City of Ryde

Water Quality Monitoring Report

Spring 2024 & Autumn 2025

This report was produced by Sydney Water Monitoring Services™
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Report version: Combined Spring 2024 and Autumn 2025

Report Name: City of Ryde Water Quality Monitoring Report Combined Spring 2024 and Autumn 2025

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Cover image: Porters Creek (Main Branch at Wicks Road), Autumn 2025

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Executive summary

This report presents the findings of water quality monitoring for the Ryde area for Spring 2024 and Autumn 2025. The survey area includes the Archers, Buffalo, Porters, Shrimptons and Terrys Creek catchments. The results of the current season were found to be generally consistent with the data trends observed in previous reports. Macroinvertebrate and water quality sampling were conducted on the 10th September 2024 and 18th March 2025. The monthly rainfall for September 2024 was 51 mm, all falling after the Spring sampling event. The monthly rainfall for March 2025 was 145 mm, with 45 mm falling in the first week of March and the remaining 100 mm falling after the Autumn sampling event.

Freshwater Macroinvertebrate Analysis

Freshwater macroinvertebrate sampling was conducted at the five core sampling sites. Each macroinvertebrate specimen was identified to Family level. Identification data was used to calculate a biotic health indicator score (SIGNAL_ SF score) providing a metric for waterway health. During Autumn 2025 the highest SIGNAL_SF score was observed at Archers Creek (4.73). The lowest score for this season was at Shrimptons Creek (3.78). During the previous Spring season (2024) the highest score was observed at Terrys Creek (4.49) while the lowest was observed at Archers Creek (4.16). Macroinvertebrate community composition can also be used as an indicator of waterway health. Taxa Richness scores were calculated for each of the five core sites. During Autumn 2025 the highest richness result was observed at Archers Creek with a total of 15 taxa observed. The lowest result during this season was 7.5 taxa. This was the score at both Shrimptons and Buffalo Creek catchments. During the previous Spring season (2024) the highest result was observed at Terrys Creek (13 taxa) while the lowest was observed at Porters Creek (7.5). In general, sites were dominated by the True Flies, Snails and Dragonflies family groups during both seasons.

Water quality Sampling

At each of the 14 sampling sites, water quality data was collected using both in-field and laboratory analyses. This data was compared with thresholds outlined in the ANZECC guidelines (2000). For in-situ field measurements, pH levels were relatively stable across sampling sites. Turbidity results were low, while dissolved oxygen and conductivity were highly variable across sites and sampling seasons. Further analytical laboratory analysis conducted at the Sydney Water laboratories. Microbiological testing indicated that most sites had faecal coliform concentrations below the ANZECC (2000) guideline limit, although during Spring 2024 there were two exceedances at Buffalo Creek catchment sites. During Autumn 2025, only one site (Buffalo Creek downstream of Burrows Park) had a result as high as the guideline limit. Most nutrient results were elevated above guideline limits which is a pattern that is consistent with the historical data for both Spring and Autumn seasons. Additional heavy metals analysis was conducted at the four sites within the Porters Creek catchment. Most test analytes were lower than the detection limits while exceeding results for copper and zinc in Spring 2024 were reduced to within guideline limits during the following Autumn season.

Rapid Riparian Assessment

During the Spring season, Rapid Riparian Assessment (RRA) was performed at the five core sites. For Spring 2024, RRA scores were consistent with the previous Spring season, including another low score for Shrimptons Creek core site at Wilga Park (5.4) that experienced a decline in score from 26.3 in Spring 2022 to 2.4 in Spring 2023. This is likely attributable to construction reducing the buffer zone and impacting the quality of riparian vegetation.

Water quality data was also collected throughout the year by the City of Ryde’s Streamwatch program. This data has been collated and provided in the appendix of this report.

1 Background

Water quality monitoring is carried out by the City of Ryde to inform environmental management and development decisions. The aims of this report are:

- Assess physical and chemical water properties of five major creeks (Shrimptons, Archers, Terrys, Buffalo and Porters creeks) within the City of Ryde local government area during dry and wet weather conditions
- Assess diversity and abundance of macroinvertebrate communities at five creeks within the study area
- Analyse environmental and ecosystem health data which will assist in monitoring the impact of future developments, creek restoration, stormwater management, bushland rehabilitation and general anthropogenic activities and incidents within the catchment
- Provide on-going information to assist the direction of future water quality monitoring plans
- Provide an easy to interpret report for the community
- Report any relevant environmental initiatives carried out by City of Ryde

Biological and chemical monitoring enables the City of Ryde to:

- Build on baseline data to provide long-term picture of waterway health
- Identify and track new and existing impacts affecting the catchments
- Provide direction and monitor potential infrastructural works within the LGA, i.e. in-stream or riparian rehabilitation and stormwater treatment projects
- Build on the known taxa list for each catchment and to aid in the identification of key indicator taxa

The format and style of this annual report is a simplified version of the reports produced from 2004-2019. The technical details for the methods used, quality procedures, accreditation and journal references are the same as previous years and are available in the Appendix.

2 Study Area

The City of Ryde is located 12 km North-West of central Sydney with a local government area of 40.651 km². It consists primarily of residential housing and is comprised of 16 suburbs and 14 separate stormwater catchments. It includes several important commercial and industrial sectors.

Limited areas of natural bushland border urban infrastructure, including several significant natural bush corridors and areas of open space that support recreation and sporting activities. There are small sections of Lane Cove National Park present on the eastern and northern borders of Shrimptons, Porters and Buffalo creeks. All five creeks drain into the greater Parramatta River catchment. Archers Creek enters Parramatta River directly and the remaining creeks through the Lane Cove River catchment.

Figure 1 City of Ryde Water Quality Management Program Sites Map for chemical and ecological monitoring across five creeks.

3 Sites

At each of the five catchments there is one core sampling site. At each core site macroinvertebrate sampling, rapid riparian assessment (Spring only), and water quality sampling are conducted (Table 1). The other nine sites are water quality sampling only.

Table 1 Survey sites for monitoring chemical and ecological attributes.
Core sites are denoted by (*)

Site	Location	Coordinates	Water Quality (wet & dry weather)	Macroinvertebrates	Rapid Riparian Assessment
CR1S*	Shrimptons Creek at Wilga Park	-33.78053, 151.118628	✓	✓	✓
CR1SA	Shrimptons Creek at Kent Road	-33.789246, 151.113419	✓		
CR1SB	Shrimptons Creek at Bridge Road	-33.794061, 151.109779	✓		
CR1SC	Shrimptons Creek at Quarry Road	-33.796856, 151.106775	✓		
CR2A*	Archers Creek at Maze Park	-33.805555, 151.074272	✓	✓	✓
CR3T*	Terrys Creek at Somerset Park	-33.765792, 151.098345	✓	✓	✓
CR3TA	Terrys Creek at Forrester Park	-33.777417, 151.093497	✓		
CR4B*	Buffalo Creek	-33.816451, 151.125705	✓	✓	✓
CR4BA	Buffalo Creek d/s Burrows Park	-33.814392, 151.116656	✓		
CR4BB	Buffalo Creek u/s Burrows Park	-33.81506, 151.113502	✓		
CR5P*	Porters Creek d/s of depot	-33.783362, 151.137671	✓	✓	✓
CR5PA	Porters Creek main branch	-33.7865, 151.134839	✓		
CR5PB	Porters Creek spur branch	-33.784181, 151.134708	✓		
CR5PC	Porters Creek at Wicks Road	-33.788613, 151.133557	✓		

4 Method descriptions

4.1 Macroinvertebrates

Aquatic macroinvertebrates are small (>1mm), spineless animals that naturally occur in water bodies. Macroinvertebrates are useful as bioindicators because some are more sensitive to pollution than others. As a result, a water pollution problem may be indicated if a stream is found to have a macroinvertebrate community dominated by pollution-tolerant animals and missing the more pollution-sensitive animals.

For this project, two replicate macroinvertebrate samples were collected at each of the five core sampling sites. Collection was performed using a fine mesh net to upwell the water and dislodge the animals. After sampling macroinvertebrates were picked out from the debris, preserved, and taken to the laboratory for identification.

Figure 2 Collecting macroinvertebrates from Buffalo Creek core site (CR5B)

4.1(i) SIGNAL SF

SIGNAL SF stands for *Stream Invertebrate Grade Number Average Level- Sydney Family.* It is a biotic index for freshwater macroinvertebrates examined at the family level to assess stream health.

This index assigns sensitivity scores to each individual family. They range from “1” being tolerant to poor stream health to “10” being very sensitive to poor stream health.

Figure 3(i) Preserved macroinvertebrates

4.1(ii) Taxa Richness

This is the total number of different types of animals or taxa collected. In healthier ecosystems there is typically a greater variety of different animals collected, and therefore a higher taxa diversity.

Figure 3(ii) Macroinvertebrate collection; this water bug is a backswimmer (*Notonectidae*)

4.2 Water Quality

Physical, chemical, and biological conditions of the five main catchments in the City of Ryde local government area were assessed following the same methods as previous years. (See Appendix for detailed methodology). This provides information that can create a snapshot of what was happening in the creek at that point in time.

Figure 4 In-field water quality testing

Water quality samples were collected at the same time as the macroinvertebrate samples to ensure the data was suitable for comparison.

Water quality samples were collected at all 14 sites. Several analyses were conducted in the field, and additional water was collected for lab analysis. Laboratory analyses are conducted at the Sydney Water Laboratories located in West Ryde.

Figure 5 Collecting water samples for analysis

Water quality results are compared to the Australian and New Zealand Environment and Conservation Council (ANZECC, 2000) guidelines. These guidelines outline a framework for assessing water quality in terms of whether the water is suitable for a range of environmental and community values. Exceedances of the ANZECC guidelines may indicate environmental disturbance. Historical data is used during result analysis to compare the current results over what would be expected. Table 1(i) outlines the analytes tested in this study.

Table 1(i) Water quality testing parameters

Parameter Measured	Examples
Physicochemical	Temperature, Dissolved Oxygen, pH, Turbidity, Conductivity, Alkalinity
Nutrients	Ammonia, Total Nitrogen, Total Kjeldahl Nitrogen, Oxidised Nitrogen, Total Phosphorus
Metals	Total Magnesium, Total Hardness, Heavy Metals (Lead, Mercury, Cadmium, Arsenic)
Biological	Faecal Coliforms

4.3 Rapid Riparian Assessment

The riparian zone is the area where a body of water or stream, meets the land. The Rapid Riparian Assessment (RRA) provides a summary of the features of a stream and the vegetation community surrounding it.

The methods used were originally developed by Ku-ring-gai Council and researchers from Macquarie University.

The main categories assessed are:

- Site features
- Channel features
- Depositional features
- Erosional features
- Riparian vegetation
- Vegetation structure

The variables within these categories are ranked and collated to form an overall site score. This final numerical score is associated with a final riparian health result ranging from 'very poor' to 'excellent'. This scoring system is summarised in Table 1(ii).

Table 1(ii) Riparian health categories

Category	Score range	Colour code
Excellent	≥60	Green
Good	27 to 59.99	Yellow
Fair	-6 to 26.99	Orange
Poor	-39 to -6.99	Light red
Very Poor	-72 to -39.99	Dark red

Figure 6 Archers Creek core site at Maze Park (CR2) looking upstream (Autumn 2024). This site has a consistently high density of riparian vegetation including a range of weedy riparian types (ground cover, shrubs, and an extensive tree canopy).

5 Rainfall and Sampling

The volume and frequency of rain has a significant impact on the diversity and abundance of aquatic macroinvertebrates. Rainfall also has a direct influence on chemical water quality parameters such as dissolved oxygen, turbidity, and nutrient concentrations.

Figure 7 below provides a summary of the rainfall data for the period from July 2024 to May 2025. During this period, this highest monthly total rainfall was recorded during January 2025, when a total volume of 156 mm fell.

Spring sampling was conducted on 10th September 2024. The monthly rainfall for September was 51 mm, all falling after the spring sampling event. Autumn sampling was carried out on 18th March 2025. The total monthly rainfall was 145 mm, with 45 mm falling during the first week of March and the remaining 100 mm falling after the Autumn 2025 sampling event.

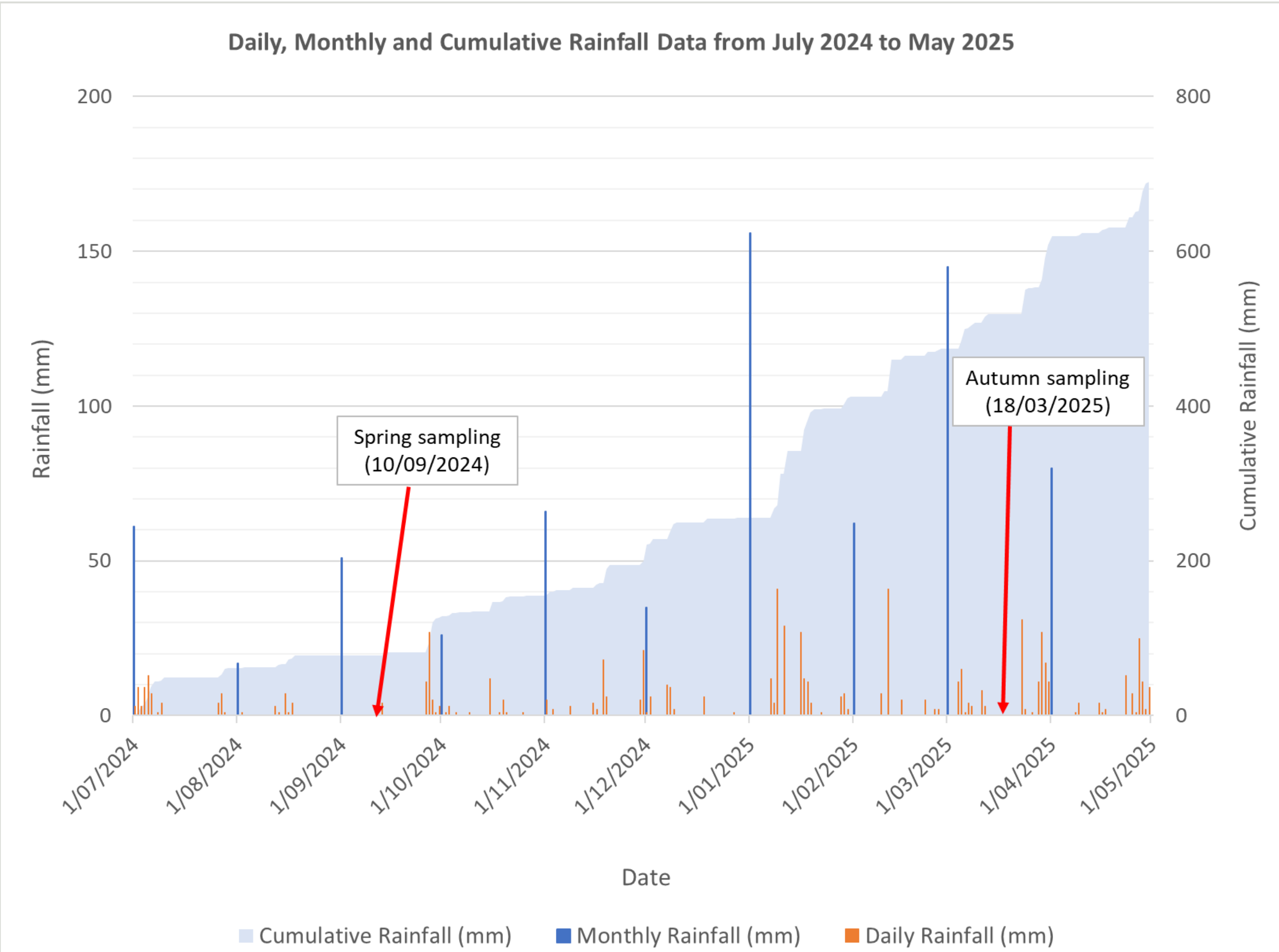


Figure 7 Rainfall and sampling events. Cumulative rainfall scale is on the right.

6 Shrimptons Creek

6.1 Sites CR1SC, CR1SA, CR1SB, CR1SC

The Shrimptons Creek catchment (Figure 8) contains three water quality sites and one core site (macroinvertebrate, water quality and riparian assessment).

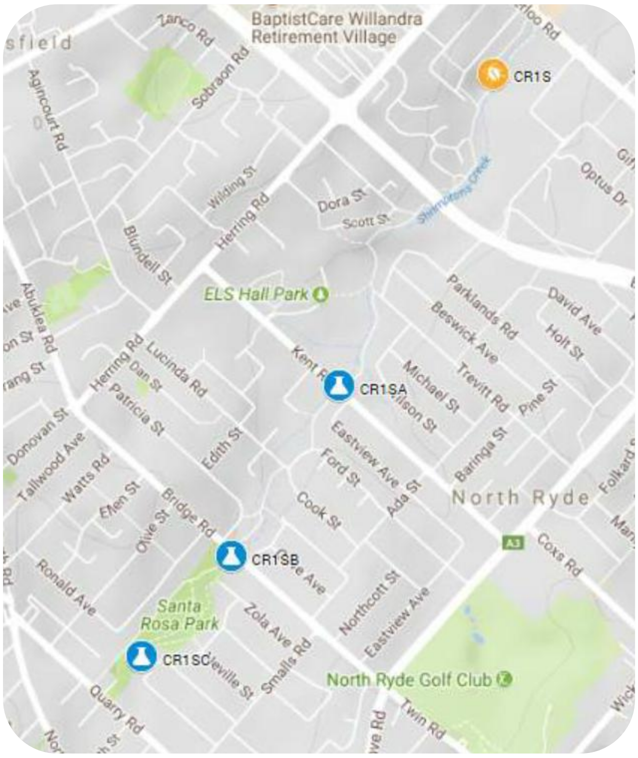


Figure 8 Shrimptons Creek Catchment Area

CR1S Shrimptons Creek at Wilga Park (Core Site)

The Shrimptons Creek core site is located within Wilga Park in the suburb of Macquarie Park. Land use in this area is primarily residential, commercial, and light industrial. The creek flows through a thin riparian corridor, which is a mix of native and exotic species (Figure 9,10). The creek bed is predominately bedrock and sand/silt.

