

14 Carrick STP

14.1 Activity and report details

Activity name	Carrick STP		
Activity address	Off Meander Valley Highway, Carrick		
Permit number	Licence to Operate -2878	Date of issue	27/10/1983
EPN	8121/2	Date of issue	23/09/2011
Treatment level	Secondary Treatment		
Authorised Dry Weather Flows	624 KL		
Key Influent Source	Residential		
Contact person	Kate Westgate		
Report author	George Fitzgibbon		
Contact details	Environment@taswater.com.au		
Date of submission	30 September 2023		

Figure 14-1: Carrick Sewage Treatment Plant



14.2 Monitoring and compliance summary

14.2.1 Flow data

Table 14-A: Flow monitoring summary

	Influent	Effluent	Reuse
Location Name	Inlet	Meander River	Ag Irrigation (Moat Property)
Coordinates	E501432 N5402715	E501266 N5402979	E501595 N5403642
Method of Measurement	In line meter	In line meter	In line meter
Date of last Calibration/Validation (if applicable).	29/07/2022	28/04/2022	28/04/2022

Table 14-B: Annual flow and rainfall data

Month	Average Daily Influent Volume (kL/day)	Rainfall (mm/month) BOM Station ID 91303	Discharge to Waters Total Effluent Volume (ML)	Discharge to Reuse Total Effluent Volume (ML)
July 2022	553	15.0	17.13	0.00
August 2022	993	102.0	30.78	0.00
September 2022	884	59.4	26.53	0.00
October 2022	1226	144.0	38.01	0.00
November 2022	1017	56.8	30.50	0.00
December 2022	732	38.6	11.34	11.34
January 2023	575	35.8	0.00	17.83
February 2023	555	34.6	0.00	15.53
March 2023	565	58.0	0.00	17.50
April 2023	573	33.0	0.00	17.18
May 2023	534	22.6	0.00	16.55
June 2023	698	102.6	0.00	20.95
Annual 2022-23	743	702.4	154.30	116.88
% of Total Discharge	--	--	56.9%	43.1%

2022-23 monthly flow data was submitted directly to the EPA.

14.2.2 Bypass events

There were no bypass events associated with the STP during the reporting period.

14.3 Discharge compliance with permit limits

Table 14-C: Compliance Summary

Parameter	Ammonia	BOD5	Chlorine	Nitrogen	Oil and grease	pH	Phosphorous	E coli	Total suspended solids
Permit/EPN limit	mg/L	mg/L	mg/L	mg/L	mg/L	Units	mg/L	MPN/100ml	mg/L
Maximum	10	20	--	15	10	8.5	8	1000	40
90th percentile	--	--	--	--	--	--	--	--	--
50th Percentile	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	6.5	--	--	--
Samples analysed									
Number required	12	12	--	12	12	12	12	12	12
Number analysed	12	12	--	12	12	12	12	12	12
Statistical summary									
Max	6.940	27	--	46.7	1.4	9.6	19.2	1583	61.0
90th percentile	6.305	23	--	10.8	1.0	9.3	8.6	839	46.1
50th percentile	1.829	11	--	5.8	1.0	8.3	4.7	181	23.5
Min	0.005	5	--	3.7	1.0	7.3	2.5	10	4.0
EPN Limit Compliance									
% compliance with Maximum	100%	83%	--	92%	100%	--	83%	92%	83%
% compliance with 90th percentile	--	--	--	--	--	--	--	--	--
% compliance with 50th percentile	--	--	--	--	--	--	--	--	--
% compliance with pH range	--	--	--	--	--	58%	--	--	--

Note: Percentages reflective of complete data set for the year

Table 14-D: Mass loads to the environment

Parameter	EPN Limit	Frequency	2022-23 result
Nitrogen (kg)	--	Annual	1211.1
Phosphorous (kg)	--	Annual	664.7
Method	Time weighted/Grab sample method		

Table 14-E: Performance Analysis (Discharge to environment)

Effluent compliance parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
Phosphorus	06/12/2022	The treatment plant is not designed for removal of phosphorus. The compliance limits are above the capacity of the STP.	No specific actions taken in reporting period. Investigate eligibility for alum dosing trial for the precipitation of dissolved phosphorus
Nitrogen	06/12/2022	The high effluent results are most likely caused by anaerobic digestion of accumulated sludge in the polishing lagoon releasing ammonia into the effluent	Alkalinity dosing added to improve performance of secondary treatment.
pH	04/10/2022	Algae and accumulated sludge in the polishing lagoon are believed to be the primary reason for elevated pH. Low rainfall in the preceding two weeks, combined with an increase in temperature during spring would exacerbate the impact of these two factors.	No specific actions taken in reporting period

Note: Non-compliances only identified for the times STP has discharged to water

No other parameters had exceedances in the reporting period when discharging to water.

14.4 Reuse Annual Reporting

The Carrick STP supplies treated effluent to the Carrick recycled water scheme (RWS) for irrigation purposes at one property “*The Moat*”.

