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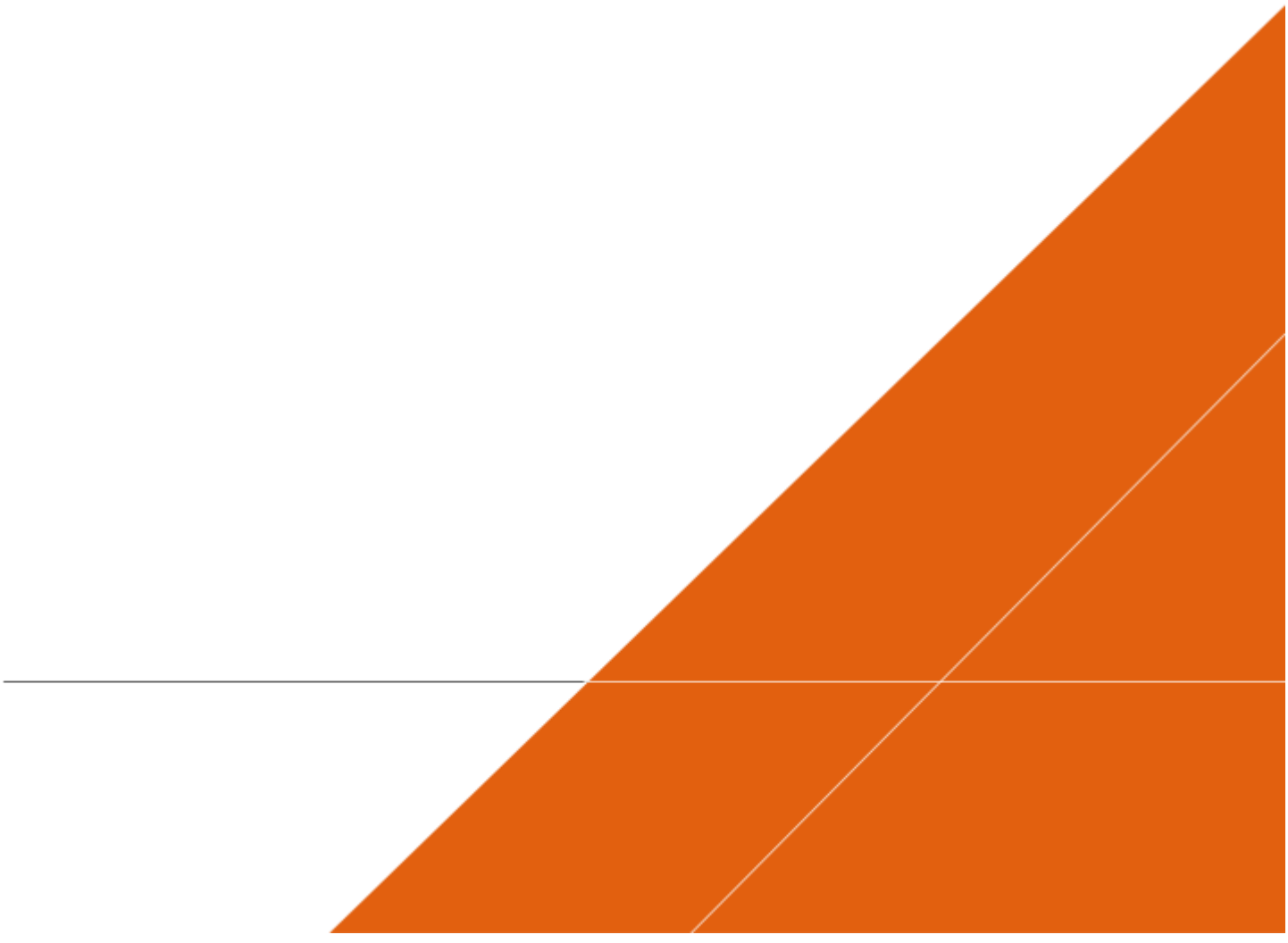
# KINGS PARK METAL RECOVERY AND RECYCLING FACILITY EXPANSION

## Water Management Report

13 JULY 2020



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# SELL AND PARKER
# KINGS PARK METAL RECOVERY AND RECYCLING FACILITY EXPANSION

## Water Management Report


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# APPENDICES

# 1 INTRODUCTION

Sell and Parker (the Applicant) currently own and operate a resource recovery facility (RRF) at 23-43 and 45 Tattersall Road, Kings Park (the Proposal site) (Figure 1). The RRF currently operates under approval SSD 5041 and three associated modifications (the Original Approval).

The Proposal involves seeking approval to increase the throughput limit of the existing RRF at the Proposal site from 350,000 to 600,000 tonnes per annum. The existing infrastructure at the Proposal site has the capacity to accommodate the proposed increased throughput and the Proposal would not require any physical works or change to the nature of operations. However, some adjustments to site management practices such as internal traffic flows and scheduling would be required.