Figure 9 Shrimptons Creek (core site) looking downstream (Autumn 2025)

Figure 10 Shrimptons Creek (core site) looking upstream (Autumn 2025)

CR1SA Shrimptons Creek at Kent Road

The Kent Road site is situated at ELS Hall Park amongst a residential area and is lined by a thin section of riparian vegetation comprised of native and exotic species that completely shades the creek (Figure 11)

Figure 11 Shrimptons Creek at Kent Road facing downstream (Autumn 2025)

CR1SB Shrimptons Creek at Bridge Road

This site is located at the downstream section of Santa Rosa Park, just before it flows under Bridge Road and is surrounded by residential areas (Figure 12). Revegetation of the riparian area has enhanced the physical buffer improving bank stabilisation and filtration.

Figure 12 Shrimptons Creek at Bridge Road facing upstream (Autumn 2025)

CR1SC Shrimptons Creek at Quarry Road

The Quarry Road site is located at the upstream section of Santa Rosa Park, at the point where Shrimptons Creek emerges from the underground stormwater system (Figure 13). This site has sandstone blocks around the drain for bank stabilisation.

Figure 13 Shrimptons Creek at Quarry Road facing downstream (Autumn 2025)

6.2 Results and Interpretation

Macroinvertebrates

SIGNAL SF

The average SIGNAL_SF score for Shrimptons Creek during the Autumn 2025 season was 3.78 (Figure 14). This result was lower than the average result observed during the previous season (4.47, Spring 2024). The Autumn result was consistent with the seasonal average for this site (3.84).

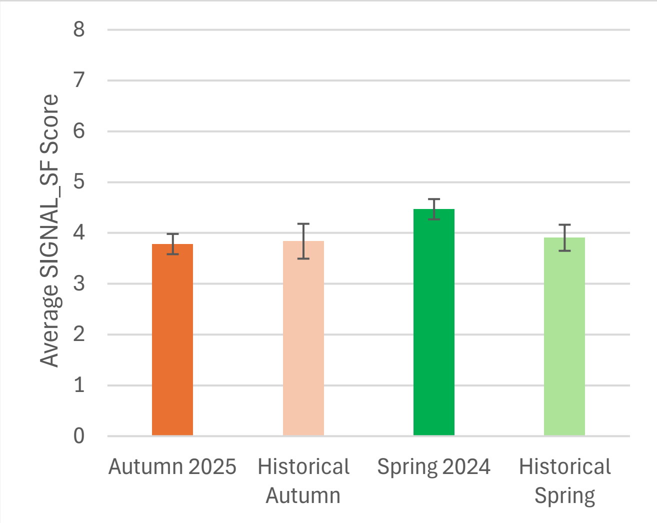


Figure 14 SIGNAL SF results for Shrimptons Creek

Taxa Richness

During the Autumn 2025 season, Shrimptons Creek had a taxa richness result of 7.5 (Figure 15). This was within range of the historical average for the season (9.8) as well as the result of the previous Spring (10 taxa, Spring 2024).

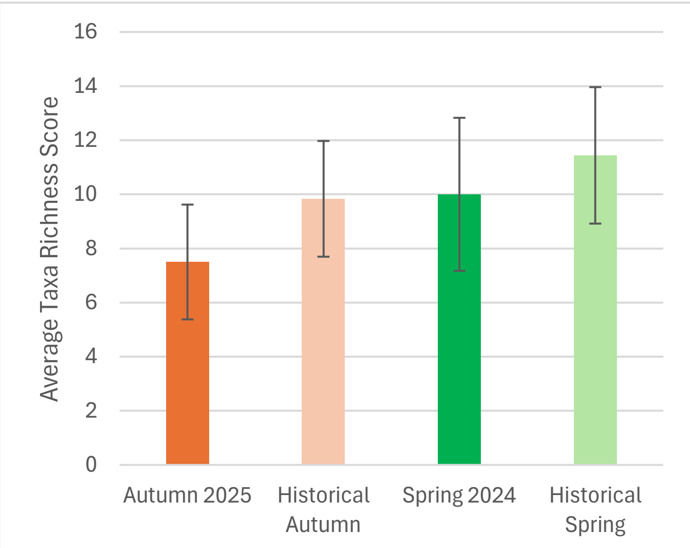
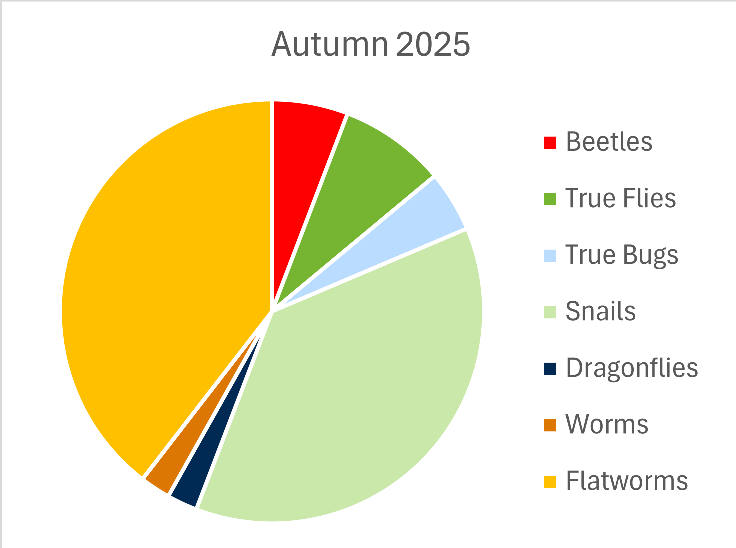


Figure 15 Taxa Richness results for Shrimptons Creek

Macroinvertebrate Community Composition

During Autumn 2025, the macroinvertebrate community at Shrimptons Creek was dominated by flatworms and snails (Figure 16). A total of 7 taxa groups were observed during this season. Similarly, during Spring 2024, the site was also dominated by snails but there was a lower abundance of flatworms. In contrast to the current season, the True Bugs group was dominant in Spring 2024, and aquatic mites were observed.



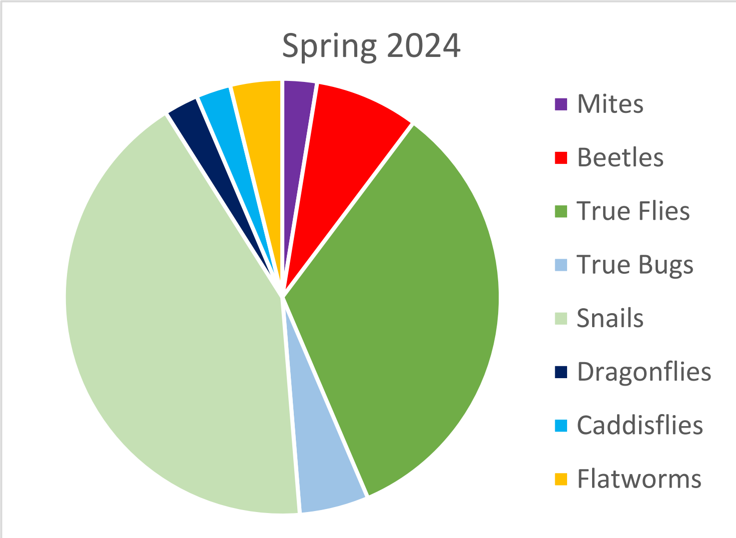


Figure 16 Shrimptons Creek macroinvertebrate community composition

Macroinvertebrates summary

SIGNAL SF Autumn 2025 result was lower than that of Spring 2024, although it was within the historical range for the Autumn season.

Taxa Richness result for Autumn 2025 was within range of the previous Spring season result and the historical Autumn average.

Shrimptons Creek Water Quality

In-field water quality testing was conducted at each of the four Shrimptons Creek sites. These results are summarised in Table 2. Dissolved oxygen saturation levels were low for the Wilga Park (CR1S) and Kent Road (CR1SA) sites, falling below the 85-110% ANZECC (2000) recommended guideline range in both Spring 2024 (57.4% and 35.8%) and Autumn 2025 (18.3% and 58.2%). Dissolved oxygen saturation levels at the Bridge Road (CR1SB) and Quarry Road (CR1SC) sites were within the ANZECC (2000) guideline range on both sampling occasions. With the exception of the Kent Road (CR1SA) site, dissolved oxygen saturation levels were higher in Spring 2024 than in Autumn 2025.

Turbidity, conductivity and pH results were within the respective ANZECC (2000) guideline recommendations at all Shrimptons Creek sites in both Spring 2024 and Autumn 2025. Turbidity levels were lower at most sites in Spring 2024 compared to Autumn 2025, with the exception again being the Kent Road (CR1SA) site. Conductivity levels were generally higher in Spring 2024, aside from the Bridge Road (CR1SB) site which was marginally lower than the Autumn 2025 result. pH results were higher in Spring 2024 at all sites with the largest difference at the Bridge Road (CR1SB) site with 7.15 in Spring 2024 compared to 7.49 in Autumn 2025.

Table 3 shows the analytical lab water quality results for Shrimptons Creek sites. All sites sampled had faecal coliform levels below the ANZECC (2000) recommended guideline of 1000 CFU/100 mL in both Spring 2024 and Autumn 2025. During both Spring 2024 and Autumn 2025 seasons most total nitrogen, total phosphorous and oxidised nitrogen results for sites in the Shrimptons Creek catchment were above the respective ANZECC (2000) guidelines. Ammonia results were below the ANZECC guideline at all sites on both sampling occasions. These results are typical for the sites sampled on Shrimptons Creek.

Table 2 In-field water quality measurement results

Analyte	Temperature		Dissolved Oxygen		Dissolved Oxygen		pH		Turbidity		Conductivity	
Unit	ºC		mg/L		% saturation		pH units		NTU		µS/cm	
ANZECC Guideline	NA		NA		85-110		6.5-8.5		50		125-2500	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR1S	15.4	19.3	5.73	1.71	57.4	18.3	7.12	6.95	3.37	6.35	567	413
CR1SA	15.5	19.7	3.58	5.35	35.8	58.2	7.06	7.01	5.82	3.79	665	498
CR1SB	15.7	19.5	9.14	8.08	91.5	87.3	7.49	7.15	2.81	3.42	560	572
CR1SC	16.6	20.4	9.32	8.12	94.9	90.3	7.48	7.18	1.76	6.30	583	530

Table 3 Analytical lab water quality results

Analyte	Faecal Coliform		Total Nitrogen		Total Phosphorus		TKN by calculation		Ammonia NH3 -N		Oxidised Nitrogen NOx-N	
Unit	CFU/100mL		µg/L		µg/L		µg/L		µg/L		µg/L	
ANZECC Guideline	1000		350		25		N/A		900		40	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR1S	270	710	620	480	179	88	510	400	40	70	110	80
CR1SA	28	28	430	290	56	46	400	270	60	30	30	20
CR1SB	420	250	510	470	27	40	230	210	<10	10	280	260
CR1SC	270	760	860	590	18	37	200	180	10	30	660	410

Water quality summary

Dissolved oxygen results were variable across sites. Turbidity, pH and conductivity were within respective guideline ranges.

Faecal coliform results were low and within guideline limits. Most nutrient results were elevated above the ANZECC guideline limit.

7 Archers Creek

7.1 Site CR2A (Core Site)

This site is located in Maze Park, West Ryde and is upstream of the Victoria Road crossing (Figure 17). The land use upstream of this site is largely residential while a golf course is present downstream. The creek bed is mostly bedrock bordered by banks of sediment (sand, silt and organic matter, Figure 18, 19). The creek channel has been previously relined with sandstone blocks. The vegetation within and adjacent to the creek is a combination of native and introduced species.

Figure 17 Archers Creek Catchment Area

Figure 18 Archers Creek looking downstream (Autumn 2025)

Figure 19 Archers Creek looking upstream (Autumn 2025)

7.2 Results and Interpretation

Macroinvertebrates

SIGNAL SF

During Autumn 2025, Archers Creek had an average SIGNAL_SF score of 4.73 (Figure 20). This was consistent with the historical Autumn average (4.51). This season had a higher SIGNAL score than that observed during the previous Spring season (4.16, Spring 2024).

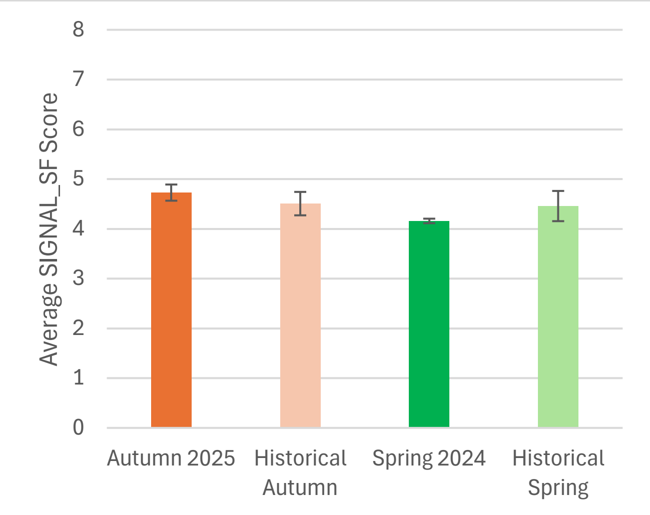


Figure 20 SIGNAL SF results for Archers Creek

Taxa richness

During the Autumn 2025, the average richness score observed at Archers Creek was 15 (Figure 21). This was consistent with the historical Autumn average (14.5). This season saw a prominent improvement in taxa richness from the previous Spring season was had a score of 8.5 which was below the seasonal average for this site (15.3)

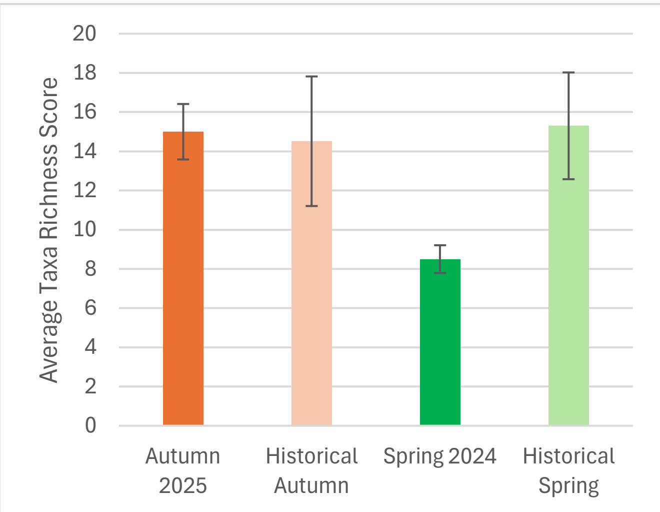
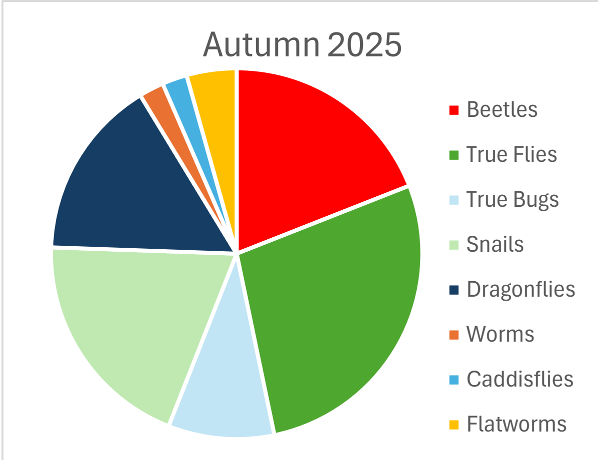


Figure 21 Taxa Richness results for Archers Creek

Macroinvertebrate Community Composition

During Autumn 2025, Archers Creek was dominated by the beetle, true fly and snail groups (Figure 22). This was consistent with the taxa observed during the previous Spring season. However, mites were observed during Spring 2024. The current season saw a higher number of taxa from the dragonfly and true bug groups when compared to Spring 2024.



