

## 41. Perth STP

### 41.1 Activity and report details

<b>Activity name</b>	Perth STP		
<b>Activity address</b>	Midlands Highway, Perth		
<b>Permit number</b>	Licence to Operate - 3574	<b>Date of issue</b>	3/11/1988
<b>EPN</b>	654/1	<b>Date of issue</b>	31/01/2003
<b>Treatment level</b>	Secondary Treatment		
<b>Authorised Dry Weather Flows</b>	450 kL/day		
<b>Key Influent Source</b>	Residential		
<b>Contact person</b>	Kate Westgate		
<b>Report author</b>	Luisa Romero (Environmental Scientist)		
<b>Contact details</b>	Environment@taswater.com.au		
<b>Date of submission</b>	30 September 2024		

**Figure O-1: Perth Sewage Treatment Plant**



## 41.2 Monitoring and compliance summary

### 41.2.1 Flow data

**Table O-A: Flow monitoring summary**

	Influent	Effluent	Reuse
Location name	Inlet	South Esk River	Scone property
Coordinates	E514010 N5395571	E513714 N5394791	E514002 N5395287
Method of measurement	In line meter	In line meter	Estimate based on effluent and influent
Date of last calibration/validation (if applicable).	15/11/2023	13/03/2024	NA – To be installed

**Table O-B: Annual flow and rainfall data**

Month	Average Daily Influent Volume (kL/day)	Rainfall (mm/month) BOM Station ID 91167	Discharge to Waters Total Effluent Volume (ML)	Discharge to Reuse Total Effluent Volume (ML)
July 2022	855	50.0	16.25	10.26
August 2022	691	46.0	21.43	0.00
September 2022	720	26.8	21.59	0.00
October 2022	608	32.4	6.69	12.17
November 2022	574	22.6	0.00	17.23
December 2022	591	32.8	0.00	18.32
January 2023	590	56.4	0.00	18.28
February 2023	660	9.0	0.00	19.13
March 2023	549	5.4	0.00	17.03
April 2023	575	58.8	0.00	17.25
May 2023	573	40.2	0.00	17.76
June 2023	580	48.1	0.00	17.39
Annual 2022–23	632	428.5	65.96	164.83
% of Total Discharge	--	--	28.6%	71.4%

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

### 41.3 Bypass events

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

#### 41.4 Discharge compliance with permit limits

**Table O-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	30.0	50	--	40.0	10.0	8.5	10.0	--	50.0
90th percentile	--	--	--	--	--	--	--	--	--
50th Percentile	--	--	--	--	--	--	--	1000	--
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	39.0	135	--	59.3	6.1	8.9	11.4	24196	89.0
90th percentile	36.0	119	--	50.8	4.4	8.8	10.8	8507	84.7
50th percentile	26.5	86	--	47.7	2.6	8.0	8.5	2147	52.0
Min	16.3	56	--	33.4	1.2	7.6	5.8	97	12.2
EPN Limit Compliance									
% compliance with Maximum	67%	0%	--	17%	100%	--	58%	--	50%
% compliance with 90th percentile	--	--	--	--	--	--	--	--	--
% compliance with 50th percentile	--	--	--	--	--	--	--	17%	--
% compliance with pH range	--	--	--	--	--	67%	--	--	--

**Table O-D: Mass loads to the environment**

Parameter	EPN Limit	Frequency	2023-24 result
Nitrogen (kg)	6800	Annual	3043.8
Phosphorous (kg)	1700	Annual	409.4
Method	Time weighted/Grab sample method		