This water management report utilises the information included in the approved site's Water Management Plan (prepared by Arcadis 12 September 2019) as well as more updated information provided by Sell & Parker with the aim to:

A. Assess the existing stormwater and wastewater systems and their capacity to manage the proposed operational increase. The current water system is designed so that stormwater runoff from processing areas is treated, stored onsite, and reused to meet production water demand. There is no allowance to discharge stormwater runoff from 'dirty' areas to Breakfast Creek. Any stormwater runoff from these areas exceeding the Proposal site's storage system may be discharged to the sewer in accordance with the Sydney Water trade wastewater agreement. Only stormwater runoff from roof and carpark areas drains to Breakfast Creek.

B. Undertake detailed site water balance assessment including identification of water requirements and measures to ensure water security and to minimise water use on site.

C. Characterise wastewater generated on site and how it is managed in a sustainable way so that its potential impacts on the receiving environment are mitigated.


*Figure 1 The Proposal site*

# 2 WATER REGULATIONS

The main regulations related to water management within the Proposal site of relevance to the proposal include:

## 2.1 Protection of the Environment Operations Act 1997 (POEO Act)

Under this Act, the existing Sell & Parker Kings Park metal recycling facility currently operates under Environment Protection Licence (EPL) 11555, which does not allow discharge of (contaminated) water to Breakfast Creek.

## 2.2 Sydney Water Trade Wastewater Agreement

Discharge to sewer can occur in accordance with the Sydney Water trade wastewater agreement (Conditional Consent 39940 on 21 December 2020) included in Appendix C.

# 3 DESCRIPTION OF THE EXISTING WATER MANAGEMENT SYSTEM

A water management system is currently operational at the Proposal site, which was developed to comply with the conditions of approval of SSD 5041 dated 12 November 2015 including three associated modifications. The Water Management Plan (WMP) presented in Appendix G which this report is based on has been approved by the NSW Department of Planning, Industry and Environment (DPIE) on 23 August 2019.

The Proposal site's water management system is principally based on separating "clean" runoff such as roof and paved areas not affected by the industrial use of the Proposal site, from contaminated "dirty" runoff where industrial activities take place such as metal stockpiling and processing. Dirty runoff is collected, treated and reused in a closed loop system so that no discharges – other than runoff from the clean catchment – are directed into Breakfast Creek. During periods of prolonged rainfall events, tertiary treated site runoff is discharged to Sydney Water's sewer based on their conditional consent to discharge industrial trade wastewater to their system. The basis of the site's water management system is shown in Figure 2, while its details are discussed below.