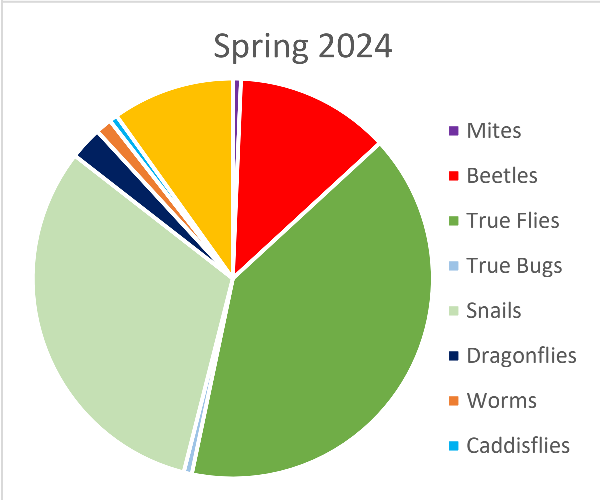


Figure 22 Archers Creek macroinvertebrate community composition

Macroinvertebrates summary

SIGNAL SF result for Autumn 2025 was consistent with the historical average for Archers Creek. The result was higher than the SIGNAL_SF score observed during the previous Spring season.

Taxa Richness result was higher in the current Autumn as compared with the previous Spring period. Current Autumn results were consistent with the historical average for the season.

Archers Creek Water Quality

Table 4 shows the in-field results for Archers Creek. Dissolved oxygen levels at the Archers Creek Maze Park (CR2A) site were low with saturation levels below the 85-110% ANZECC (2000) recommended guideline range in both Spring 2024 (37.2%) and Autumn 2025 (52.2%). Turbidity, conductivity and pH levels were within the respective ANZECC (2000) guidelines in both Spring 2024 and Autumn 2025. Conductivity was higher in Spring 2024 (704 µS/cm) compared to Autumn 2025 (446 µS/cm). As conductivity is a representation of total dissolved ions, the results for total calcium, magnesium and hardness were correspondingly higher in Spring 2024 compared to Autumn 2025.

Table 5 shows the analytical lab water quality results for Archers Creek. In Spring 2024, total phosphorous was the only laboratory analyte to exceed the relevant ANZECC (2000) guideline for Archers Creek at Maze Park (CR2A). Water quality was generally lower in Autumn 2025, with total nitrogen, total phosphorous and oxidised nitrogen results exceeding the relevant ANZECC (2000) guidelines.

Table 4 In-field water quality measurement results

Analyte	Temperature		Dissolved Oxygen		Dissolved Oxygen		pH		Turbidity		Conductivity	
Unit	**ºC**		**mg/L**		**% saturation**		**pH units**		**NTU**		**µS/cm**	
ANZECC Guideline	**NA**		**NA**		**85-110**		**6.5-8.5**		**50**		**125-2500**	
Season	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**
CR2A	14.0	20.0	3.70	4.78	37.2	52.2	6.97	7.16	2.12	2.60	704	446

Table 5 Analytical lab water quality results

Analyte	Faecal Coliform		Total Nitrogen		Total Phosphorus		TKN by calculation		Ammonia NH3 -N		Oxidised Nitrogen NOx-N	
Unit	**CFU/100mL**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**	
ANZECC Guideline	**1000**		**350**		**25**		**N/A**		**900**		**40**	
Season	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**	**Sp24**	**Au25**
CR2A	~27	150	330	540	32	189	320	480	10	10	10	60

Water quality summary

Dissolved oxygen results were low in both seasons, likely attributed to low flow in the channel. Turbidity, conductivity, and pH results were within ANZECC guideline limits.

Faecal coliform levels were well below the ANZECC guideline in both seasons. Nutrient results were variable between seasons, with higher results in Autumn 2025.

8 Terrys Creek

8.1 Site CR3T, CR3TA

CR3T Terrys Creek at Somerset Park (core site)

This site is located within Somerset Park under the M2 overpass in the suburb of Epping (Figure 23). The surrounding land use is residential, and the creek flows through a bushland corridor The riparian area bordering the creek contains both native and exotic plant species. The creek bed is predominately bedrock, gravel, and sand (Figure 24, 25).

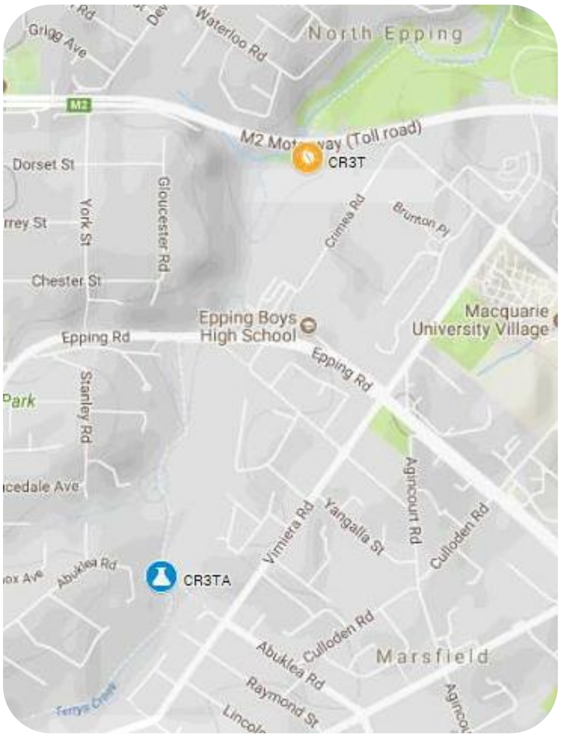


Figure 23 Terrys Creek Catchment Area

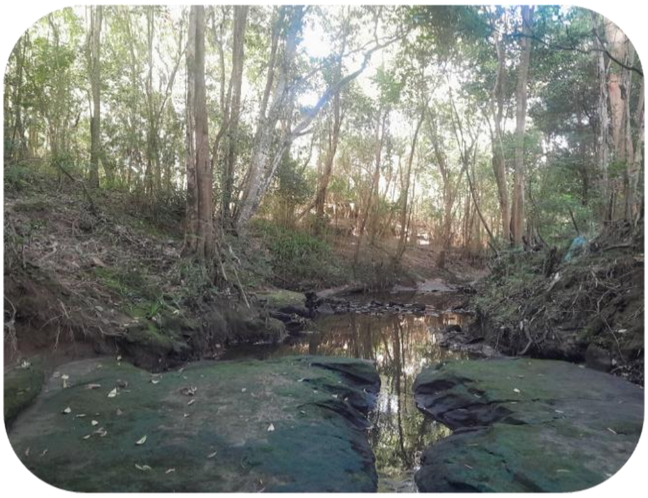


Figure 24 Terrys Creek (core site) looking downstream (Autumn 2025)

Figure 25 Terrys Creek (core site) looking upstream (Autumn 2025)

CR3TA Terrys Creek at Forrester Park

This site is located downstream of Terrys Creek Waterfall, which is an area surrounded by bushland (Figure 26). Dense vegetation covers both banks and consists of a mixture of native and introduced species. The bank is comprised of sediment (mostly sand and silt) and river rocks, which create riffle areas.

Figure 26 Terrys Creek at Forrester Park looking upstream (Autumn 2025)

8.2 Results and Interpretation

Macroinvertebrates

SIGNAL SF

During the current season Terrys Creek had an average SIGNAL_SF score of 4.47 (Autumn 2025, Figure 27). This was within range of the historical Autumn average (4.19). The result was also consistent with the average SIGNAL score observed at the site during the previous Spring season (4.49, 2024).

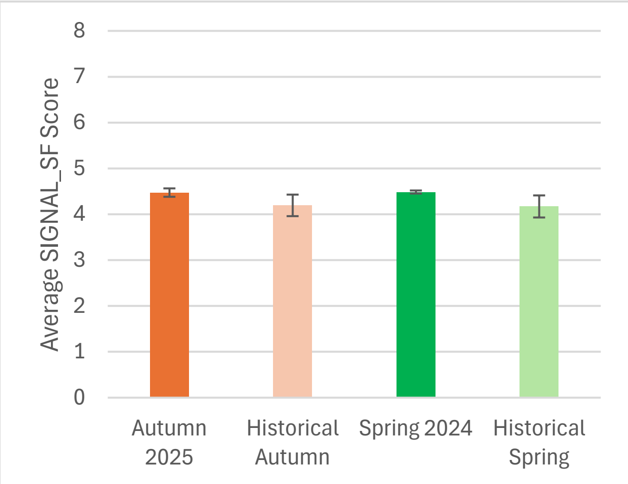


Figure 27 Terrys Creek SIGNAL SF

Taxa richness

The Autumn 2025 season saw an average taxa richness result of 11 (Figure 28). This was within range of the historical Autumn average (14.8). The result for the current season was slightly lower than the result observed in Spring 2024 (13) but was still within range of this result.

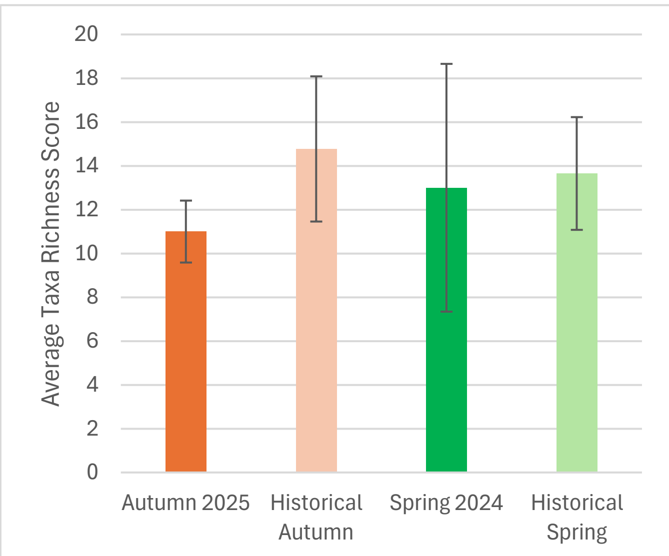
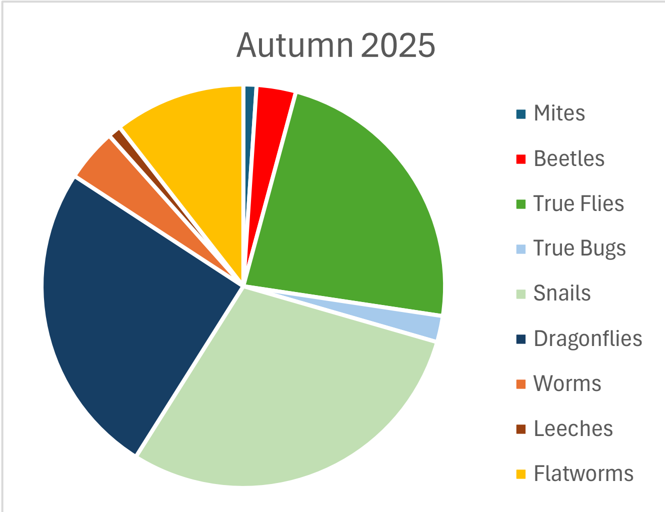


Figure 28 Terrys Creek Taxa Richness

Macroinvertebrate Community Composition

At Terrys Creek catchment, similar macroinvertebrate community assemblages were observed in Autumn 2025 and Spring 2024 (Figure 29). Both seasons saw a dominance of dragonfly and snail families. Both seasons also saw prominence of the True Flies with the current Autumn season seeing greater representation of this group. Autumn 2025 also saw the emergence of more tolerant taxa such as leeches and flatworms.



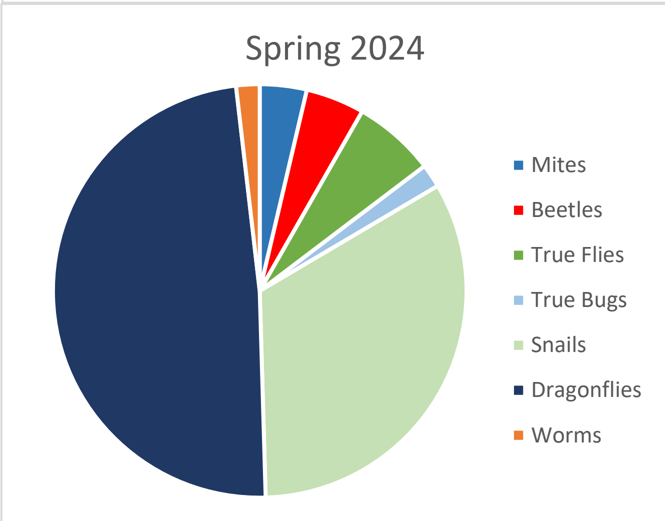


Figure 29 Terrys Creek macroinvertebrate community composition

Macroinvertebrates summary

SIGNAL SF Autumn 2025 score was consistent with the historical Autumn average and the Spring 2024 score.

Taxa Richness result for Autumn 2025 was within range of the seasonal average but slightly lower than the Spring 2024 score.

Terrys Creek Water Quality

In-field water quality testing was conducted at both sites in the Terrys Creek catchment. Table 6 shows the in-field results for sites in Terrys Creek. Dissolved oxygen saturation results for Terrys Creek were below the ANZECC (2000) guideline in both Spring 2024 and Autumn 2025 for both Somerset Park (CR3T) and Forrester Park (CR3TA). Turbidity, conductivity and pH levels were within the respective ANZECC (2000) guidelines at both sites on both sampling occasions. Conductivity levels were slightly higher at both sites in Spring 2024 compared to Autumn 2025. This is a reflection of the higher results for total calcium, magnesium and hardness recorded for Spring 2024 compared to Autumn 2025 (Table 6).

Table 7 shows the analytical lab water quality results for Terrys Creek. While faecal coliform results for both sites on Terrys Creek were below the ANZECC (2000) guideline on both sampling occasions, total nitrogen, total phosphorous and oxidised nitrogen results all exceeded the respective ANZECC (2000) guidelines.

Table 6 In-field water quality measurement results

Analyte	Temperature		Dissolved Oxygen		Dissolved Oxygen		pH		Turbidity		Conductivity	
Unit	ºC		mg/L		% saturation		pH units		NTU		µS/cm	
ANZECC Guideline	NA		NA		85-110		6.5-8.5		50		125-2500	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR3T	13.2	18.0	7.20	5.65	67.3	59.3	7.16	7.14	1.53	1.53	610	454
CR3TA	14.2	18.9	7.87	7.46	76.4	80.8	7.55	7.25	17.8	3.66	728	585

Table 7 Analytical lab water quality results

Analyte	Faecal Coliform		Total Nitrogen		Total Phosphorus		TKN by calculation		Ammonia NH3 -N		Oxidised Nitrogen NOx-N	
Unit	CFU/100mL		µg/L		µg/L		µg/L		µg/L		µg/L	
ANZECC Guideline	1000		350		25		N/A		900		40	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR3T	5	85	480	410	40	44	290	230	10	<10	190	180
CR3TA	200	45	660	560	50	54	420	410	<10	40	240	150

Water quality summary

Dissolved oxygen results were below the guideline range for both sites in both seasons. pH, turbidity and conductivity results were within the guidelines at both sites.

Faecal coliform concentration results were below the guideline limit. Most nutrient results exceeded the guideline limit for both sites in both seasons.

9 Buffalo Creek

9.1 Site CR4B, CR4BA, CR4BB

Buffalo Creek catchment has one core site in the Field of Mars Reserve. The two remaining sites are water quality only and are located upstream in Burrows Park (Figure 30).

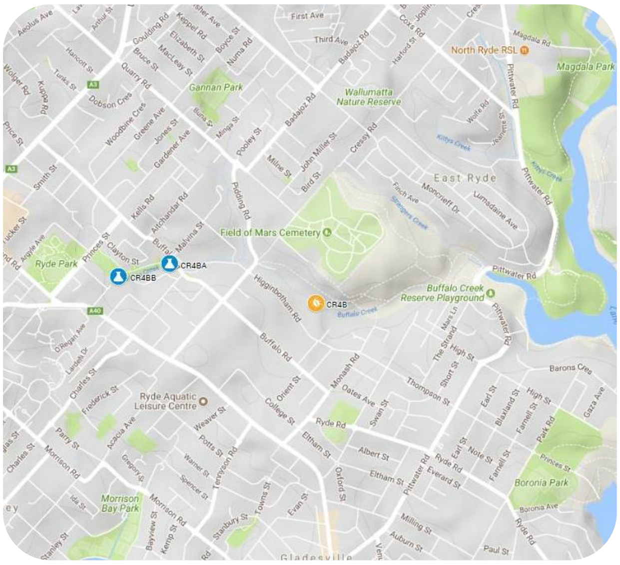


Figure 30 Buffalo Creek Catchment Area

CR4B Buffalo Creek (core site)

The Buffalo Creek core sampling site is located along the Southern border of the Field of Mars Reserve in the suburb of Gladesville and is accessed through private property (Figure 31, 32). The surrounding land use is a mix of residential, light industry/commercial and reserves. The surrounding vegetation is a mix of native and exotic species, with exotic species dominating. The southern bank is mostly residential lawns.

The creek bed is a mixture of sand, silt, and gravel. There is usually some macrophyte growth, (*Egeria* and *Potamogeton*), and a small amount of algal growth observed in the channel. Sedimentation has occurred in the creek channel periodically.

Figure 31 Buffalo Creek core site looking downstream (Autumn 2025)

Figure 32 Buffalo Creek core site looking upstream (Autumn 2025)

CR4BA Buffalo Creek Downstream of Burrows Park

The downstream Burrows Park site is accessed off Buffalo Road and is positioned just before the creek flows under the road (Figure 33). The surrounding land use is residential, and Burrows Park consists mostly of a bush corridor. There are usually obvious signs of bird activity around this site, including extensive bird droppings.