**Table O-E: Performance analysis (discharge to environment)**

Effluent compliance parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
BOD	4/07/2023 1/08/2023 5/09/2023 3/10/2023	Perth STP is significantly overloaded. Higher flows between July and October due to seasonal rains further decreases lagoon detention time, which contributes to elevated BOD and TSS.  Algae can also contribute to elevated BOD and TSS levels, with high concentrations (greater than 100,000 cell/mL) still detected between July and September.	The future site strategy is being reviewed under the Meander Valley regional strategy (see Section 41.11).
TSS	5/09/2023		
Ammonia	4/07/2023 1/08/2023	High plant loading is contributing to non-compliant ammonia and nitrogen. Low temperatures during winter significantly reduce nitrification rates, resulting in seasonal ammonia spikes.	No specific actions undertaken in reporting period
Nitrogen	4/07/2023 1/08/2023 5/09/2023 3/10/2023	Facultative lagoons have limited capacity for denitrification, with total nitrogen trends closely correlating with ammonia trends.	No specific actions undertaken in reporting period
E. coli	12-month 50 <sup>th</sup> percentile limit exceeded	Perth STP is hydraulically overloaded due to significant growth in the catchment, resulting in a reduced HRT. Shorter lagoon retention decreases the time available to achieve disinfection of pathogens. E. coli trends also correlate with algae concentrations, indicating the impact that algae shading has on reducing UV penetration.	No specific actions undertaken 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.

## 41.5 Reuse Annual Reporting

Perth STP supplies treated effluent for irrigation purposes to the Perth recycled water scheme (RWS) located at the Scone property.

**Table O-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	135	8.9	24196
90th percentile	119	8.8	8507
50th percentile	86	8.0	2147
Min	56	7.6	97
Summary of results			
% compliance with Maximum	0%	--	92%
% compliance with 90th percentile	--	--	--
% compliance with 50th percentile	--	--	17%
% compliance with pH range	--	100%	--

**Table O-G: Performance analysis (discharge to reuse)**

Reuse compliance parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
E. coli	4/07/2023	Perth STP is hydraulically overloaded due to significant growth in the catchment, resulting in a reduced HRT. Shorter lagoon retention decreases the time available to achieve disinfection of pathogens. This is exacerbated in winter with elevated inflows due to rainfall.  E. coli trends also correlate with algae concentrations, indicating the impact that algae shading has on reducing UV penetration.	No specific actions taken during reporting period
	12-month 50 <sup>th</sup> percentile limit exceeded		
BOD	4/07/2023 1/08/2023 5/09/2023 3/10/2023 7/11/2023 5/12/2023	9/01/2024 6/02/2024 5/03/2024 9/04/2024 7/05/2024 4/06/2024	High plant loading is the primary reasons for high effluent BOD.  Algal blooms in warmer months and increased flows in colder months also contribute to effluent non-compliance.

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

Annual soil sampling was completed at five sites (P1, P2, P4-P6) at the RWS in April 2024. The annual compliance audit was completed in conjunction with the soil sampling. A summary of the findings of the programs is provided in

Table 41-H.

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

Program	Compliance audit	Soil monitoring
<b>Compliance status</b>	Minor non-compliance Inadequate signage at recycled water storage	Soil salinity and sodicity remain within recommended levels at all sites, exception of site P6 which remains non-saline but characterised as sodic.  Phosphorous (P) levels remain above recommended range at all sites (exception site P2).
<b>Comments</b>	During audit customer advised they had been notified multiple times of potential BGA risk. Increased withholding times for stock was implemented and maintained until notification levels are below required limits.	Excessive nutrient levels are attributed to fertiliser application and not recycled water irrigation due to low irrigation rates and low nutrients supplied by recycled water.

RWS groundwater status: Amber

Perth RWS groundwater network consists of five groundwater monitoring bores ID numbers PEGW1-2 and PEGW5-7. Bore ID's PEGW5-7 were developed in 2020 and pre-existing bores ID numbers PEGW1 and 2 were first installed in 2001 and re-developed in 2020. One round of sampling (6-monthly) was completed at bore ID's PEGW2, PEGW6 and 7 in April 2024, and bore ID's PEGW1 and 5 in May. The second (annual) sampling round was not completed. TasWater has put measures in place for the 2024-25 sampling program to address scheduling and resourcing delays experienced in recent years.

The 2023-24 groundwater monitoring event recorded one or more nutrient concentrations above the at least one of the adopted recommended guideline criteria at all bores. When compared to Perth STP treated effluent the results suggested that the groundwater of the bores was chemically different in composition. Further monitoring is required for a more robust data set to assess long term trends.