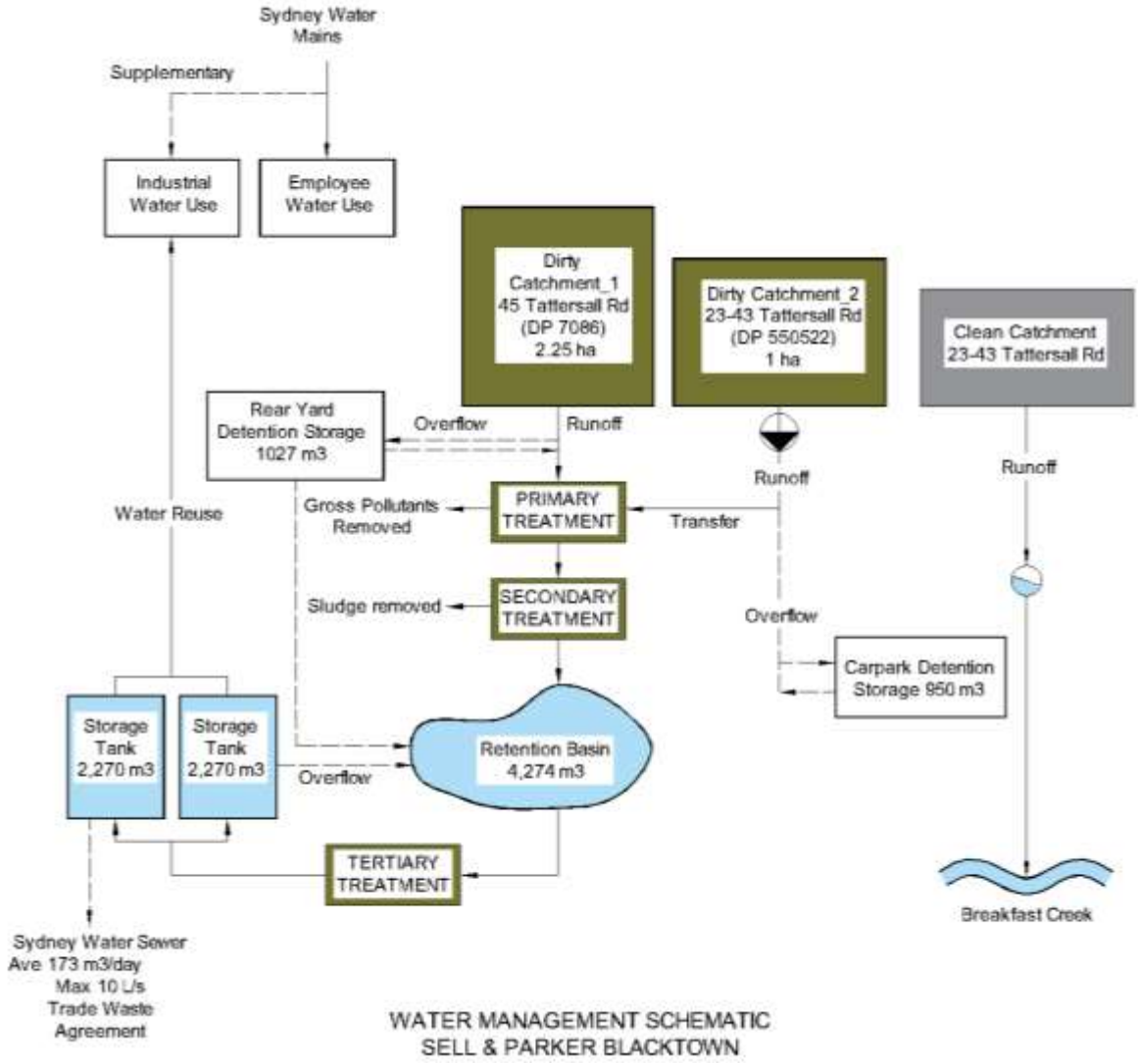


*Figure 2 Proposal site water management system*

## 3.1 Water Transfer and Diversion Management

The Catchment Area Plan (Appendix A) details the clean and dirty areas of the Proposal site reflected in Figure 2. Roofed areas and the front carpark in the 23-43 Tattersall Road site are clean water areas and rainfall runoff from these locations flow through a stormwater pit-pipe system to Breakfast Creek. The dirty catchment in 45 Tattersall Road drains directly to the floc pit, while the dirty catchment in 23-43 Tattersall Road drains to an underground concrete buffer tank fitted with a rising main that transfers collected runoff to the floc pit. The Proposal site's stormwater drainage arrangement is detailed in the Site Drainage Plan (Appendix B) prepared by ADW Johnson. No new infrastructure is required for the Proposal.

## 3.2 Primary Treatment System – Floc Pit

Water from the 45 Tattersall Road site is gravity fed into the floc pit, which comprises of a drive through two-part system that allows coarse gross pollutants to fall out in the first section . A hydrocarbon boom is utilised as required. Water passing through the screens will go into the floc pump pit ready for automatic transfer to the secondary treatment system. The location of the Floc Pit is detailed on the Site Drainage Plan in Appendix B.

*Figure 3 Proposal site's Floc Pit*

## 3.3 Secondary Treatment System – Sludge Bags

Water is pumped from the Primary Treatment System's pump pit to the Secondary Treatment System which consists of sludge bags in a bunded area on the retention basin wall. The bund is 15 metres in length, 5 metres wide with a 30 centimetre gutter and constructed from reinforced concrete. The location of the sludge bags is shown on the Site Drainage Plan in Appendix B. The bags will retain the majority of the sediment while filtered water will seep out into the bund and then gravity feed down a sluice pipe into the retention basin. The sludge bags will retain suspended solids including hydrocarbons and metals that adhere to particles in the water. Sludge removal to approved landfill facility takes place as required.

*Figure 4 Proposal site's Sludge Bags*

## 3.4 Onsite Retention Basin

The Proposal site's retention basin is used for storage of secondary treated runoff and storage of runoff overflowing from the Proposal site's transfer system during heavy rainfall events. The storage capacity of this retention basin is 4,274 cubic metres , supplemented by two temporary onsite detention systems: 1,027 cubic metres detention storage at the rear yard, and 950 cubic metres detention storage at the rear carpark. The details of these storage systems are included in the Proposal site's stormwater management assessment undertaken by ADW Johnson in 2017 and presented as part of the approved WMP in Appendix G.

A validation program to test retention basin integrity has been undertaken in consultation with the EPA. Sell & Parker will continue to undertake yearly validation sampling to ensure ongoing efficacy of the retention basin.

*Figure 5 Proposal site's retention basin*

## 3.5 Tertiary Water Treatment System

A Tertiary Water Treatment System (TWTS) comprising of media filtration and chlorine disinfection is being utilised to remove fine suspended particulate material and provide a water quality that meets the requirements for Sydney Water sewer discharge. The commissioning phase of the treatment system was undertaken in 2017 by a suitably qualified and experienced person(s) in consultation with the EPA. Sydney Water also approved this TWTS as suitable to treat site runoff for discharge to its sewer system according to the approved trade wastewater agreement issued on 21 December 2018. Since then, all tested discharges to the sewer have been complying with the water quality requirements in the trade wastewater agreement. An example of the water quality achieved through this TWTS is shown in Appendix D, which shows the latest testing results of onsite samples taken from the treated effluent.

