,025,333

Interim Report – June 2021

The graph below tracks budget against actuals plus commitments.





DEVIATION FROM BUDGET AND POLICY:

The above financial commentary includes all carry overs.

OPERATIONAL PLAN / BUSINESS PLAN – EXCEPTION REPORTING

Strategy (i.e. C5)	Service Area	Description	Highlight/Exception, including explanation
I6	Effective and Efficient Capital Works Delivery	Implementation of effective project and contract management systems and procedures: • >90% of capital program delivered to budget	Monitor
		Implementation of effective project and contract management systems and procedures: • >90% all subprograms in the W&W capital program is completed on time and in budget	Delay in the delivery of some projects has been reflected in under expenditure for actuals. Monitor

NEXT MONTH'S PROGRAM:

Capital Projects Update

CW Number	Project Name/ Description	Comments/Exceptions
CW182537	CORP Raw Water Remediation Works	Land valuations were obtained from an independent valuer. An application to purchase State Land was lodged (RPS). Department of Resources (DoR) has completed the assessment and issued an offer which has subsequently been accepted. Community Consultation completed as per DoR requirements. Consultant engaged to provide pathway for Native Title extinguishment. Further dam remediation design reviews currently underway to ensure that VFM is achieved. Revise design and project estimate scheduled for delivery by end of July.
CW182563	MMT WTP Reroof Clearwater Tanks 1 & 2	Prestart meeting held 17 March 2021. Final designs were delivered. Methodology and program of works delivered. All materials, fittings and backwash pumps on site. Additional tank panels required due to unexpected

		corrosion found within five (5) tank panels. Project on track for end of July finish.
CW182564	CORP WTP Clearwater Tank Upgrades (Capricorn St Reservoir)	DGH quoting putting overflow pipe on outside of reservoir. Significant Safety benefit.
CW182580	Old Failed equipment (MBH WWTP Belt press)	MBH BFP: Shed complete, civils completed, and physical BFP equipment complete. Electrical Completed. Tested belts and general operations. Waiting to be commissioned (potential resource risk from COVID).
CW192733	CLM STP Upgrade works	Chlorine Duplication Project: Portable water upgrade, asbestos removed, building expansion and commissioning both Cylinders completed. Need booster pump to be installed to complete commissioning, plus minor items (labels, documentation) to be completed by July 2021.
Capital Works Projects (FY20/21)		
CW202807	CLM-Raw Water-TCD Water Storage	Desilting complete. Demobilised. Variation 2 approved. Awaiting final invoice from Dredging Solutions.
CW202809	MBH Landfill - Stormwater, Leachate Management	Project awarded at Ordinary Meeting 28/04/2020 to Synergy Resource Management. Revised project estimate now $5,500,000. Current expenditure $3,003,000 contractor has completed land fill reshaping, supply and placement of cover material, and is now placing the final clay capping areas. Agreement has been reached for the Principal to supply the project topsoil and top up clay due to credit issues between the principal contractor and the local sub-contractor supplying the material. Progress has been slow, with the contractor is likely to be 7 months late in the delivery of this project. The delays have been caused by slow progress within all stages of the work due to construction issues, and contractor inexperience. The contractor has been encouraged to improve their productivity. A new Superintendent was appointed Feb 2021 (Premise) to assist with the closing out of this project. The Project Team has also concerns relating to the financial stability of the Principal Contractor, with legal advice sought to address this issue if it arises. The contractors revised program has PC and 30 July 2021. However, the project team don't expect this work to be completed before mid-August 2021.This is a multiyear project.
CW202846	NBO WTP Electrical Connectivity Improvement	Funds to be utilised to reduce the EC wastewater levels at WTP or alternative solutions. Short-term & medium-term options being investigated. Quote accepted for flowmeter and EC monitoring equipment (43K) to assist with TEP at WWTP. Quote accepted for brine diversion works at the WTP. Works expected to be completed by 15/07/2021.
CW212857	CAR Transfer Station - Retaining Wall	Combined with Greenhills transfer station project. Revised drawings received 10/6/21, reviewed by IRC and designers currently amending the drawings to suit the existing terrain, possible additional Geotech investigation may be required for existing drop off mound to determine

		safe excavation slopes for construction. RFT documentation being developed. Anticipate construction works to go out for Tender in July 2021. Project will carry over into Q1 2021/22.
CW212861	CORP Water Mains Replacement Program	Balance of funds utilised by operations/capital for WM replacement in Nebo, MBH etc. RFQ to be developed for 280m WM replacement in Archer Drive MBH.
CW212863	CORP Water Valve & Hydrant Repair/Replace	MBH McCool St and Flinders Dr valve replacements in progress by Moranbah Plumbing & Contractors. Scheduled for completion on 30/6/2021.
CW212864	CORP SN Main Relining Program	Project awarded to Relining Solutions. Pipe relining works completed 21/06/2021. Installation of top hats into house connection branches to continue into July 2021.
CW212866	CORP - SPS Renewal Program	NBO & GLN SPS: The SPS switchboard that require minor work have been completed, irrigation switchboard completed, waiting Ergon on last switchboard. MBH SPS upgrade planned for completion end of July 2021.
CW212869	CORP Potable Water Meter Install Parks & Gardens	Review of unmetered services completed in Clermont. W&W operations currently procuring materials and installing meters in CLM. Installation of several irrigation service meters to Clements St MBH completed in April. Project expected to carryover to Q1, 21/22.
CW212875	Caravan Dump Points - MBH & MMT	Materials have been ordered for both sites, but no delivery dates have been given by the suppliers.
CW212936	CORP SN Manhole Rehabilitation	Project awarded to Nixon Plumbing. Works progressing in Clermont, potential for delays due to supply issues for precast components. Works to be included in Middlemount to address major concrete degradation in several manholes. Project to carryover to Q1, 21/22.
CW212939	CLM STP Lighting Rectification	Lighting complete and operational.
CW212940	CLM WTP Quality Response Action Works	Iron and manganese analysers to be installed under IRCQ2013-1120-854 to improve the quality of the CLM water supply. Works expected to be completed by mid-October 2021.
CW212941	DYS STP Optimisation of Plant	Concrete Infrastructure report: Site inspected & CCTV conducted, waiting report. Building Works: Was awarded in mid-April, with construction started early May and is expected to be completed by mid-July. Electrical/SCADA: RFQ close on 14 May, with project to be issued next fin year.

DEVELOPING INITIATIVES / ISSUES:

Not applicable.

INFORMATION BULLETIN

ISAAC REGION
HELPING TO ENERGISE THE WORLD
ABN 39 274 142 600

Report authorised by:

LINDA ROBERTS

Acting Director Water and Waste

Date: 7 July 2021

ATTACHMENTS

- Confidential Attachment 1a – Water & Waste Capital Projects Jun 2020 / 2021 Fin Yr

PAGES 195 TO 196 HAVE INTENTIONALLY BEEN REMOVED DUE TO CONFIDENTIAL REASONS