Biannual sampling is scheduled for all bores during the 2024-25 groundwater monitoring program with annual sampling at the recycled water storage for further water classification assessment.

## 41.6 Ambient monitoring program

**Table O-I: Program details**

<b>Program</b>	Ambient monitoring required under EPA permit variation 23/64 D23-322305. Biennial, seasonal (spring and autumn) biological monitoring (AusRivAS).
<b>Status</b>	Ambient monitoring required under EPA permit variation from May -December each year. Biennial, seasonal (spring and autumn) biological monitoring (AusRivAS).
<b>Update</b>	Ambient monitoring required under EPA permit variation from May -December each year completed during the reporting period. Biennial, seasonal (spring and autumn) biological monitoring (AusRivAS) completed during the reporting period.
<b>Comments</b>	<p>Ambient water quality monitoring was conducted during effluent discharges into the South Esk River receiving environment. Effluent discharges to environment occurred from mid-July to mid-October 2023 due to unavailability of the recycled water scheme. Due to a blockage in the outfall pipeline, discharges overflowed further upstream and likely compromised the upstream water quality data. Biological monitoring in the South Esk River was conducted in spring (August) 2023 and autumn (March) 2024. Key findings from the ambient water quality and biological monitoring are summarised below:</p> <ul style="list-style-type: none"> <li>• Ammonia levels did not exceed the ANZG Default Guideline Value (tDGV) at either upstream or downstream monitoring location during STP effluent discharges. However, both the upstream and downstream locations exceeded the EPA DGVs for slightly to moderately disturbed ecosystems within the South Esk River catchment with downstream levels correlating with upstream levels. This is related to the discharge overflow into the environs of the upstream monitoring location.</li> <li>• Nitrate levels at both the upstream and downstream monitoring locations exceeded the EPA DGV in July and August and were within the EPA DGV at all other times. Downstream levels closely correlated with upstream levels, again due to the discharge overflow entering the South Esk River in the vicinity of the upstream monitoring location.</li> <li>• Total nitrogen levels at both the upstream and downstream monitoring locations exceeded the EPA DGV at all times with downstream levels closely correlated with upstream levels.</li> <li>• Total phosphorus levels at both the upstream and downstream monitoring locations exceeded the EPA DGV at all times with downstream levels generally lower but closely correlated with upstream levels.</li> <li>• Total suspended solids (TSS) levels at both the upstream and downstream monitoring location were within the EPA DGV at all times except when there was a significant peak at the upstream location in October 2023.</li> <li>• Enterococci levels at the downstream monitoring location occasionally exceeded, but closely correlated with upstream levels. Levels of enterococci at both locations exceeded the EPA low risk guideline values for waters with current or potential recreational use in August 2023 and June 2024, and at the downstream monitoring location only in November and December 2023.</li> <li>• <i>E. coli</i> levels at the downstream monitoring location occasionally exceeded levels at the upstream downstream with a peak at both locations exceeding the EPA low risk guideline values for waters with current or potential recreational use observed in August 2023. Elevations above the low-risk guidelines for recreational waters were also observed at both monitoring locations in December 2023. <i>E. coli</i> levels also occasionally exceeded the draft ANZG livestock drinking water guidelines.</li> <li>• No significant levels of blue-green algae (BGA) or potential toxin producing BGA were detected at any time at the downstream or upstream monitoring locations.</li> </ul> <p>Assessing the water quality impacts of seasonal STP effluent discharges into the South Esk River receiving environment were difficult to determine due to discharge overflows entering the South Esk River in the vicinity of the upstream monitoring location rather than at the designated discharge outfall location. Levels of nutrients and pathogens were generally elevated in the South Esk River during effluent discharges when compared to monitoring data collected during non-discharge events although the EPA DGVs for nutrients were generally exceeded at all times, irrespective of STP effluent discharges. Levels of ammonia and nitrate were well within the accepted DGVs. The recreational and livestock drinking</p>

water PEVs within the South Esk River are occasionally impacted by STP effluent discharges.