The TWTS is regularly used to treat site's runoff for storage in one of the aboveground storage tanks, which is then supplied within the site as reuse water or discharged into the sewer before anticipated large rainfall events and during heavy rainfall to maximise available storage capacity. The filtration system is fully automated operating on a set level controls in the tanks and the retention basin. Two back up diesel pumps are available in the event of large rain events.

*Figure 6 Proposal site's Tertiary Water Treatment System (TWTS)*

## 3.6 Storage Tanks

Tertiary treated water is stored in the above ground tanks. The water is utilised for site reuse and discharged as trade wastewater if and when required. Water can be released back through all three stages of the filtration system from the tanks if additional water treatment is required. Each tank has a 2,270 kL capacity. Their locations are shown in the Site Drainage Plan in Appendix B, while their details and elevations are included in the ADW Johnson Stormwater Management report in Appendix G.

*Figure 7 Proposal site's Reuse Storage Tanks*

## 3.7 Controlled Discharge to Sewer

According to the "Consent to discharge industrial trade wastewater" agreement (Conditional Consent 39940) signed by both Sydney Water and Sell & Parker, the Proposal site can discharge trade wastewater to the sewer provided that certain flow rate and pollutant concentration levels are met as shown in Appendix C. The maximum instantaneous rate of pumped discharge is 10 L/s, while the average daily discharge is 173 kL. The trade wastewater is discharged via metered pipe from the clean water tank/s to the sewer discharge point. It includes a visual air gap backflow prevention connection from pipe discharge to the Sydney Water sewer connection.

Wastewater from the Proposal site has been discharging to the sewer in accordance with this Sydney Water's trade wastewater agreement since 21 December 2018 after the commissioning and approval of the TWTS. Recently tested (complying) quality of the discharged effluent to the sewer is shown in Appendix D, while discharge volumes to Sydney Water's sewer since activation are shown in Table 1 based on information provided by Sell & Parker. This information shows that the average daily discharge volume to Sydney Water's sewer is 36 kL/day, well below the average 173 kL/day specified by the trade wastewater agreement.

*Table 1 Details of site discharges to Sydney Water's sewer*

| Date | Volume Discharged to Sewer (kL) |
|---|---|
| 15/01/2019 | 569 |
| 16/01/2019 | 474 |
| 12/04/2019 | 667 |
| 19/09/2019 | 809 |
| 20/09/2019 | 814 |
| 21/09/2019 | 849 |
| 22/09/2019 | 561 |
| 23/09/2019 | 706 |

| Date | Volume Discharged to Sewer (kL) |
|---|---|
| 24/09/2019 | 848 |
| 25/09/2019 | 170 |
| 26/09/2019 | 161 |
| 27/09/2019 | 4,919 |
| 11/12/2019 | 2 |
| 22/01/2020 | 170 |
| 23/01/2020 | 376 |
| 28/01/2020 | 58 |

# 4 SITE'S WATER BALANCE

A site's water balance is undertaken as part of the assessment for the Proposal to:

- Identify water requirements for the life of the project
- Ensure an adequate and secure water supply is available for the Proposal and ascertain measures to minimise water use at the site
- Demonstrate sustainable management of the Proposal site's water system including no discharge to Breakfast Creek from the onsite retention pond.

## 4.1 Site's Water Sources and Demands

### 4.1.1 Current Potable Water Demand

The Proposal site's potable water demand – supplied through Sydney Water's mains – includes water use by the Proposal site's employees such as drinking, laundry, bathroom, toilet flushing and kitchen. Potable water is also infrequently used to supplement the production water use when required. According to Sell & Parker, this supplementary potable water demand for production use is a rare occasion during extended dry periods.

Sell & Parker considers the 2018 mains water use to be representative of typical potable water demand during current production throughput as there was flow meter irregularity in the 2019 data. The total monthly use of water mains in the Proposal site (23-43 and 45 Tattersall Road) for 2018 is presented in Table 2. The daily average of these readings was 25 kL/day (assuming 365 days per year to facilitate water balance modelling using MUSIC software).

*Table 2 Total monthly use of water mains for 2018*

| Month | Potable Water Use (kL) |
|---|---|
| January | 1,760 |
| February | 1,462 |
| March | 1,356 |
| April | 436 |
| May | 571 |
| June | 434 |
| July | 404 |
| August | 546 |
| September | 388 |
| October | 491 |
| November | 524 |
| December | 752 |
| **Total (kL/year)** | **9,124** |
| **Average (kL/day)** | **25** |

## 4.1.2 Current Production Water Demand

The production water demand for the Proposal site includes the water usage for the shredder as well as for the Proposal site's washdown and dust control.

Based on information provided by Sell & Parker, the site's shredder water use in 2019 for sprays – which does not include any other usage – is shown in Table 3. The daily average of these water volumes was 18 kL/day (assuming 365 days per year).