Figure 33 Buffalo Creek Downstream of Burrows Park facing downstream (Autumn 2025)

CR4BB Buffalo Creek Upstream of Burrows Park

The upstream Burrows Park site is about 300 metres upstream of Buffalo Road and lies in the middle of a bush corridor (Figure 34).

The site is surrounded by vegetation that completely shades the creek. The creek is shallow at this point and has little flow.

Figure 34 Buffalo Creek Upstream of Burrows Park facing downstream (Autumn 2025)

9.2 Results and Interpretation

Macroinvertebrates

SIGNAL SF

During Autumn 2025 the average SIGNAL_SF score for the Buffalo Creek catchment was 4.41 (Figure 35). This was consistent with the historical Autumn average (4.01). This result was also consistent with the result observed during the previous Spring (4.30).

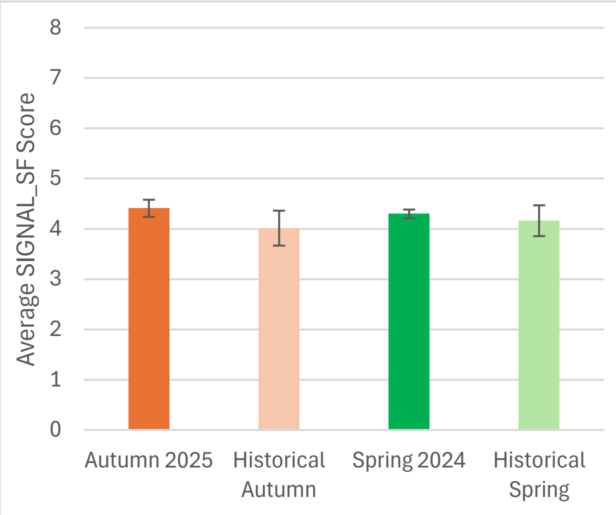


Figure 35 Buffalo Creek SIGNAL SF

Taxa richness

The richness result for Autumn 2025 was 7.5 (Figure 36). This was lower than then the historical Autumn average (13.65). However, richness results for this season were within range of the Spring 2024 average (8).

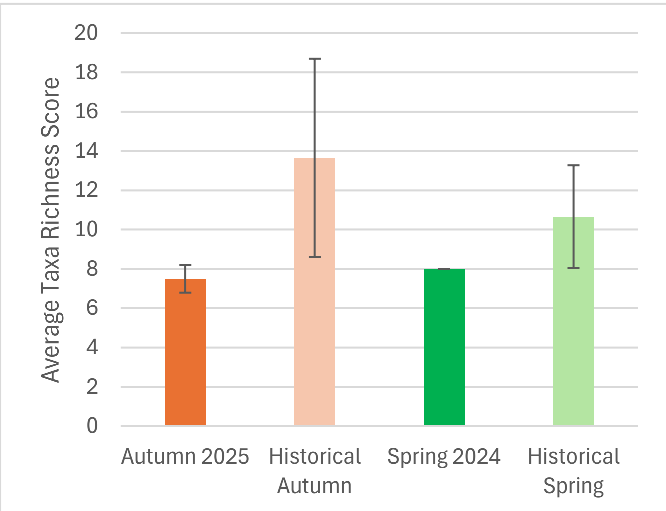


Figure 36 Buffalo Creek Taxa Richness

Macroinvertebrate Community Composition

During Autumn 2025 the macroinvertebrate community at Buffalo Creek was dominated by the True Flies and Snails groups (Figure 37). These groups also dominated Buffalo Creek during the previous Spring 2024 season. The current Autumn season saw a higher representation of dragonfly families compared to Spring 2024. However, this season saw an absence of caddisfly families which were present during Spring 2024.

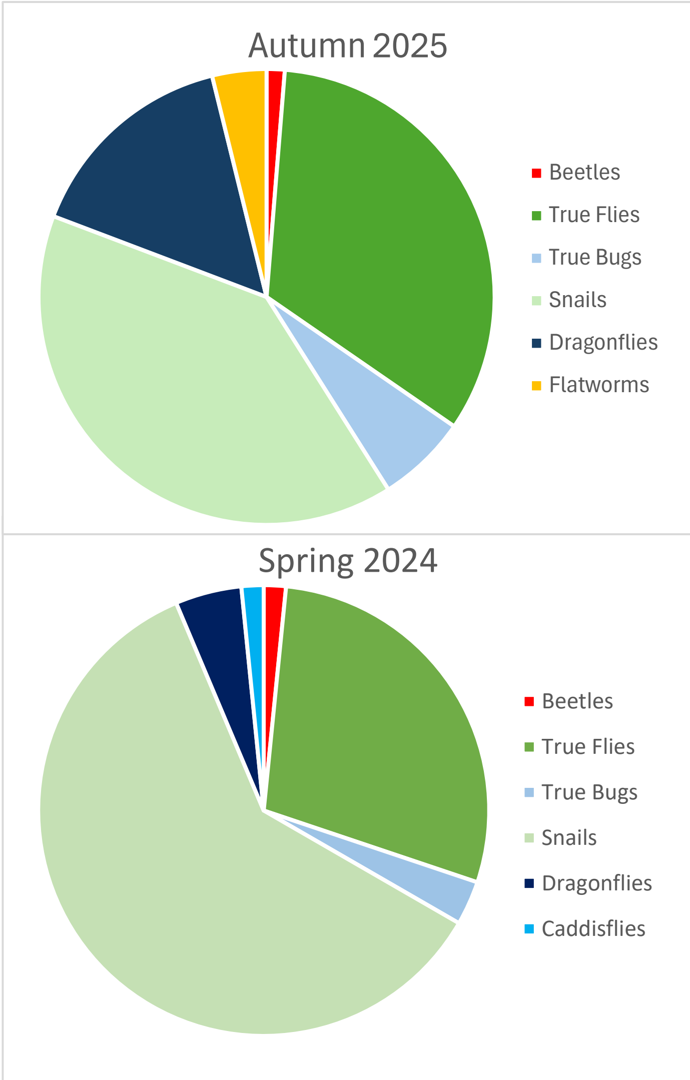


Figure 37 Buffalo Creek macroinvertebrate community composition

Macroinvertebrates summary

SIGNAL SF Autumn 2025 score was consistent with the historical Autumn average and the Spring 2024 score.

Taxa Richness result for Autumn 2025 was lower than the seasonal average but was consistent with the average score for Spring 2024.

Buffalo Creek Water Quality

Table 8 shows the in-field results for sites in Buffalo Creek. All dissolved oxygen saturation levels were below the ANZECC (2000) guideline range aside from the Spring 2024 result at the core site (Below Higginbotham Road CR4B, 91.3%). The lowest result of 58.2% was recorded for the site downstream of Burrows Park (CR4BA) in Spring 2024. Turbidity, conductivity and pH results for all sites were within respective ANZECC (2000) guidelines for both Spring 2024 and Autumn 2025.

Table 9 shows the analytical lab water quality results for Buffalo Creek. Faecal coliform levels exceeded the ANZECC (2000) guideline level of 1000 CFU/100 mL at Downstream of Burrows Park site (CR4BA; ~1,200 CFU/100 mL) and Upstream of Burrows Park site (CR4BB; ~1,400 CFU/100 mL) in Spring 2024, with reduced concentrations in Autumn 2025 conforming to the guideline. Most total nitrogen, total phosphorous and oxidised nitrogen results exceeded the respective ANZECC (2000) guidelines. The exception was for total phosphorous at the core site (CR4B) in Spring 2024 which had a result of 18 µg/L.

Table 8 In-field water quality measurement results

Analyte	Temperature		Dissolved Oxygen		Dissolved Oxygen		pH		Turbidity		Conductivity	
Unit	**ºC**		**mg/L**		**% saturation**		**pH units**		**NTU**		**µS/cm**	
ANZECC Guideline	**NA**		**NA**		**85-110**		**6.5-8.5**		**50**		**125-2500**	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR4B	14.3	18.5	9.38	7.17	91.3	75.6	7.52	7.30	2.79	2.98	816	687
CR4BA	15.6	19.4	5.83	6.52	58.2	70.3	6.96	6.98	11.40	5.88	1072	844
CR4BB	15.8	19.1	6.64	6.56	66.4	69.5	7.40	7.15	9.45	0.99	812	600

Table 9 Analytical lab water quality results

Analyte	Faecal Coliform		Total Nitrogen		Total Phosphorus		TKN by calculation		Ammonia NH3 -N		Oxidised Nitrogen NOx-N	
Unit	**CFU/100mL**		**µg/L**		**µg/L**		**µg/L**		**µg/L**		**µg/L**	
ANZECC Guideline	**1000**		**350**		**25**		**N/A**		**900**		**40**	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR4B	~660	~110	980	430	18	28	270	190	<10	10	710	240
CR4BA	~1200	~1000	1690	1090	85	65	850	170	540	30	840	920
CR4BB	~1400	~390	1360	710	62	61	410	560	90	20	950	150

Water quality summary

Dissolved oxygen results were variable across the catchment. Turbidity, conductivity, and pH results were within guideline limits for each site.

Two sites had exceeding faecal coliform results in Spring 2024 and one site was on the guideline level in Autumn 2025.

Most nutrient results were elevated above ANZECC guideline limits in both seasons.

10 Porters Creek

10.1 Sites CR5P, CR5PA, CR5PB, CR5PC

There is one core site and three water quality only sites within the Porters Creek Catchment (Figure 38). From 1969 to 1986 the Council's Porters Creek site operated as a landfill site. It now operates as a construction waste recycling facility.

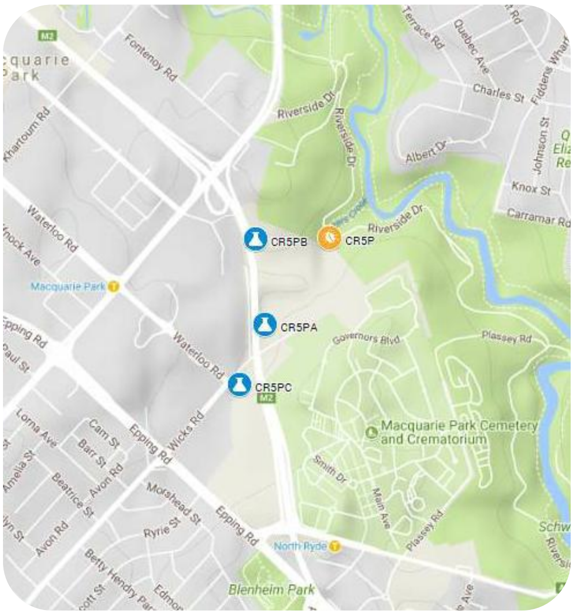


Figure 38 Porters Creek Catchment Area

CR5P Porters Creek (core site)

This site is in the Lane Cove National Park, North of the Council's Environmental Construction Materials Recycling Facility. It is at this point that Porters Creek emerges after flowing mostly underground in its upper section. Water quality and macroinvertebrate sampling was conducted near the Porters Creek Bridge (Figure 40).

The surrounding riparian area is dominated by native plants with a small number of exotic species. The creek bed is mostly bedrock with some cobble, boulder, and sand (Figure 39). No macrophyte growth has been observed although there has been algal growth present.

Figure 39 Porters Creek Core Site looking downstream (Autumn 2025)

Figure 40 Porters Creek Core Site looking upstream (Autumn 2025)

CR5PA Porters Creek at Main Branch

This site is located on the western boundary of the construction waste recycling facility and consists of an open concrete channel (Figure 41). Samples are collected from the retention basin at the end of the channel.

Figure 41 Porters Creek at Main Branch facing downstream

CR5PB Porters Creek at Spur Branch

This site is in the north-western corner of the centre in an underground drainage pit where several underground stormwater lines meet before joining and draining to the main Porters Creek line (Figure 42). The exact location has changed over the years due to access issues.

Figure 42 Porters Creek at Spur Branch (Autumn 2025)

CR5PC Porters Creek at Wicks Road

This site is the first point that Porters Creek emerges from the underground stormwater system. The site is surrounded by commercial and industrial land uses. The banks have been re-lined with sandstone and surrounding area vegetated with native plants (Figure 43).

Figure 43 Porters Creek at Wicks Road (Autumn 2025)

10.2 Results and Interpretation

Macroinvertebrates

SIGNAL SF

The average SIGNAL_SF score for Porters Creek during the Autumn 2025 season was 4.49 (Figure 44). This was consistent with the historical autumn result (4.37). The result for this season was also consistent with the average score observed during the previous Spring season (4.44, Spring 2024).

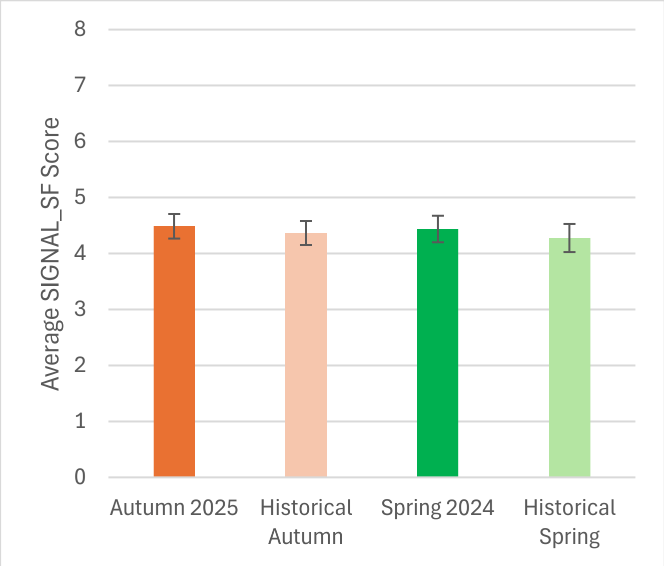


Figure 44 Porters Creek SIGNAL SF

Taxa richness

Autumn 2025 had an average taxa richness result of 13 (Figure 45). This was within range of the historical Autumn average (13.96). The Autumn richness result was far greater than the score observed during the previous Spring (7.5, Spring 2024).

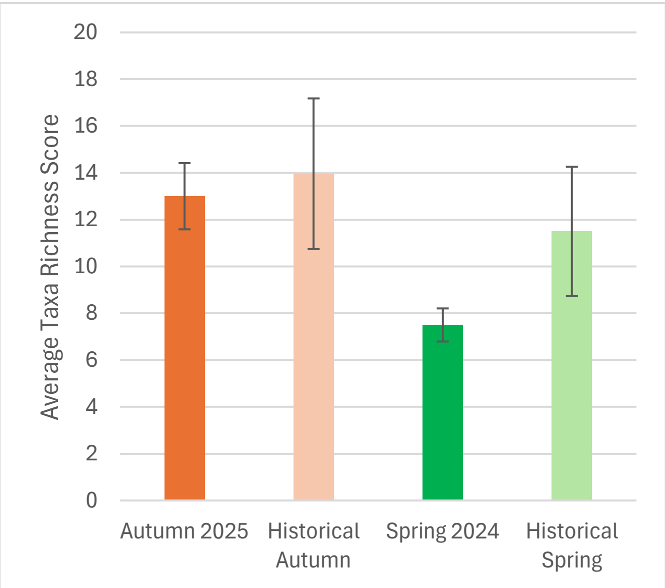
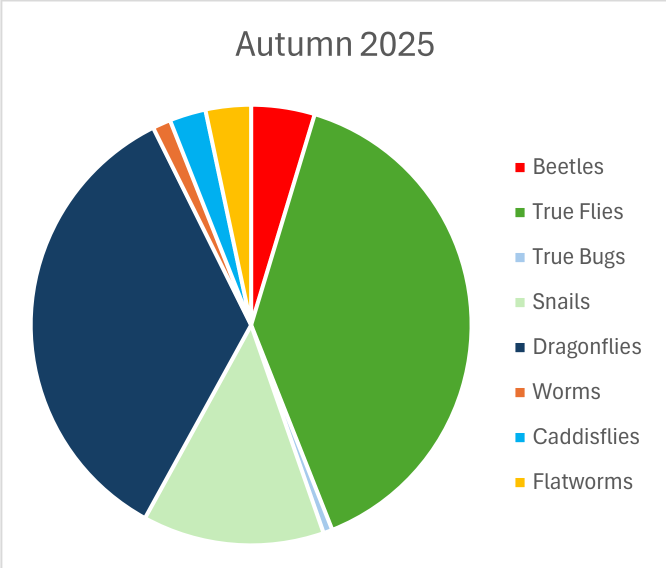


Figure 45 Porters Creek Taxa Richness

Macroinvertebrate Community Composition

During Autumn 2025, the macroinvertebrate community at Porters Creek catchment was dominated by the True Flies, Dragonflies and Snails groups (Figure 46). These groups were also dominant during the previous Spring 2024 season. The freshwater shrimp family *Atyidae* was observed during the Spring season only, while the caddisfly family *Ecnomidae* was only observed during the Autumn season.