Table 14-F: Reuse Compliance Summary

Parameter	BOD5	pH	E coli
Permit/EPN limit	mg/L	Units	MPN/100ml
Maximum	50	9.0	10000
90th percentile	--	--	--
50th Percentile	--	--	1000
Minimum	--	5.5	--
Samples analysed			
Number required	12	12	12
Number analysed	12	12	12
Statistical summary			
Max	27	9.6	1583
90th percentile	23	9.3	839
50th percentile	11	8.3	181
Min	5	7.3	10
Summary of results			
% compliance with Maximum	100%	--	100%
% compliance with 90th percentile	--	--	--
% compliance with 50th percentile	--	--	92%
% compliance with pH range	--	75%	--

Table 14-G: Performance analysis (Discharge to reuse)

Reuse Compliance Parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
pH	07/02/2023 07/03/2023	Algae is believed to be the primary reason for elevated pH due to CO ₂ uptake during photosynthesis. Most of the non-compliance results were in warmer months when algal blooms occur. Algae is a source of oxygen and is fundamental to lagoon treatment.	No specific actions undertaken in reporting period.

*Non-compliances only identified for the times STP has discharged to reuse

Annual soil sampling was completed in April 2023 at two sites (*Air Strip* and *Pivot 1*). The annual compliance audit was completed in conjunction with the soil sampling. Summary of the findings can be found in the below table.

Table 14-H: Annual recycled water scheme compliance audit and soil monitoring summary

Program	Compliance audit	Soil monitoring
Compliance status	Compliant	Soil salinity and sodicity indicators decreased at both sites. Both sites remain non-sodic and Air Strip site is considered saline (low level). P levels decreased but remain excessive at Air Strip site and high at Pivot site.
Comments	Landowner advised that TasWater's recycled water storage dam does overflows into a drain on the property that eventually flows into the Liffey River but did not occur last year. Notification received by landholder by TasWater regarding BGA levels and associated risk, and recommended increased withholding times.	Elevated nutrient levels are attributed to fertiliser usage and not recycled water irrigation due to low irrigation rates.

RWS Groundwater Status: Amber

The RWS groundwater monitoring network consists of five bores; ID numbers CAGW4-8. Sampling at all five bores was reintroduced in the 2021-22 monitoring program. Bore ID CAGW4 is associated with the recycled water storage dam and is located downgradient to the northwest of the storage. Annual sampling at the standard analytical suite was completed at bores CAGW4-5 and CAGW7-8 in June 2023. Bore ID CAGW6 was unable to be sampled.

Amber rating is due to elevated total phosphorous concentrations above adopted guideline criteria at all bores. Impacts unlikely due to recycled water irrigation given the low rate of recycled water irrigation however more consistent data set is required, in particular bore ID CAGW6.

Annual sampling at the standard analytical suite is planned for all five bores during the 2023-24 monitoring program.

14.5 Ambient monitoring program

Table 14-I: Program details

Program	Seasonal Discharge Program - Routine monitoring during discharge to water.
Status	Ambient monitoring completed during discharge events within the reporting period.
Update	Ambient water quality conducted during seasonal discharge events. Seasonal (autumn/spring) biological monitoring conducted during STP discharge and non-discharge events.
Comments	Ambient water quality monitoring was conducted during STP effluent discharges into the Meander River receiving environment. The STP discharged from July – December 2022. Key findings from the ambient water quality monitoring data review were: <ul style="list-style-type: none"> The Default Guideline Value (DGV) for ammonia was not exceeded at the upstream or either of the two downstream monitoring locations during STP effluent discharges. The site-specific water quality objective (SSWQO)

for ammonia was significantly exceeded in the October 2022 upstream and first downstream location and slightly exceeded in the second downstream location suggesting an alternative upstream source of ammonia. Ammonia levels both upstream and at the two downstream locations were generally within the SSWQO during discharges and slightly exceeded them in July 2022.

- Downstream nitrate levels correlated both with upstream levels and/or STP effluent discharges but did not exceed the DGV. Nitrate levels downstream of the STP effluent discharge did exceed the SSWQO in September 2022 and this correlated with a peak in effluent nitrate levels however all other monitoring events showed no specific relationship with effluent discharges with downstream levels mostly driven by upstream levels.
- Total nitrogen levels downstream of the STP effluent discharge within the Meander River generally trended within upstream levels and did not correlate with effluent levels. The upstream location and both downstream locations exceeded the SSWQO in August 2022. Both upstream and downstream levels generally exceeded the SSWQO during discharge monitoring further indicating an upstream source of nitrogen.
- Total phosphorous levels downstream of the STP effluent discharge within the Meander River generally trended within upstream levels. The upstream location and both downstream locations significantly exceeded the SSWQO in August 2022. Both upstream and downstream levels hovered around the SSWQO during discharge monitoring.
- Total suspended solids (TSS) levels downstream in the Meander River did not correlate with STP effluent discharges. Significantly elevated TSS levels were detected in August 2022 at the upstream and both downstream monitoring locations and correlate with the elevated nitrogen and phosphorous levels observed at the same time suggesting an upstream source.
- Enterococci and *E. coli* levels were elevated at the upstream location and both downstream locations within the Meander River in August 2022 correlating with an unknown event that affected TSS, nitrogen and phosphorus levels at the same time. Enterococci and *E. coli* levels were also elevated at the upstream and the downstream locations in November 2022 but again these did appear to be related to the STP effluent discharge. Enterococci levels at the upstream and downstream monitoring locations generally exceeded the NHMRC low risk primary and secondary contact GV on these occasions.
- Toxin producing blue-green algae was detected at low levels in both the upstream and second downstream location on the one occasion in January 2023 during discharge events. Levels were well within accepted NHMRC freshwater criteria.