*Table 3 Monthly water use for shredder's spray for 2019*

| Month | Water Use (kL) |
|---|---|
| January | 740 |
| February | 814 |
| March | 563 |
| April | 599 |
| May | 426 |
| June | 148 |
| July | 246 |
| August | 594 |
| September | 515 |
| October | 626 |
| November | 934 |
| December | 489 |
| **Total (kL/year)** | **6,694** |
| **Average (kL/day)** | **18** |

The remaining production water demands including the shredder's other water uses, Proposal site's washdown and dust control, were estimated using calculations of the Proposal site's operational water balance during August to October 2016 (shown in Appendix F). These are presented in Table 4.

*Table 4 Remaining site's production estimated water use (based on the site's operational water balance presented in Appendix F)*

| Production Use | Aug 2016 (kL) | Sep 2016 (kL) | Oct 2016 (kL) | Average (kL/day) |
|---|---|---|---|---|
| Other Shredder uses (Shred & Floc) | 349 | 489 | 184 | 11 |
| Washdown | 390 | 390 | 390 | 13 |
| Dust control | 180 | 200 | 50 | 5 |

Based on the above, the estimated total for the Proposal site's water demands for the current production condition are compiled in Table 5. This shows that the total production water demand representing 350,000 tonnes per year throughput is estimated to be 47 kL/day.

*Table 5 Site's estimated production water demand for 350,000 tonnes throughput*

| Water **Use Type** | **Average Water Use** |
|---|---|
| Shredder (spray) | 18 kL/day |
| Shredder (Shred & Floc) | 11 kL/day |
| Site washdown | 13 kL/day |
| Site dust control | 5 kL/day |
| **Total daily for production** | **47 kL/day** |
| **Total yearly for production** | **17,155 kL/year** |

### 4.1.3 Onsite Water Reuse

As discussed earlier in Section 3, stormwater runoff generated from rainfall on the "dirty" catchments is treated by primary and secondary treatment before storage in the onsite retention basin. Water from the retention basin is further treated by a tertiary media filtration system and then chlorine disinfected before being stored for onsite reuse in the storage tanks. This reuse is mainly directed to meet the production water demand outlined earlier, while only supplemented by Sydney Water's mains in rare occasions during extended dry period according to Sell & Parker.

The additional tertiary treatment further reduces risks associated with reusing this water for onsite production purposes such as:

- Water spray within the shredder for cooling the hammermill
- Other uses within the shredder such as for shredding and washing floc
- Dust suppression
- Washdown of areas required for pedestrian and truck movements and work areas outside of stockpile locations.

ERM also undertook assessment of the risks associated with stormwater reuse on the site as required by the 2015 development assessment approval conditions for the site. They concluded that such risks were low and acceptable according to their document "45 Tattersall Road, Kings Park - Water Reuse Risk Assessment" of the 22nd March 2016 (presented in Appendix E).

### 4.1.4 Estimated Future Demand

For this assessment, we have assumed that the increase in production throughput associated with the proposal from 350,000 tonnes per year to 600,000 tonnes per year would proportionally increase the production water demand. This would increase the production water demand from 47 kL/day (17,155 kL/year) to 81 kL/day (29,565 kL/year).

We also note that the number of employees is not expected to change with the proposed increase in production throughput based on information provided by Sell & Parker. The potable water demand for employees is expected to remain at the current level of 25 kL/day (9,124 kL/year).

Therefore, it is estimated that the total water demand for the Proposal would be 106 kL/day (38,689 kL/year).

## 4.2 Water Balance Calculations

Water balance calculations are aimed to evaluate the security of reuse water supply from the onsite retention pond to meet the site's production water demands for both current and proposed conditions, and to demonstrate that the current trade wastewater agreement with Sydney Water is sustainable over the long term considering the proposed increase in production throughput.

For this purpose, water balance calculations were undertaken using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) software. MUSIC has a typical node for modelling rainwater tanks, which allows for the simulation of stormwater harvesting and reuse for extended rainfall periods.

Following Blacktown City Council's latest guidelines[1], a MUSIC model was developed that used daily rainfall data from Blacktown station (067059) for the years 1963 to 1993, which is considered suitable for all developments within Blacktown LGA. The average annual rainfall for the selected simulation period is 854 mm/year and the average annual evapotranspiration is 1,261 mm/year. The MUSIC model included the "dirty" catchment of 3.25 ha discharging into the onsite retention basin, which is then reused to supply the site's production water demand supplemented by the two aboveground storage tanks and the supplementary detention storages at the carpark and the rear yards. The total capacity of the site's storage system is 10,791 $m^3$.

Two scenarios were modelled:

- Current scenario: assumes the site's storage system captures runoff from the "dirty" catchment for reuse to meet the site's total production water demand of 47 kL/day. This scenario represents the current approved site's throughput of 350,000 tonnes per year.
- Proposed scenario: assumes the site's storage system captures runoff from the "dirty" catchment for reuse to meet the site's total production water demand of 81 kL/day. This scenario represents the proposal's throughput of 600,000 tonnes per year.

The results of the two modelling scenarios are presented in Figure 8 and Figure 9, and summarised in Table 6.