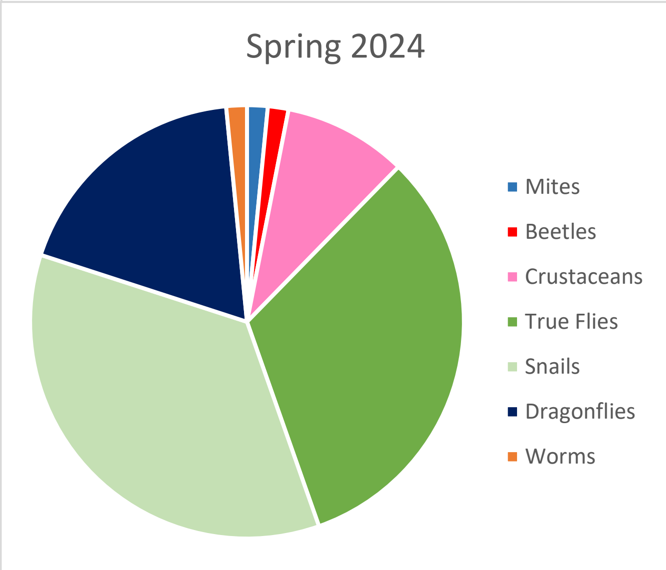


Figure 46 Porters Creek macroinvertebrate community composition

Macroinvertebrates summary

SIGNAL SF results were consistent between Autumn 2025 and Spring 2024 seasons.

Taxa Richness result for Autumn 2025 was consistent with the historical Autumn average and higher than the Spring 2024 richness result.

Porters Creek Water Quality

Table 10 shows the in-field results for sites in Porters Creek. Dissolved oxygen saturation levels were generally within the ANZECC (2000) guidelines. The exceptions were for the spur branch site (CR5PB) in both Spring 2024 (72.1%) and Autumn 2025 (59.6%), and the site downstream of the depot (below piped section; CR5P) in Autumn 2025 (47.0%). Turbidity, conductivity and pH results were within the respective ANZECC (2000) guidelines for both Spring 2024 and Autumn 2025. The highest turbidity (13.1 NTU) and pH (7.88) results were recorded at the Wicks Road site (CR5PC) in Spring 2024. The highest conductivity result was recorded from the main branch channel site (CR5PA) in Spring 2024. Reflective of the unusually high total calcium, total magnesium and total hardness results from the main branch channel site (CR5PA) in Spring 2024, conductivity was also elevated at 1053 µS/cm.

Table 11 shows the analytical lab water quality results for Porters Creek. Faecal coliform levels were below the ANZECC (2000) guideline at all sites on Porters Creek in both Spring 2024 and Autumn 2025. The lowest faecal coliform results were recorded for the main branch channel site (CR5PA) in Spring 2024 (8 CFU/100 mL) and Autumn 2025 (2 CFU/100 mL), while the highest results (570 CFU/100 mL and ~960 CFU/100 mL) were recorded for the Wicks Road site (CR5PC). Most total nitrogen results exceeded the ANZECC (2000) guideline. The exception was for the main branch channel site (CR5PA) in Autumn 2025. Total phosphorous results exceeded the ANZECC (2000) guideline on both sampling occasions for the Wicks Road (CR5PC) site (132 µg/L and 51 µg/L), and on one occasion each from each of the other three sites. Oxidised nitrogen exceeded the ANZECC (2000) guideline on both sampling occasions at the Wicks Road (CR5PC; 1710 and 2240 µg/L) site and the site downstream of the depot (CR5P; 1530 and 4400 µg/L), and on one occasion at the spur branch site (CR5PB; 250 µg/L). Most ammonia concentration results were lower than the guideline limit (900 µg/L) for both Spring and Autumn seasons. Only Porters Creek at Wicks Road site (CR5PC) had a result that was the same as the guideline limit during Spring 2024. During the following Autumn this was reduced to 40 µg/L.

Table 10 In-field water quality measurement results

Analyte	Temperature		Dissolved Oxygen		Dissolved Oxygen		pH		Turbidity		Conductivity	
Unit	ºC		mg/L		% saturation		pH units		NTU		µS/cm	
ANZECC Guideline	NA		NA		85-110		6.5-8.5		50		125-2500	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR5P	14.2	18.4	9.40	4.47	90.1	47.0	7.30	7.39	2.20	7.50	307	732
CR5PA	15.0	20.4	9.05	7.86	89.7	86.70	7.28	6.83	10.30	1.05	1053	238
CR5PB	13.4	17.4	7.67	5.76	72.1	59.6	7.71	7.14	0.81	0.64	564	288
CR5PC	17.8	19.6	9.30	8.89	97.40	96.5	7.88	7.55	13.10	2.99	481	630

Table 11 Analytical lab water quality results

Analyte	Faecal Coliform		Total Nitrogen		Total Phosphorus		TKN by calculation		Ammonia NH3 -N		Oxidised Nitrogen NOx-N	
Unit	CFU/100mL		µg/L		µg/L		µg/L		µg/L		µg/L	
ANZECC Guideline	1000		350		25		N/A		900		40	
Season	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25	Sp24	Au25
CR5P	29	~27	2010	4960	13	41	480	560	220	210	1530	4400
CR5PA	8	2	760	260	47	20	760	250	<10	10	<10	10
CR5PB	~72	~19	360	610	16	39	280	360	<10	10	80	250
CR5PC	570	~960	2950	2530	132	51	1240	290	900	40	1710	2240

Porters Creek Heavy Metals Analysis

During the Autumn 2025 and Spring 2024 seasons, the four Porters Creek sites had additional heavy metal analysis conducted. The concentration results of each test analyte are summarised in Table 12 below. Results that exceeded trigger value limits have been highlighted in *red.* ANZECC guideline limit values have been adjusted according to water hardness levels as required. (Further information can be found in Table 4, APPENDIX). ANZECC guideline limits that have been adjusted for this data are summarised in Tables 13 and 14 below. Most heavy metal results were below detection level for Autumn 2025 and Spring 2024 seasons (Table 12). For both seasons, total values of arsenic, cadmium, chromium and lead were below detection levels. During Spring 2024, total copper concentrations were below the detection level at three of the four sites. Only Porters Creek at Wicks Road site (CR5PC) had an elevated copper result of 12 µg/L. This result exceeded the adjusted ANZECC limit value of 5.9 µg/L (Table 13). During the Autumn 2025 season, these results improved as all sites had copper results below detection level (<5 µg/L).

Total lead results were below detection level for each site during both seasons. For both seasons total manganese results were below the ANZECC guideline threshold for each site. During Spring 2024, Porters Creek at Wicks Road site (CR5PC) had an exceeding total zinc result (220 µg/L) which was higher than the adjusted guideline value of 31.2 µg/L. During Autumn 2025 total zinc concentration for this site was more than ten times lower (20 µg/L) and within the adjusted guideline value of 31.2 µg/L (Table 14). During this season there were no trigger value exceedances, although site Porters Creek at Main Branch (CR5PA) had a total zinc concentration the same as the adjusted trigger value (20 µg/L).

Table 12 Porters Creek heavy metal results

	Total Arsenic	Total Cadmium	Total Chromium	Total Copper	Total Iron	Total Lead	Total Manganese	Total Zinc
Spring 2024	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
CR5P	<20	<5	<5	<5	190	<10	5	10
CR5PA	<20	<5	<5	<5	610	<10	231	40
CR5PB	<20	<5	<5	<5	170	<10	16	10
CR5PC	<20	<5	<5	12	660	<10	32	220
Autumn 2025								
CR5P	<20	<5	<5	<5	440	<10	20	20
CR5PA	<20	<5	<5	<5	110	<10	47	20
CR5PB	<20	<5	<5	<5	150	<10	39	10
CR5PC	<20	<5	<5	<5	300	<10	45	20

Table 13 ANZECC (2000) trigger value (TV) adjustments for water hardness for Spring 2024

Spring 2024 Adjusted trigger values				
Site	Hardness	Category	Adjusted Copper	Adjusted Zinc
CR5P	89	Moderate	x	20
CR5PA	470	Ex. Hard	x	72
CR5PB	170	Hard	x	31.2
CR5PC	130	Hard	5.88	31.2

Table 14 ANZECC (2000) trigger value (TV) adjustments for water hardness for Autumn 2025

Autumn 2025 Adjusted trigger values						
Site	Hardness	Category	Adj. Cadmium	Adj. Copper	Adj. Lead	Adj. Zinc
CR5P	190	Very Hard	11.4	7.28	40.12	41.6
CR5PA	68	Moderate	5.4	3.5	13.6	20
CR5PB	76	Moderate	5.4	3.5	13.6	20
CR5PC	150	Hard	8.4	5.46	25.84	31.2

Water quality summary

Dissolved oxygen results were variable across the catchment with lower results in Autumn 2025 than Spring 2024. pH, turbidity and conductivity results were within ANZECC guideline limits.

All coliform concentration results were below the ANZECC guideline limit. Nutrient results were variable with several exceedances across the catchment and seasons.

Most heavy metal concentration results were below detection level for all sites for both Spring 2024 and Autumn 2025. Autumn 2025 saw a reduction in both copper and zinc concentrations.

11 Rapid Riparian Assessment

Rapid Riparian Assessments (RRA) are conducted during Spring sampling at each of the five catchments. These assessments involve the observation of a range of stream features as well as the structure of adjacent vegetation. Each assessment is summarised by a final score. The score range indicates in which health category a site is classified. A summary of the categories and score ranges are provided in Table 15. Table 16 below provides a summary of the riparian results from the two recent Spring sampling seasons.

All sites had consistent results between Spring 2023 and Spring 2024. Both Shrimptons and Archers Creek catchments had a ‘Fair’ health result. This relatively low result is associated with narrow buffer zone depth and low-quality riparian vegetation within these catchments. At Shrimptons Creek, this could be attributed to the nearby State Significant Development that has involved vegetation removal in the riparian zone and in-creek works associated with the construction of the bridge. Both Terrys and Buffalo Creek catchments reported a ‘Good’ health score for both seasons. This is associated with the density and more complex vegetation adjacent to the creek, complexity of in-channel features such as riffle sections and a range of different sediment types. Porters Creek catchment had the highest riparian health score for both Spring 2023 and 2024 seasons. The evidence of a potential sewer overflow in Spring 2023 impacted the RRA score (68.0, high turbidity and odour), this had improved in Spring 2024 when there was low turbidity and no odour, leading to an improvement of RRA score (75.0).

Table 15 Rapid Riparian Scores and categories

Category	Score range	Colour code
Excellent	≥60	Green
Good	27 to 59.99	Yellow
Fair	-6 to 26.99	Orange
Poor	-39 to -6.99	Red
Very Poor	-72 to -39.99	Dark red

Table 16 Rapid Riparian Scores and categories for Spring 2024 and Spring 2023 seasons

	Season	
Catchment	Spring 2024	Spring 2023
Shrimptons	5.4	2.0
Archers	8.6	14.0
Terrys	58.0	57.0
Buffalo	45.9	38.0
Porters	75.0	68.0

12 Discussion & Conclusion

12.1 Macroinvertebrates

Freshwater macroinvertebrate data (SIGNAL_SF & taxa richness) was compiled for each of the five core sites during the Spring 2024 and Autumn 2025 seasons. SIGNAL_SF results were observed to be within a similar range across each of the sites for both seasons. During Autumn 2025 the highest SIGNAL_SF score was observed at Archers Creek (4.73). This was an improvement from the previous season where this site had the lowest SIGNAL_SF score (4.16, Spring 2024). This low score may have been attributed to the very low flow observed in the channel, which would reduce both macroinvertebrate habitat and dissolved oxygen concentration. Shrimptons Creek had the lowest SIGNAL_SF score during this season (3.78). This site is adjacent to residential areas, a park space and roadway. Proximity to such environments can lead to an influx of runoff and pollutants entering the waterway, impacting water quality. During the previous Spring season (2024) the highest score was observed at Terrys Creek (4.49). Terrys Creek also had the highest richness result during this season (13 taxa). This site is in a bushland area, with complex in-stream habitat consisting of a range of substrates including riffle sequences, cobbles, and bank under-hangs. Increased habitat complexity is associated with increased diversity of macroinvertebrate communities.

Macroinvertebrate Taxa Richness scores were also calculated for each of the five core sites. During Autumn 2025 the highest richness result was observed at Archers Creek with a total of 15 taxa observed. This site is in located in a riparian corridor with a creek bank stabilised with sandstone borders. Riparian habitats provide nutrient influx and habitat for macroinvertebrates. High density, complex vegetation can contribute to improved diversity of aquatic communities. The lowest richness result for Autumn 2025 was 7.5 taxa. Both Shrimptons and Buffalo Creek catchments had this richness result. Both sites are adjacent to residential zones, park spaces and private gardens. The proximity of such areas to these sites may contribute to the influx of run-off, contributing to a decline in overall water quality. During the previous Spring (2024) Terrys Creek had the highest richness result (13 taxa) while the lowest was observed at Porters Creek (7.5). In general, sites were dominated by the True Flies, Snails and Dragonflies family groups.

12.2 Water Quality

Water quality is highly dependent on both natural and anthropogenic factors. The creeks sampled under this monitoring program are substantially disturbed systems as they flow through urbanised catchments that can receive substantial road and stormwater runoff (ANZECC 2000). In urban areas, there are more pollution sources and impervious surfaces, which can magnify the effects of runoff on water quality. Where there are areas of high impervious surfaces, such as roads, footpaths, and buildings, it increases the volume and speed of the rainwater. These impervious surfaces are often a source of pollutants, such as oils, metals, and nutrients, which are then deposited in streams.

For each of the 14 sampling sites, chemical water quality data was collected using both in-field and laboratory analyses. Water quality results were compared with thresholds outlined in the ANZECC guidelines (2000). For in situ field measurements, pH levels were relatively stable across sampling sites and most sites recorded low turbidity, while conductivity and dissolved oxygen results were variable including those for sites located in the same catchment zone.

A range of analytes were also tested at the Sydney Water laboratories. In general, faecal coliform concentration results were within ANZECC (2000) guideline limit of 1000 CFU/100mL. Nutrient results were elevated above guideline limits for most sites. This has been observed consistently in previous reporting periods during both Spring and Autumn seasons and can be attributed to the location of these catchment zones in urban areas that can be highly impacted by road and stormwater run-off.

Additional heavy metals analysis was conducted at the four sites within the Porters Creek catchment. Most analytes were observed to be within threshold limits, however, during Spring 2024, there were observed exceedances in copper and zinc analytes. During the Autumn 2025 season, concentration results improved and there were no analytes with results greater than the trigger value limit. This is consistent with results from previous seasons, where most test analyte results were below detectable limits.

12.3 Rapid Riparian Assessment

At each of the five core sites Rapid Riparian Assessments (RRA) were performed to assess a range of environmental characteristics. These included features such as in-channel structures and bank vegetation composition. RRA scores were collated and compared to results from the previous Spring. Results for Spring 2024 indicated no change in score category from Spring 2023, including another low score for Shrimptons Creek core site at Wilga Park (5.4) that experienced a decline in score from 26.3 in Spring 2022 to 2.4 in Spring 2023. This score could be associated with the nearby by State Significant Development which involved vegetation removal and in-creek works associated with bridge construction.