The findings of the biennial seasonal biological monitoring are summarised below:

- In both spring 2023 and autumn 2024, the macroinvertebrate fauna of the South Esk River had low to moderate diversity, with AusRivAS analyses in both seasons indicating a significantly impacted fauna at all sites, typical of a river with a heavily modified largely agricultural catchment.
- The results of the AusRivAS analyses for both seasons indicated generally better water conditions at sites downstream compared to sites upstream of the STP outfall.
- In both spring 2023 and autumn 2024, the overall AusRivAS ranking for sites upstream of the STP outfall was in impairment band C ('severely impaired'), while the overall AusRivAS ranking for sites downstream of the STP outfall was in impairment band B ('significantly impaired').
- The only impact that could be reliably attributed to the STP effluent discharge was an apparent localised impact from the effluent discharge overflow at site u/s 2 during spring monitoring, with lower scores for all AusRivAS indicators at this site.
- Given that the Perth STP was discharging in spring 2023, the apparent improvement in the condition of the macroinvertebrate fauna downstream of the STP outfall may be due to impacts from moderate nutrient enrichment from the STP outfall. However, given that the Perth STP was not discharging during the autumn monitoring event, the apparent improvement in the condition of the macroinvertebrate fauna downstream of the STP outfall in autumn 2024 cannot be related to the STP effluent discharge, but may be due to other factors including localised variation in sample site characteristics.

## 41.7 Groundwater monitoring

Site status: Amber – (2022–23 report)

The Perth STP groundwater monitoring network consists of two (2) bores ID's PEGW3 and PEGW4. Developed in 2020 PEGW is located east of the STP boundary with PEGW4 located south of the STP down gradient of the recycled water storage. One round of sampling (6-monthly) was completed at both bores in April 2024. The second (annual) sampling round was not completed. TasWater has put measures in place for the 2024–25 sampling program to address scheduling and resourcing delays experienced in recent years.

Following delays, the 2023–24 report will be finalised and available in October 2024. Any actions to address identified potential issues will be determined following the hydrogeological review. Previous monitoring has recorded evidence of potential STP impact across the network with elevated concentrations of several nutrients above the adopted criterion particularly at bore ID PEGW3. Additional monitoring and analysis were required before long term trends could be identified.

Biannual sampling is scheduled at all bores at the extended analytical suite for both bores in the 2023–24 groundwater monitoring program. Annual sampling of STP lagoons 1 and 2 is scheduled to assist in water classification assessment.

## 41.8 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 2024 to prioritise I&I investigation and works state-wide. This catchment was ranked 80 out of 108 in priority.

#### 41.9 Sludge and biosolids

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

This STP was fully compliant with the 2023–24 SSMP.

No stockpiling occurs at this site.

**Table O–J: Desludging status and comments**

Desludging status	Comments
Low priority	Desludging of Primary completed in 2022–23 – 3,912.5 wet tonnes removed from the lagoon. Desludging of Lagoon 2 is outside of the current prioritisation planning schedule.

#### 41.10 Non-compliance with other permit requirements

**Table O–L: EPN non-compliances**

EPN condition	Description of non-conformance	Future actions to be taken
23 Effluent quality limits	Discharge compliance with permit limits	See section 41.4 Discharge compliance with permit limits and Performance Analysis

#### 41.11 Complaints and incident reporting

No complaints reported during the FY2023–24 reporting period.

A blockage in the outfall pipeline was reported 12 July 2023 resulting in surcharging and overflows at a manhole upgradient from the outfall location resulting in overflows into the South Esk River that likely compromised the upstream monitoring location water quality data. The outfall blockage was reported cleared on 11 October 2023 with discharges returned to the designated discharge location at the RWS.

#### 41.12 Any other relevant information

**Table O–M: Projects or significant operational events that occurred in FY 2023–24**

Project or significant operational event	Progress
Meander Valley Sewerage Strategy (MVSS)	Perth is currently being investigated for rationalisation within the MVSS. A MVSS Strategic Business Case has been completed identifying preferred options and priorities. Work package Detailed Business Cases for specific prioritised options will be developed within PSP4/5 period.

For further information on the Perth STP please contact TasWater on 13 6992

[www.taswater.com.au](http://www.taswater.com.au)