For the current scenario, the results show that the provided onsite storage system would overflow 7,330 kL/year or an average of 20 kL/day into the sewer system. This is comparatively close to the 36 kL/day recorded by Sell & Parker to be discharged to the sewer in 2019 (discussed earlier in Section 3.7 of this report), especially considering the unavoidable imprecision associated with the model when compared to reality and that the model considers 30 years of rainfall data, while the recorded values were only for a single year. The estimated 20 kL/day average discharge to sewer is also less than the 173 kL daily average licenced by Sydney Water to discharge to sewer, which indicates the sustainability of this scheme with no overflows expected from the onsite retention pond to Breakfast Creek. The results for this scenario also show that the site reuse supply almost completely (99.9%) meets the production water demands in the current condition, which is inline with Sell & Parker's advice that potable water top up for production water use only happens in rare occasions.

In the proposed condition scenario, the site's production demand is greater, which results in more reuse demand and eventually less overflow to the sewer (average 3 kL/day). Table 6 also shows that in the proposed scenario, 80% of the site's production demand is met through the onsite reuse water supply. This water reuse equates to a 61% potable water saving of the total water demand of the site (considering the 25 kL/day potable water used by the site's employees). The remainder of the total water demand of the site will be supplied from Sydney Water mains.

[1] WSUD Developer Handbook: MUSIC modelling and design guide DRAFT 2019 by Blacktown City Council

*Table 6 Water balance results of the current and the proposed scenarios*

| Scenario | Stormwater Inflow into Storage (kL/year) | Storage Overflows Discharge to Sewer (kL/year) | Production (Reuse) demand (kLyear) | % Reuse demand satisfied |
|---|---|---|---|---|
| Current | 24,710 | 7,330 | 17,155 | 99.9% |
| Proposed | 24,710 | 1,000 | 29,565 | 80% |

These results show that the proposal's water management system and mitigation measures are sustainable in the long-term and incorporate measures that minimise potable water use on the site and achieve significant water savings.