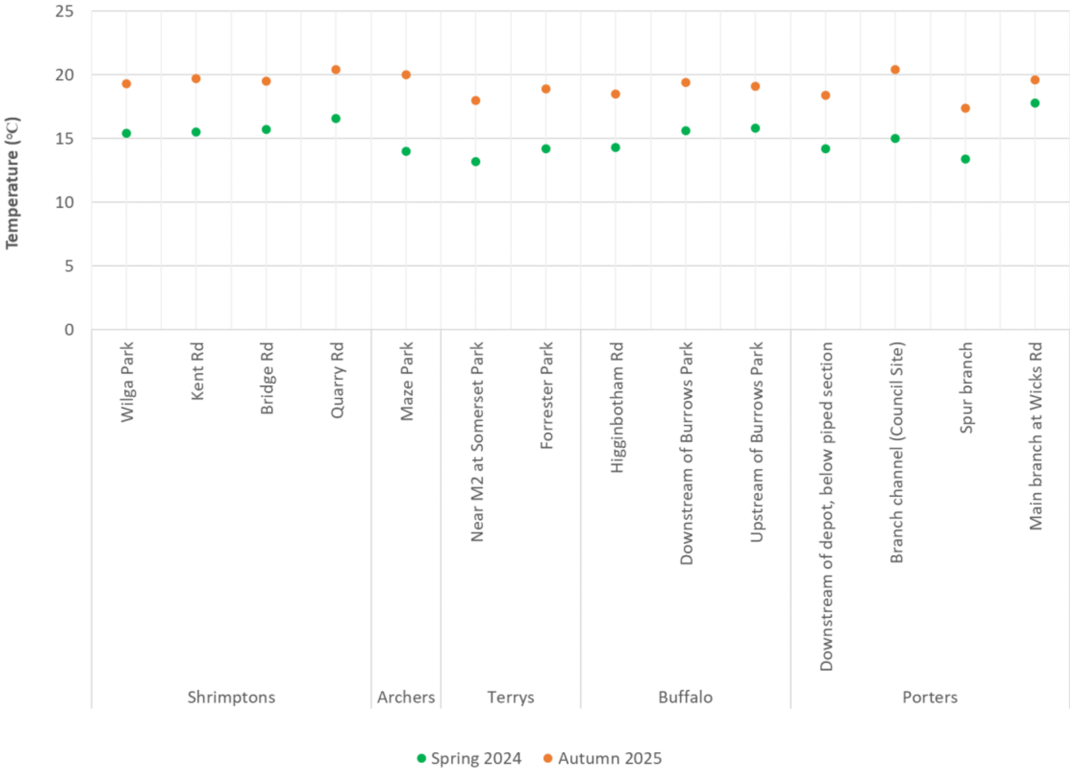
13 Recommendations

- At each of the established sampling sites, continue to monitor:
    - i) Macroinvertebrate communities (SIGNAL SF and Taxa Richness indices)
    - ii) Chemical water quality parameters
    - iii) Riparian condition
- Continue Gross Pollutant Trap maintenance and rubbish removal
- Consider collecting pre-and post-work water quality data on any Council projects that aim to improve water quality
- Continued preparation of heath scorecard for each catchment
- Continued collection of Streamwatch data, sampled in parallel with Sydney Water sites and time periods

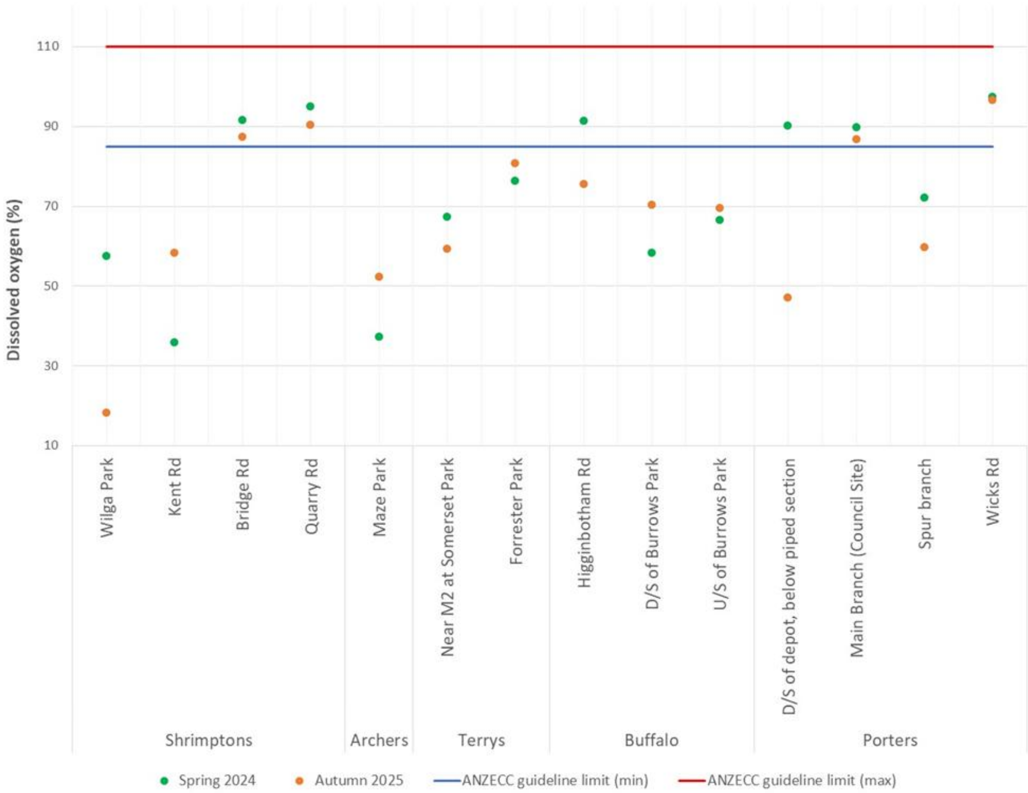
14 Appendix 1: Water Quality Charts

This section provides a summary of selected in-field and analytical laboratory data collected during the Spring 2024 and Autumn 2025 sampling seasons for each of the 14 sampling sites. Data from both sampling periods have been plotted on the same graph for seasonal comparison.