Biological monitoring was undertaken in spring (October) 2022 during STP discharges and autumn (February) 2023 when no discharges were occurring. The summarised findings of biological monitoring were:

- In both seasons, upstream and downstream sites supported a moderately diverse macroinvertebrate fauna typical of an impacted stream.
- In both sample seasons, the macroinvertebrate fauna in the Meander River appeared to be in slightly better condition, evident in all AUSRIVAS parameters, at the sites downstream of the STP outfall.
- The similar result in both seasons (i.e. no evidence of a decline in the condition of the macroinvertebrate fauna downstream of the STP outfall) further supports the absence of an impact of the STP effluent discharge on the biological community downstream from the STP outfall.

Seasonal discharges into the Meander River receiving environment occurred throughout the winter – early summer period due to unavailability the recycled water scheme. Effluent discharges appeared to have minimal impacts on the

receiving environment with significant changes to water quality driven by unknown upstream factors, especially in August 2022.

14.6 Groundwater monitoring

Site Status: Green – no sign of STP impact (2022 report)

Carrick STP groundwater monitoring network consists of four bores; ID numbers CAGW1-3 and CAGW11. Annual sampling was completed at all four bores in June 2023 with bacteriological analysis included.

Following delays, the 2022-23 report will be finalised and available by October 2023. Any actions to address identified potential issues will be determined following the hydrogeological review.

Annual sampling at the standard analytical suite is planned for all four bores during the 2023-24 monitoring program.

14.7 Inflow and infiltration (I&I)

The latest revision to the TasWater Inflow and Infiltration Management Plan includes details of the actions undertaken statewide to address I&I issues. Update to the actions completed will be provided in the next revision due September 2024.

A Multi Criteria Assessment was undertaken by TasWater in 2022 to prioritise I&I investigation and works state-wide. This catchment was ranked 60 out of 79 in priority.

14.8 Sludge and Biosolids

The latest revision to the Sewage Sludge Management Plan (SSMP) includes full details of the actions undertaken during the reporting period, the most recent sludge profiling results, and upcoming annual desludging program.

This STP was fully compliant with the 2022-23 SSMP.

No stockpiling occurs at this site.

Table 14-J: Desludging status and comments

Desludging Status	Comments
Medium Priority	Desludging scheduled to occur in 2026, as per the current prioritisation planning schedule.

14.9 Non-compliance with other permit requirements

Table 14-K: EPN non-compliances

EPN Condition	Description of non-conformance	Future Actions to be taken
EF2 Effluent quality limits for discharge to water	See section 14.3 Discharge compliance with permit limits and Performance Analysis	See section 14.3 Discharge compliance with permit limits and Performance Analysis
EF8 Discharge Management Plan	Discharge Management Plan overdue.	Submission timeframe TBC. Plan in development for DMP submission dates following on from agreed format between TasWater and EPA.

EPN Condition	Description of non-conformance	Future Actions to be taken
OP2 Operational Procedures Manual	No contemporary Operational Procedures Manual	New SharePoint based solution for OPMMs currently being developed. First version to be implemented in FY2024.

14.10 Complaints and incident reporting

No complaints received during the 2022-23 reporting period.

Table 14L: Incident reporting

Date	Category	Details	Mitigation
9 June 2023	IDEAL transfer valve	Transfer valve between the two IDEAL lagoons mechanically failed, impacting the ability to intermittently decant IDEAL 1. On 16 August 2023, the Rotork shaft that controls the valve position was replaced. Follow-up testing found that the valve still continually faults and fails to operate. Repairs to the valve are scheduled for FY23-24.	The operation of the STP has been reverted to the original control philosophy, with the two IDEALS hydraulically balanced (i.e., the IDEAL 1 decant valve remains open through the sequence). Ongoing site monitoring has shown only a minor impact to effluent quality.

14.11 Any other relevant information

Table 14-M: Projects or significant operational events that occurred in FY 2022-23:

Project or significant operational event	Progress
Meander Valley Sewer Strategy (MVSS)	Carrick is currently being investigated for rationalisation within the MVSS. A MVSS Strategic Business Case and Strategic Options Report will be completed in FY 2023-24.

For further information on Carrick STP please contact TasWater on 13 6992

www.taswater.com.au