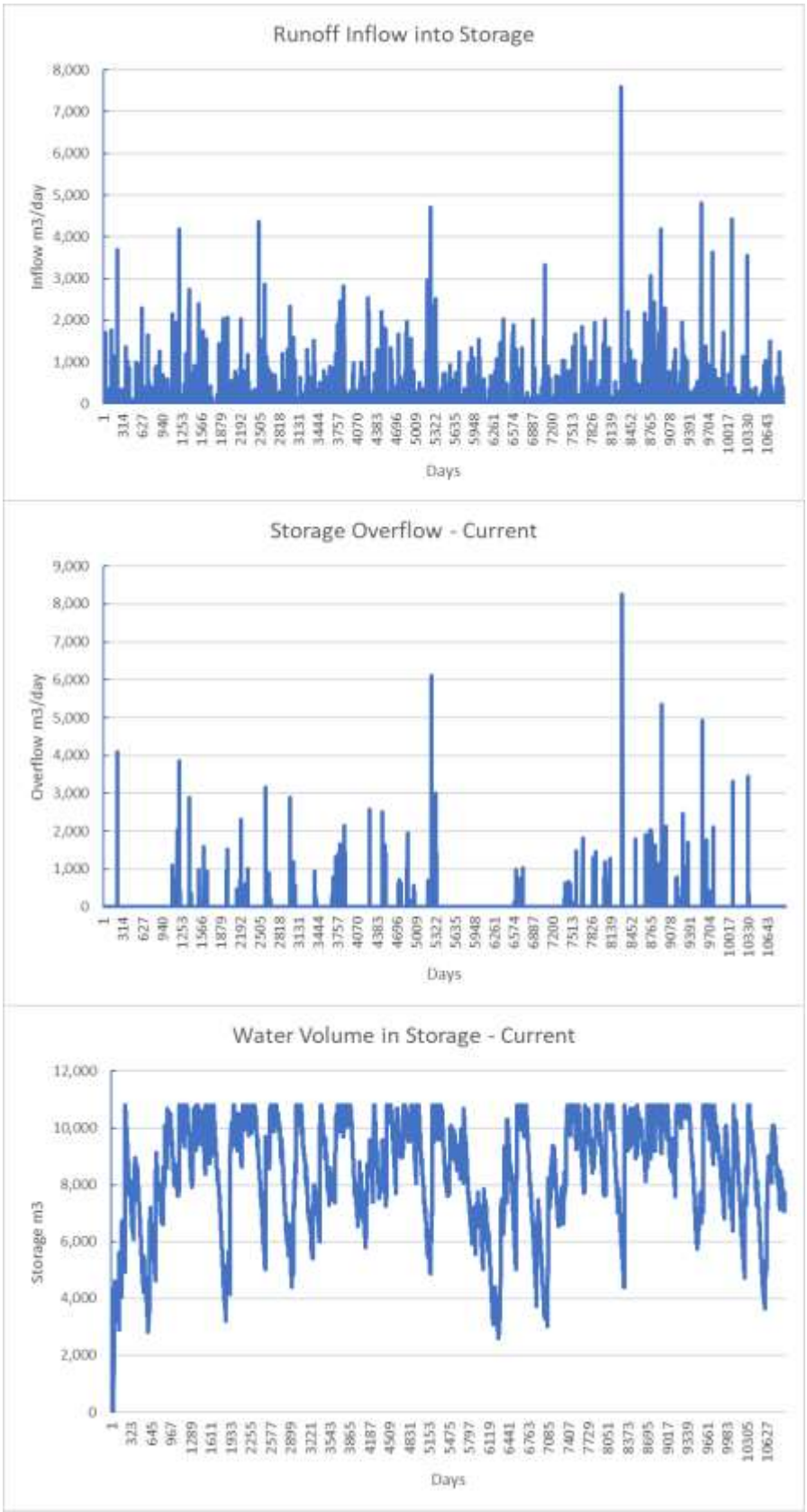


*Figure 8 Water balance calculation results for the current scenario*

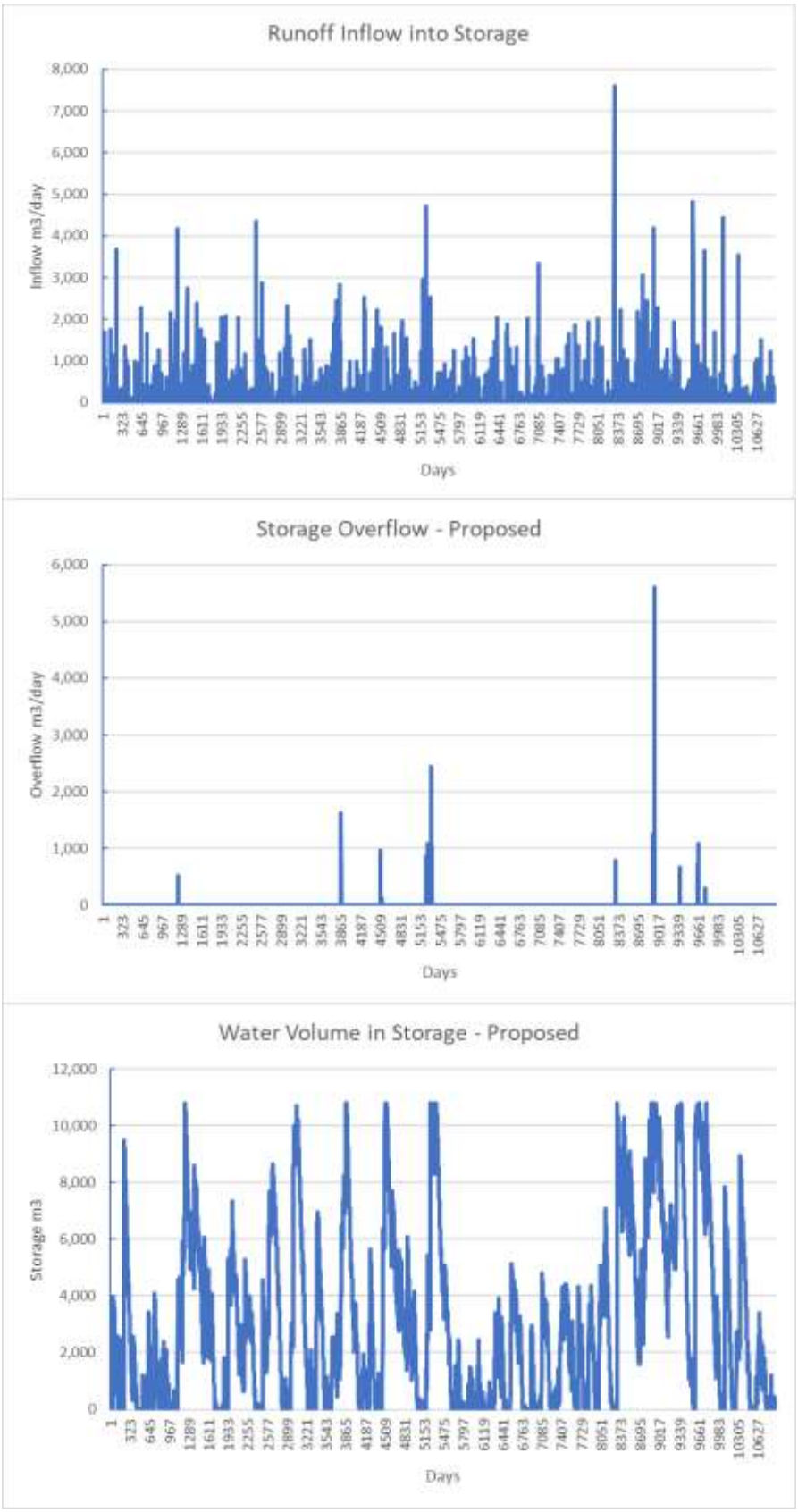


*Figure 9 Water balance calculation results for the proposed scenario*

# 5 MANAGEMENT OF POTENTIAL IMPACTS

The approved WMP (presented in Appendix G) provides specific mitigation measures and controls applicable to the current operation of the Proposal site to avoid or minimise negative environmental impacts. The WMP also outlines a monitoring regime to check the adequacy of these controls and corrective actions instigated when monitoring indicates a significant change in the Proposal site's water quality.