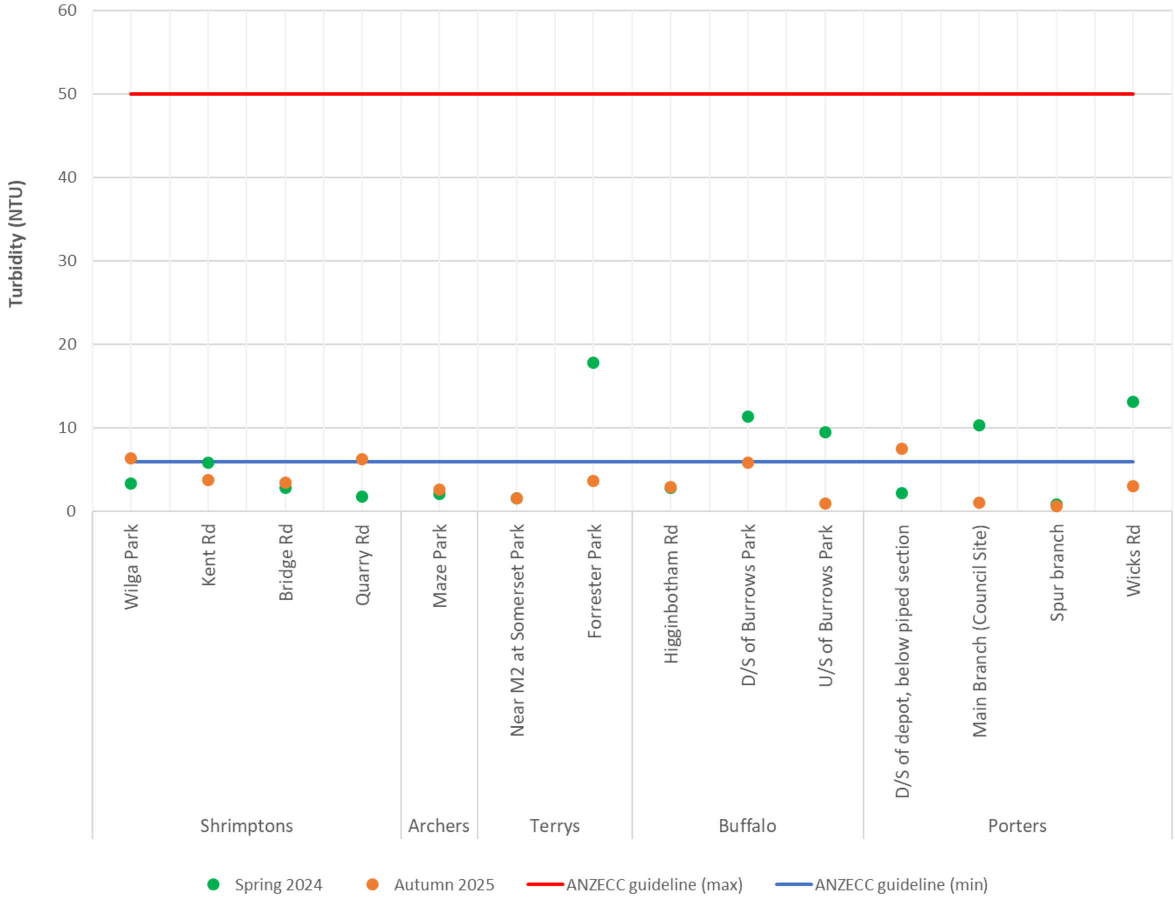
Temperature



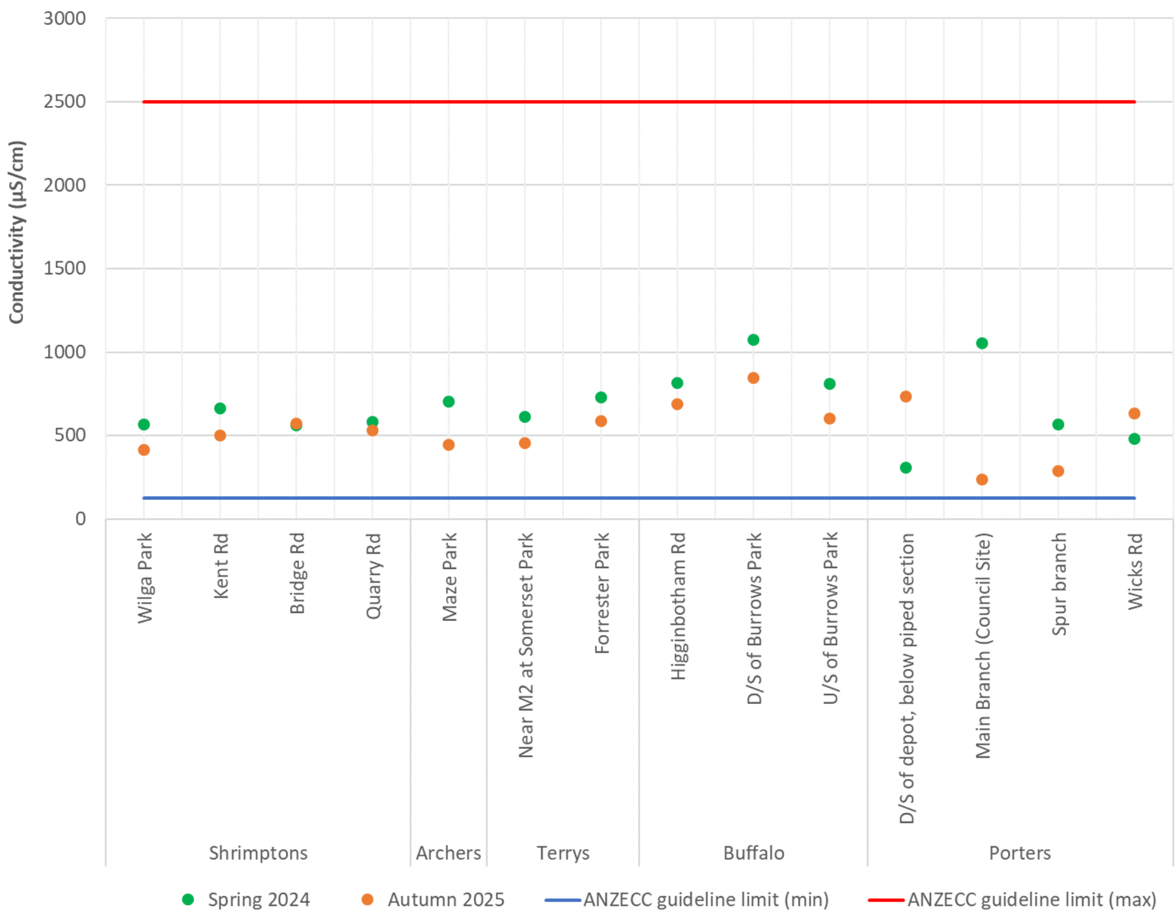
Dissolved oxygen saturation



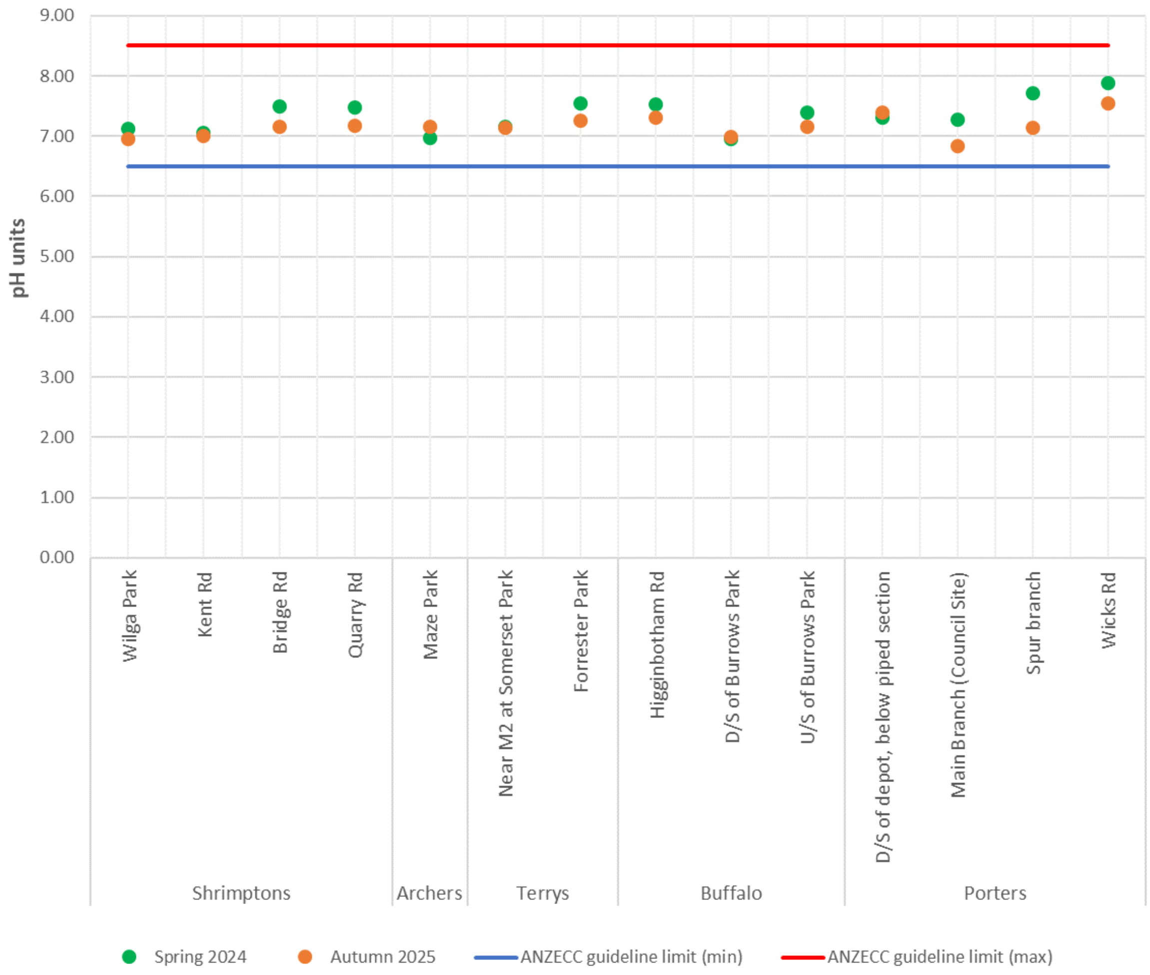
Turbidity



Conductivity

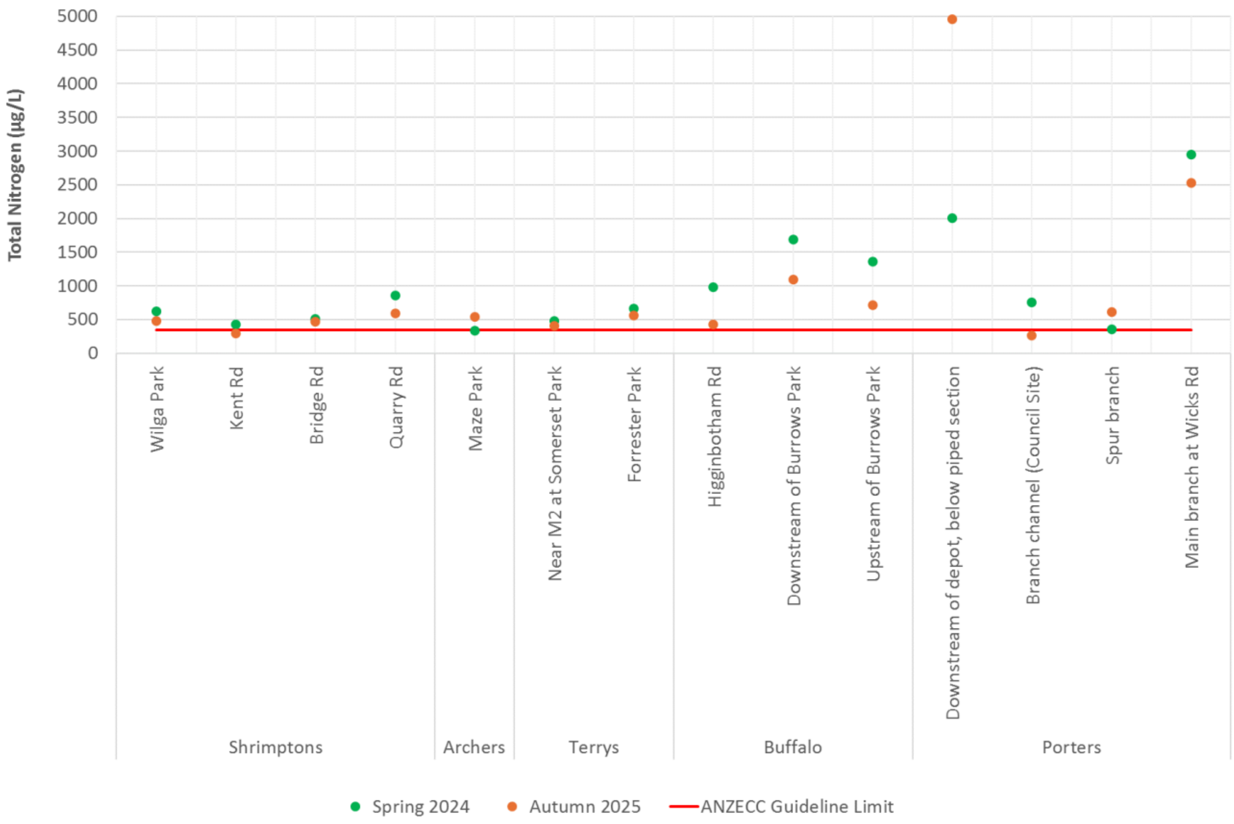


pH

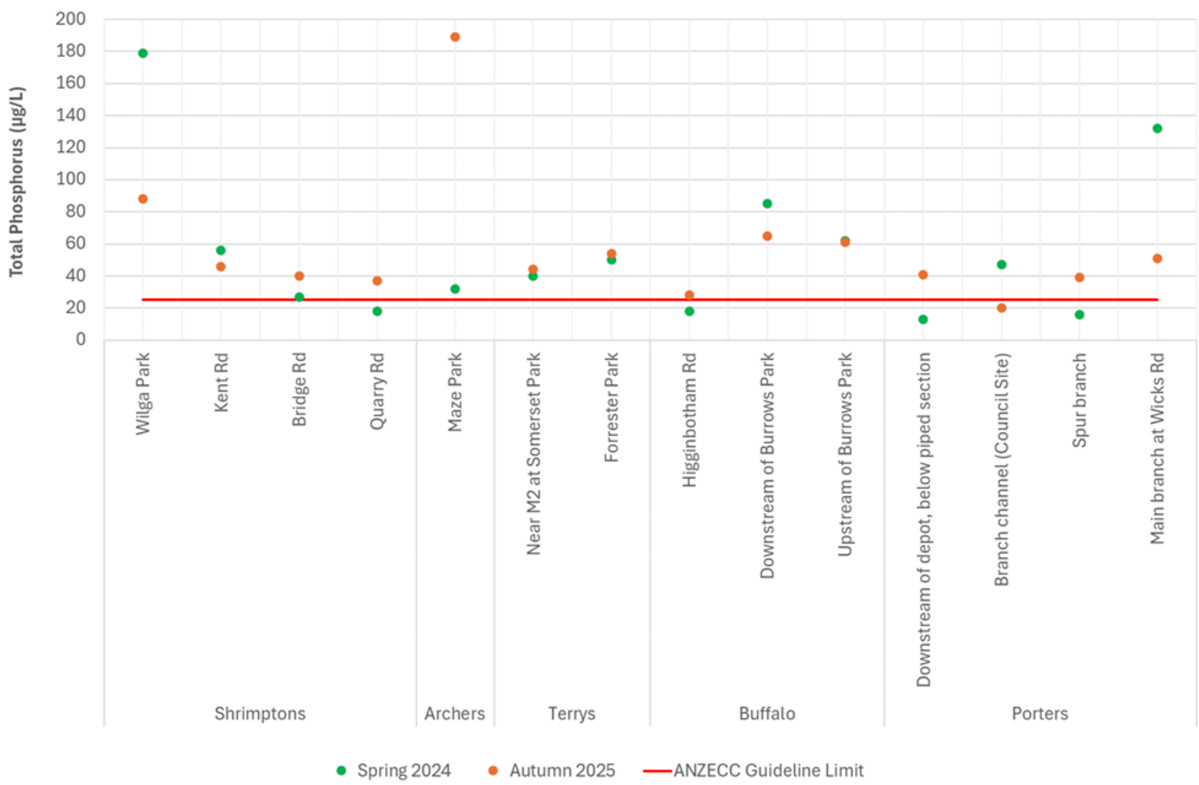


Faecal coliforms

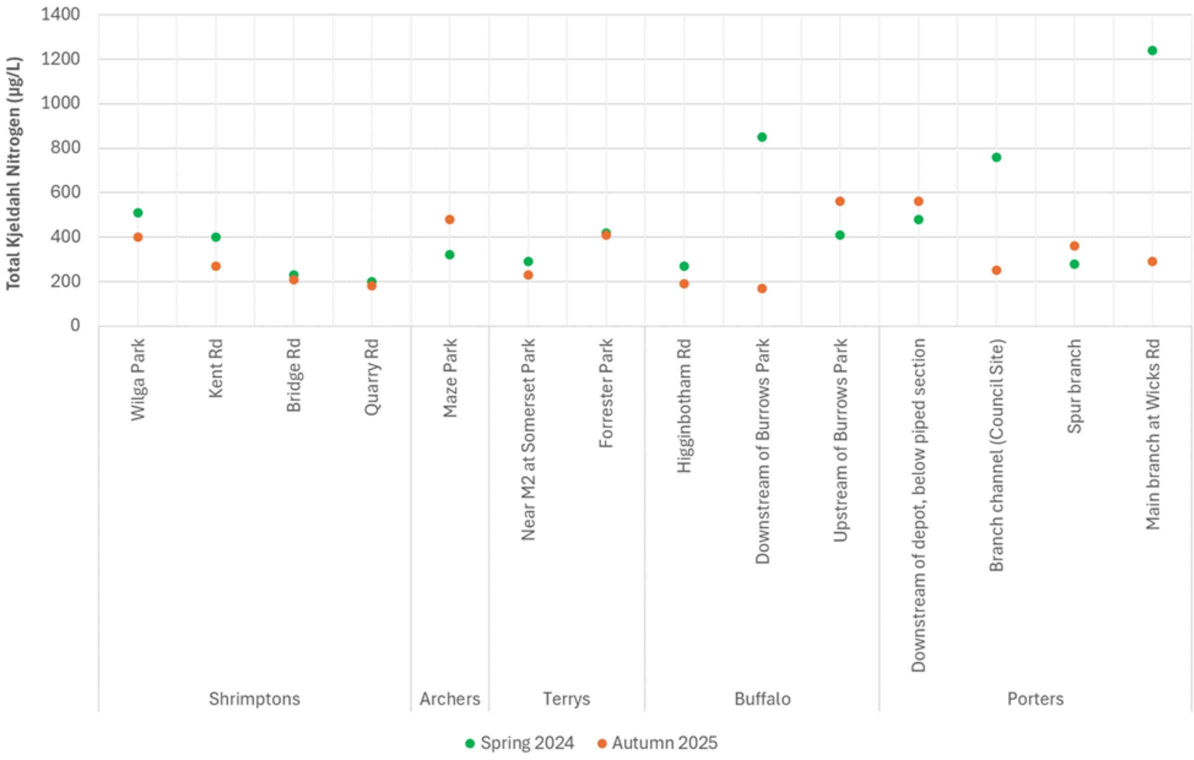
Total Nitrogen



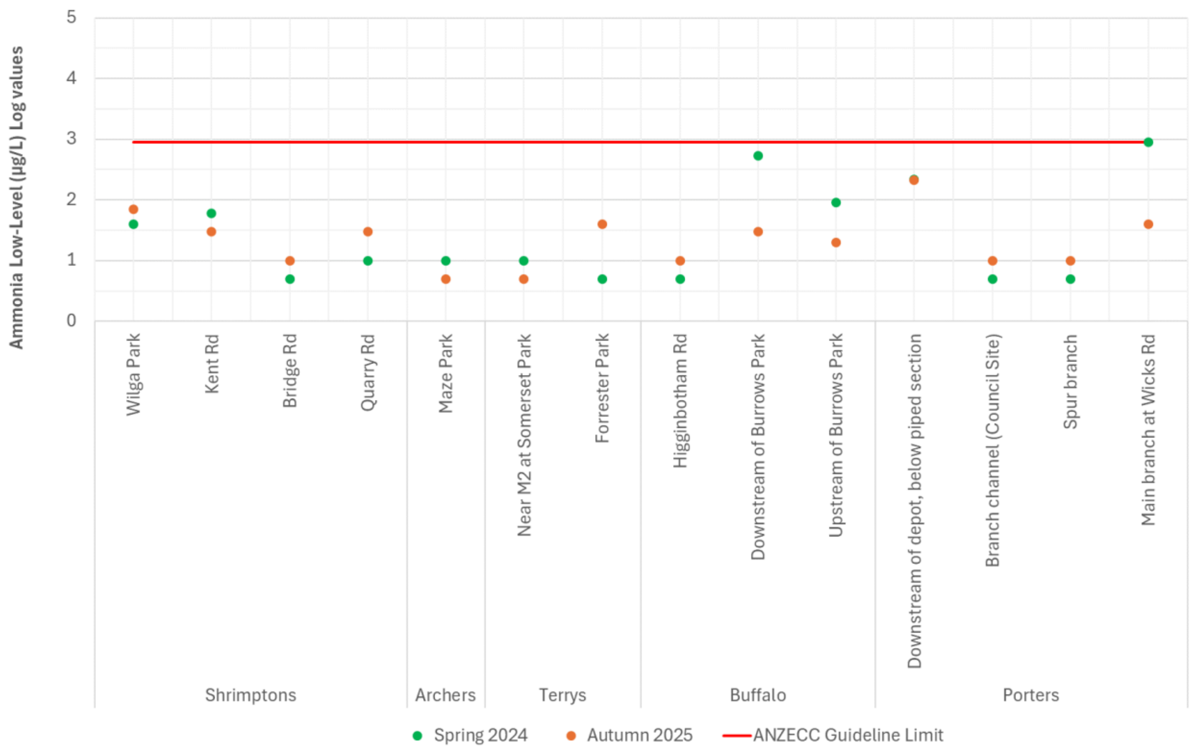
Total Phosphorous



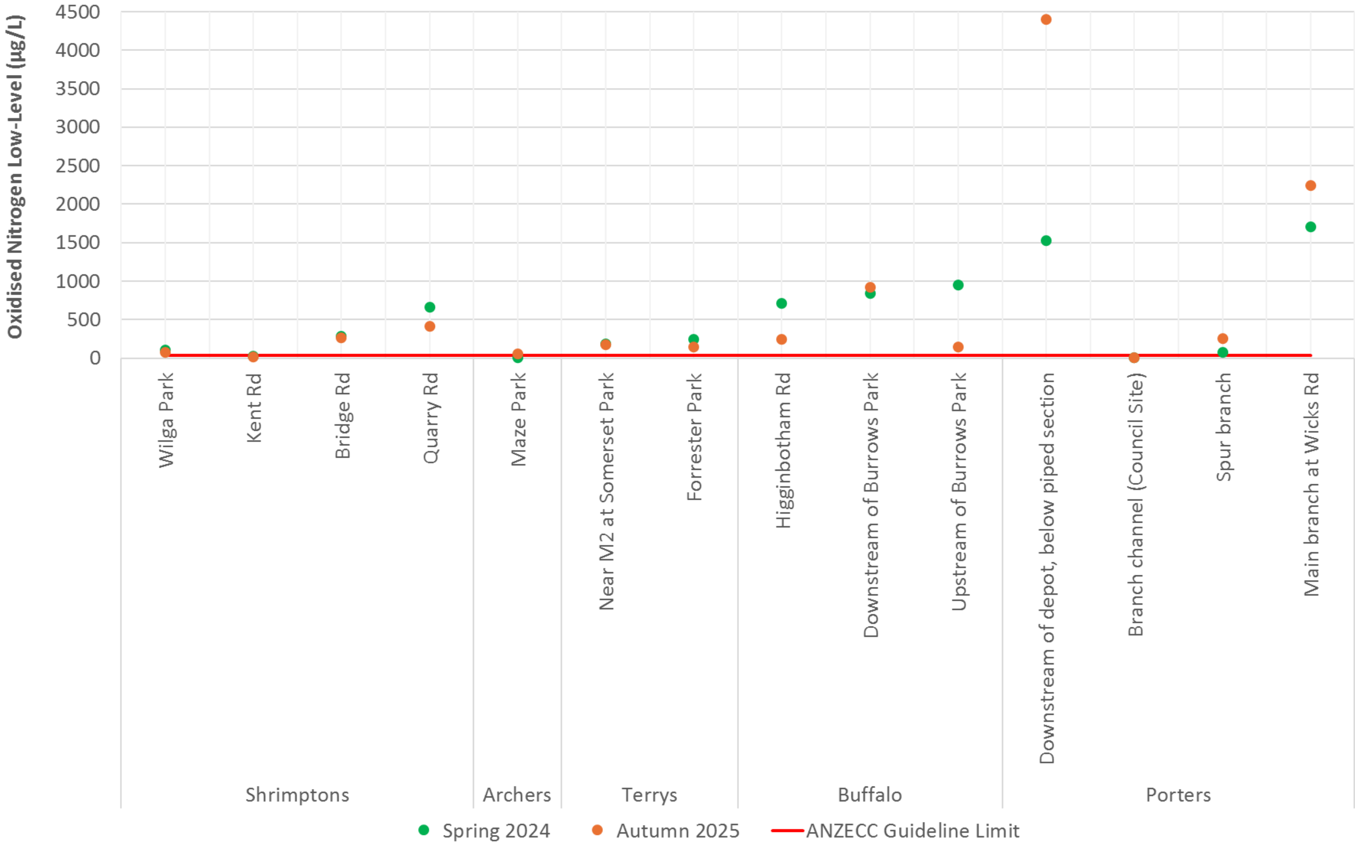
Total Kjeldahl Nitrogen



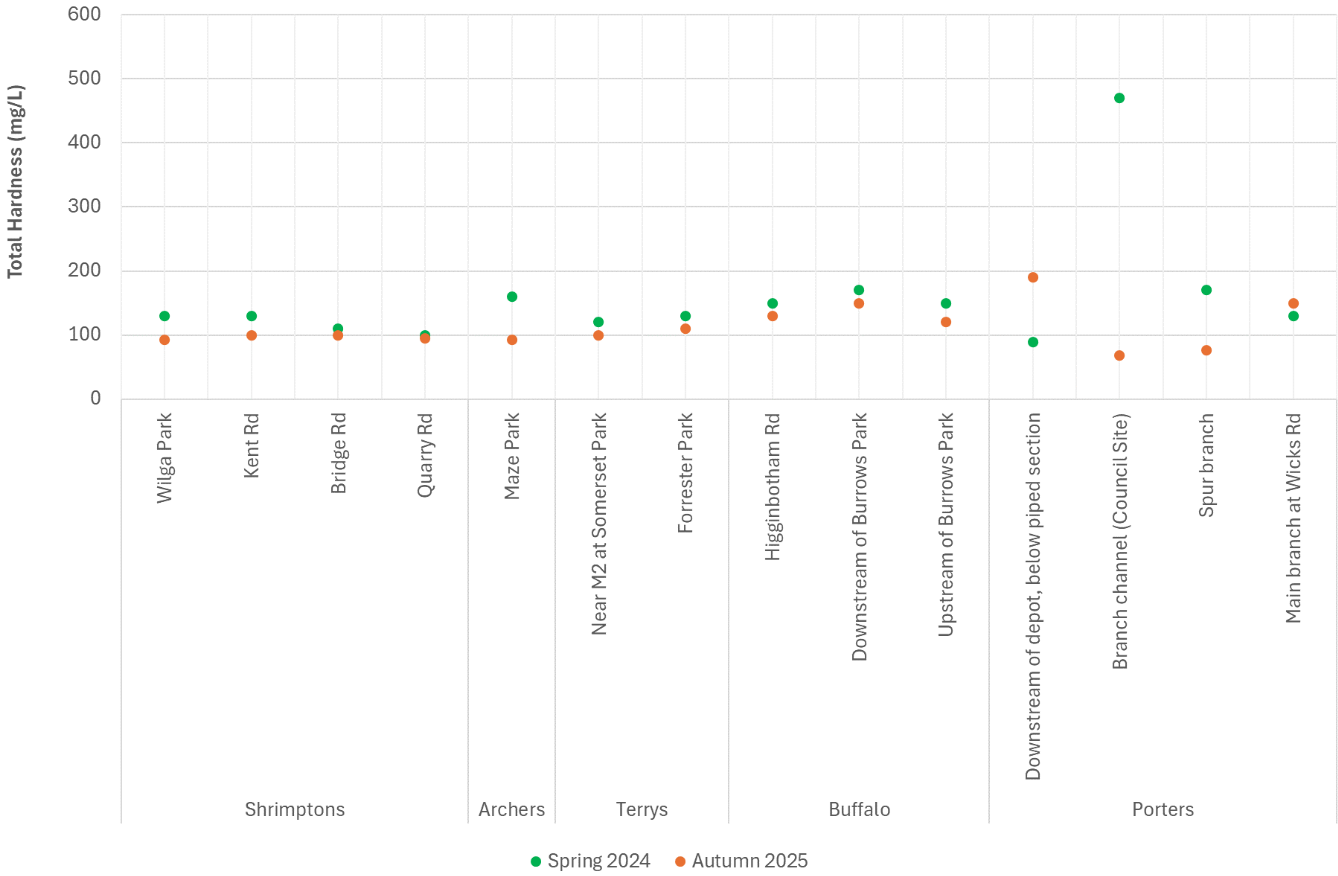
Ammonia



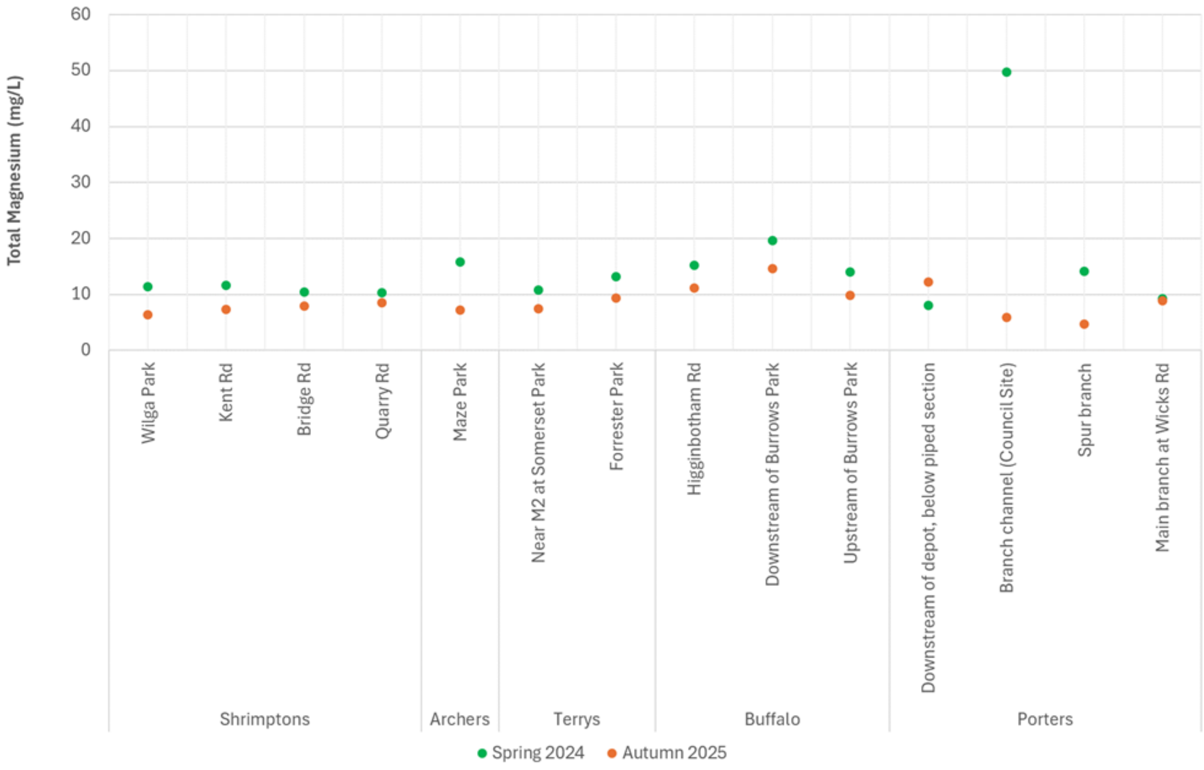
Oxidised Nitrogen



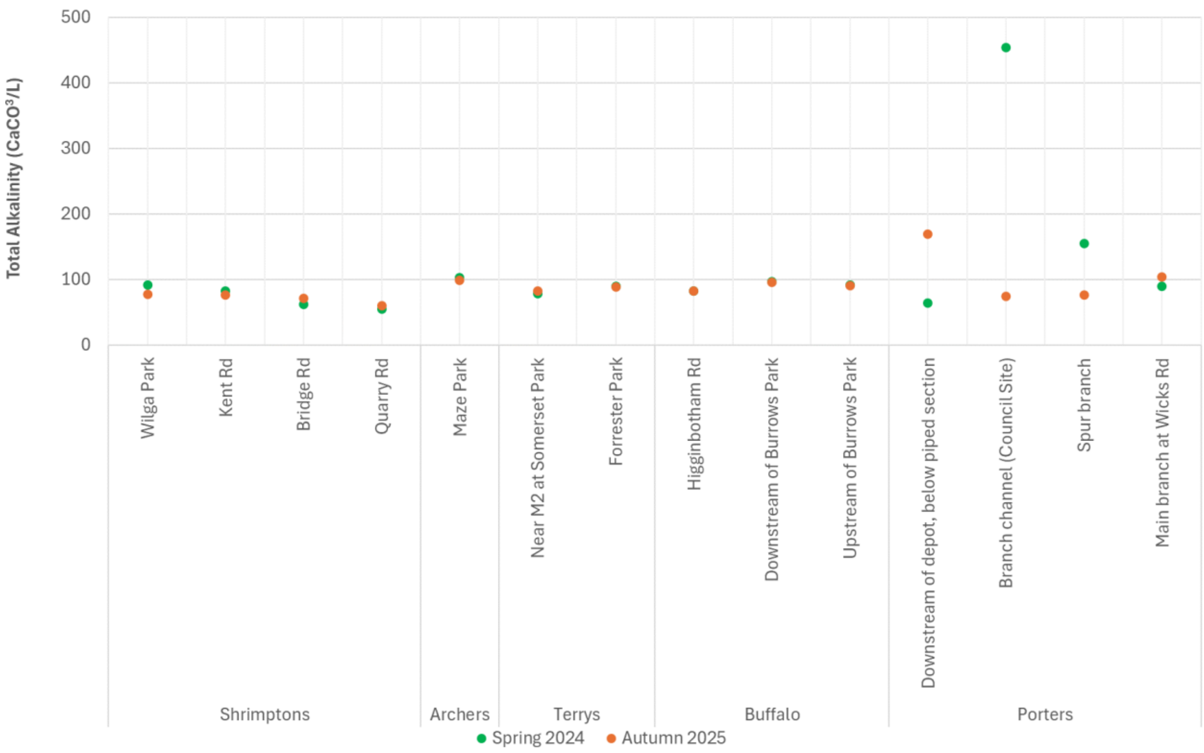
Total Hardness



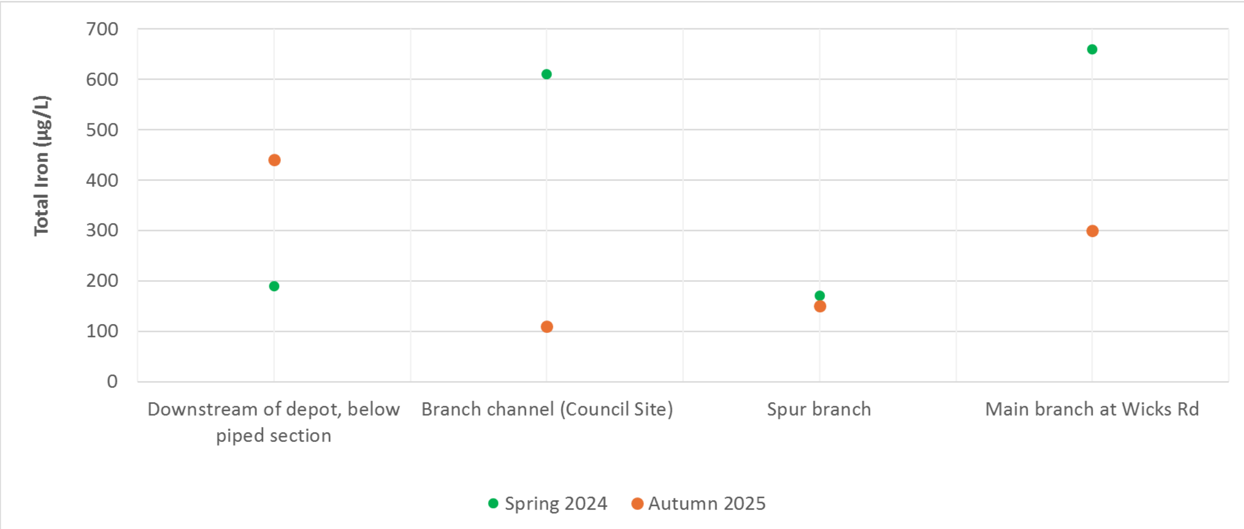
Total Magnesium



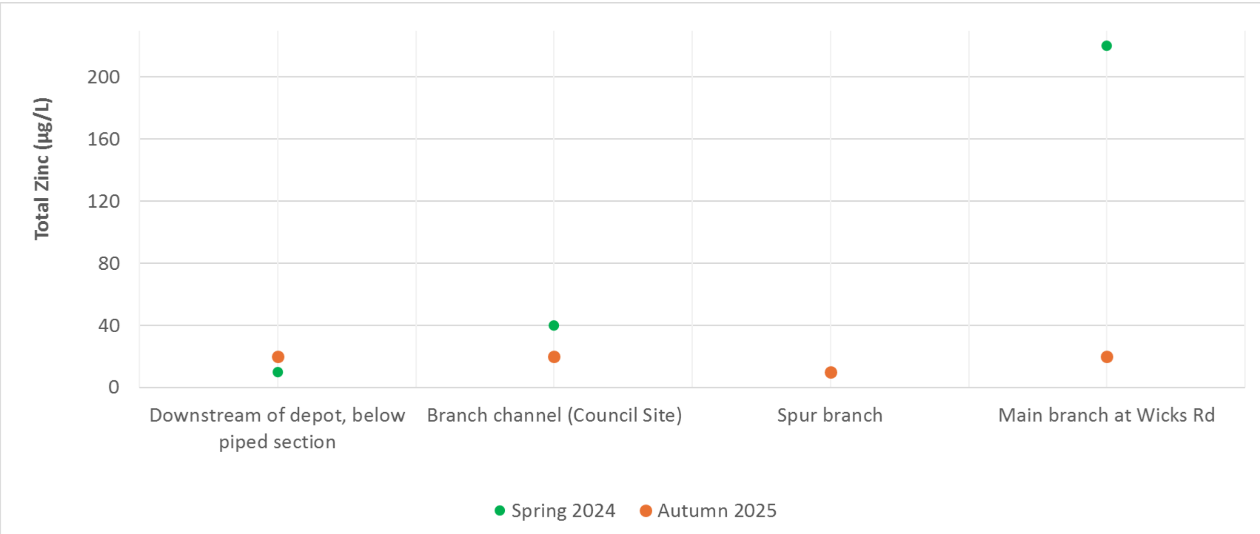
Total Alkalinity



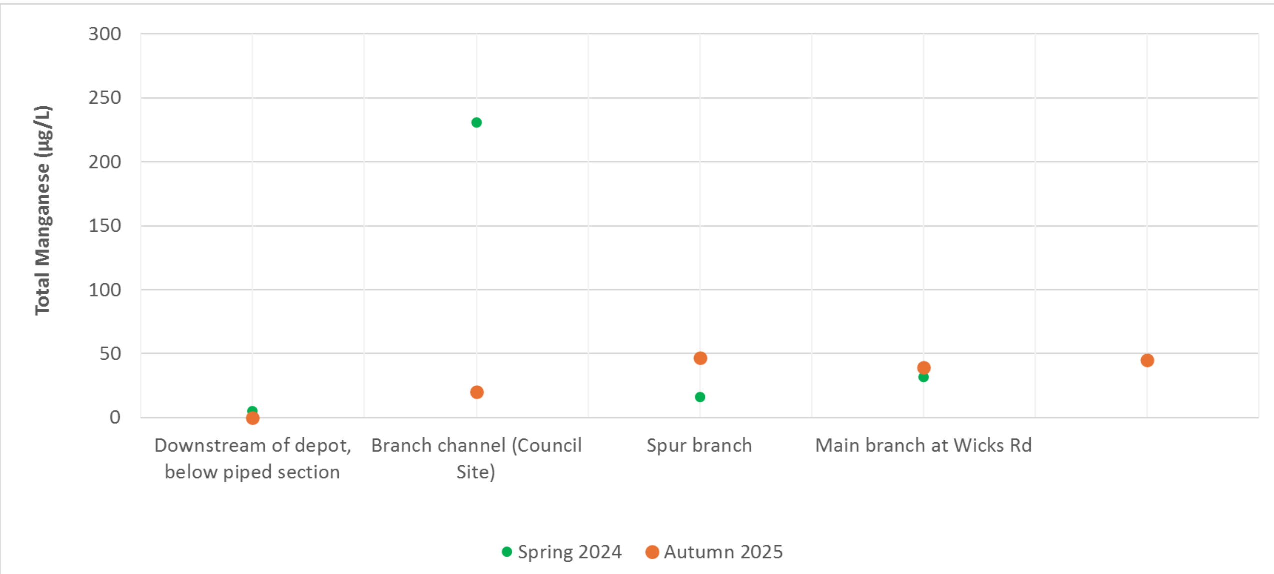
Porters Creek – Total Iron



Porters Creek – Total Zinc



Porters Creek – Total Manganese



15 Appendix 2: Streamwatch

City of Ryde Council provided Streamwatch water quality data for several sites within the catchment zones currently sampled by Sydney Water. It is to be noted that the Streamwatch data was collected by trained Bushcare groups throughout the year using standardised equipment and methodologies. Data from the Council is verified before being stored as a permanent public record that is available for non-commercial purposes. Sydney Water and the Sydney Catchment Authority do not accept responsibility for the use of this information. Data is