The main relevant impact resulting from the Proposal of increasing the throughput limit of the existing RRF from 350,000 to 600,000 tonnes per annum is increasing the Proposal site's production water demand.

In the current condition, production water demand is largely supplied through the Proposal site's reuse water system discussed earlier in Section 3 of this report, supplemented by mains water supply in rare occasions during periods of extended dry weather. On the other hand, the Proposal site would discharge excess stormwater runoff from the dirty catchments to the sewer during extended wet periods. This is reflected in the water balance calculations presented in Section 4 of this report.

In the proposed condition, increasing the production throughput would increase the Proposal site's production water demand, thus would increase the required mains water supplement on one hand and reduce the expected overflow discharges to sewer from the other hand. This is reflected and discussed in the water balance calculations presented in Section 4 of this report.

Reducing the overflow discharges to the sewer is a positive impact as it would improve the safeguard against any potential contaminated discharges from the Proposal site to Breakfast Creek. Thus, the main management measures required to mitigate the potential negative impacts associated with the Proposal are:

A. Ensure the Proposal site's water management system is operated and maintained according to the approved WMP.

B. Ensure the availability of adequate mains water supply from Sydney Water required to supplement the shortfall in the reuse water supply to meet the increased production water demand.

C. Ensure that the Proposal site's reuse water system is adequately designed to meet the expected increase in production water usage.

# 6 CONCLUSION

The current water management system of the Proposal site is hinged around capturing, treating, storing and then reusing all runoff from dirty catchments to create a closed loop system whereby discharges outside this system are only allowed to the Proposal site's sewer based on the trade wastewater agreement with Sydney Water. This way compliance with the current EPA licence is achieved, which does not allow any contaminated discharges from the Proposal site to Breakfast Creek.

As shown in the water balance assessment presented in Section 4 of this report, the Proposal site's water management system – including the available onsite storage systems – was modelled using MUSIC software and simulated with daily rainfall data for 30 years incorporating the current and the Proposal's estimated water reuse demands.

For the current condition, the results showed that the discharges to sewer required to prevent overflow to Breakfast Creek are well within the current licence to discharge to the sewer based on the trade wastewater agreement with Sydney Water. Furthermore, the ADW Johnson's Stormwater Management Assessment (presented as part of the approved WMP in Appendix G) included a detailed site water balance, which demonstrated that the provided onsite storage systems along with the approved Sydney Water trade wastewater discharge agreement are adequate to comply with the EPA's licence requirement of no discharges to Breakfast Creek. This study was approved by the EPA as part of the NSW DPIA approval of the site's Water Management Plan on 23 August 2019.

The Proposal would increase the Proposal site's production water demand as shown in Section 4 from an estimated 47 kL/day to 81 kL/day. This would reduce the possible discharges to the sewer from 20 kL/day to 3 kL/day, thus improves the sustainability of the Proposal site's water management system. Significant water savings would also be associated with the Proposal through reusing the Proposal site's treated runoff for production purposes, estimated at 61% of the total water use for the Proposal site.

The approved WMP (Appendix G) provides specific mitigation measures and controls applicable to both the current and proposed operation of the Proposal site to avoid or minimise negative environmental impacts. The WMP also outlines a monitoring regime to check the adequacy of these controls and corrective actions instigated when monitoring indicates a significant change in the Proposal site's water quality.

The main management measure required to mitigate the potential negative impacts associated with the Proposal is to ensure the availability of adequate mains water supply from Sydney Water to supplement the reuse water supply in order to meet the increased production water demand.

In conclusion, the Proposal's water management system and adopted mitigation measures would have no adverse impact on the receiving environment, would minimise the impact of the increase in production water demand and are sustainable in the long-term. The potential for the Proposal to adversely impact Breakfast Creek due to runoff from dirty catchment overflows is mitigated by the current water management system implemented on site. The Proposal would provide additional safeguard against the potential for such an event to occur.

# APPENDIX A SITE'S CATCHMENT AREA PLAN

# APPENDIX B SITE DRAINAGE PLAN

# APPENDIX C SYDNEY WATER TRADE WASTEWATER AGREEMENT

# APPENDIX D WATER QUALITY TESTING RESULTS FOR THE TERTIARY WATER TREATMENT SYSTEM EFFLUENT

# APPENDIX E ERM'S WATER REUSE RISK ASSESSMENT

# APPENDIX F OPERATIONAL USE WATER BALANCE (2016)

Source: Appendix H of the approved site's Water Management Plan prepared by Arcadis 12 September 2019

# APPENDIX G APPROVED SITE'S WATER MANAGEMENT PLAN

Source: Main body report of the approved site's Water Management Plan prepared by Arcadis 12 September 2019