uncontrolled if printed or downloaded. As Streamwatch water quality sampling was conducted at different sampling locations and dates, comparisons cannot be made for this data. A best-match approach was taken when selecting data for graphing.

Buffalo Creek Catchment

Streamwatch data collected during Autumn 2025 was collated and graphed. The data from the below Streamwatch sites sampled on 18th March 2025 were used:

- Pidding Road
- Burrows Park downstream
- Burrows Park Upstream
- Higginbotham Road
- Minga Reserve
- Monash Road
- Visitors Centre

These results were graphed with Sydney Water sampling sites; (i) Below Higginbotham Road, (ii) Downstream of Burrows Park and (iii) Upstream of Burrows Park.

Temperature results were within a close range across sites in this catchment. The lowest result was 18.5ºC while the highest was 20.0ºC (Figure i). Dissolved oxygen results were variable. The lowest result was at the Streamwatch site, Monash road (2.7 mg/L) while the highest was at the Streamwatch site Pidding Road (8.3 mg/L). The pH results for this catchment were stable with a small range of fluctuation between sites (6.5 – 7.5 pH units). Conductivity results were variable (Figure ii). The lowest result was observed at Streamwatch site, Monash Road (295 µS/cm). The highest was at Sydney Water site, Downstream of Burrows Park (844 µS/cm)

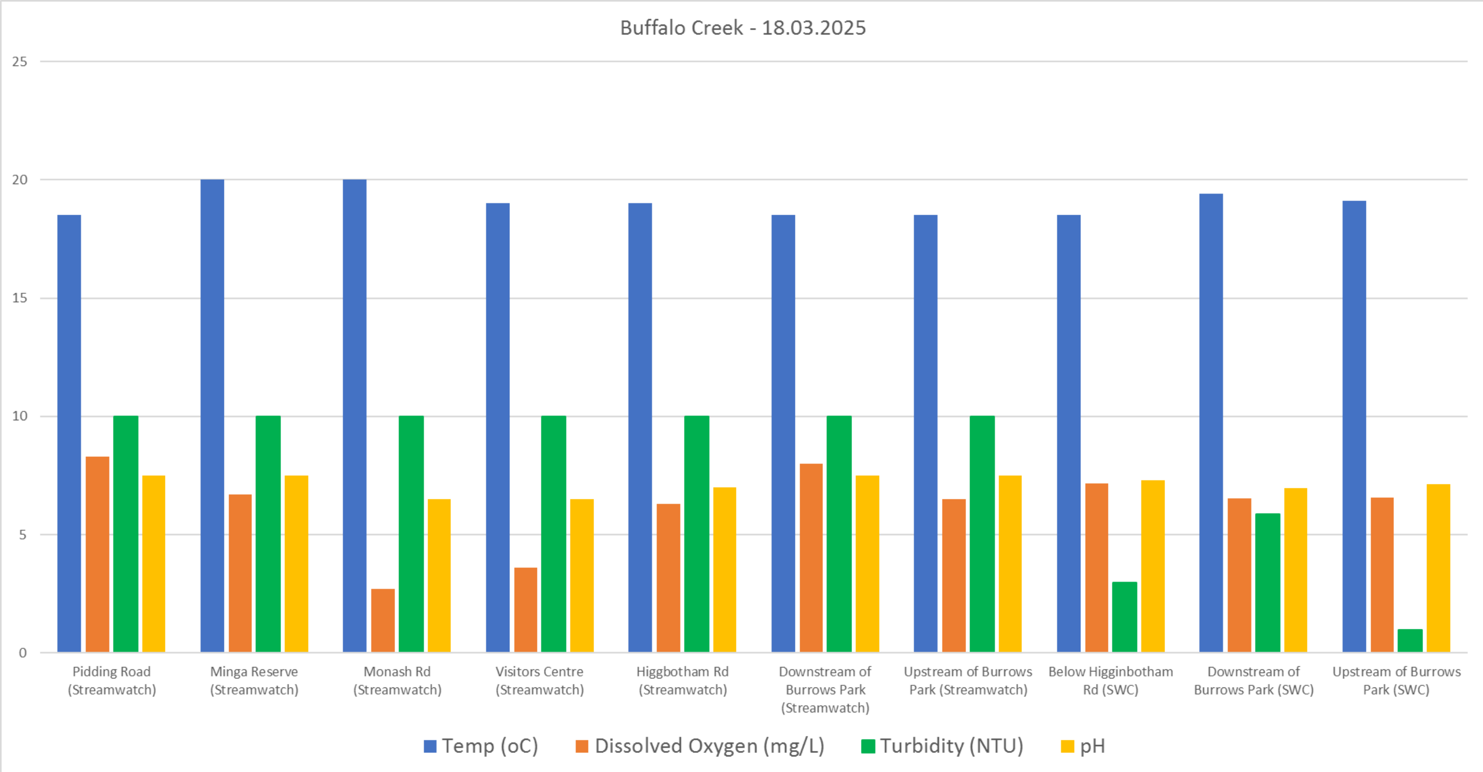


Figure (i): Buffalo Creek catchment data from Streamwatch and Sydney Water sampling programs

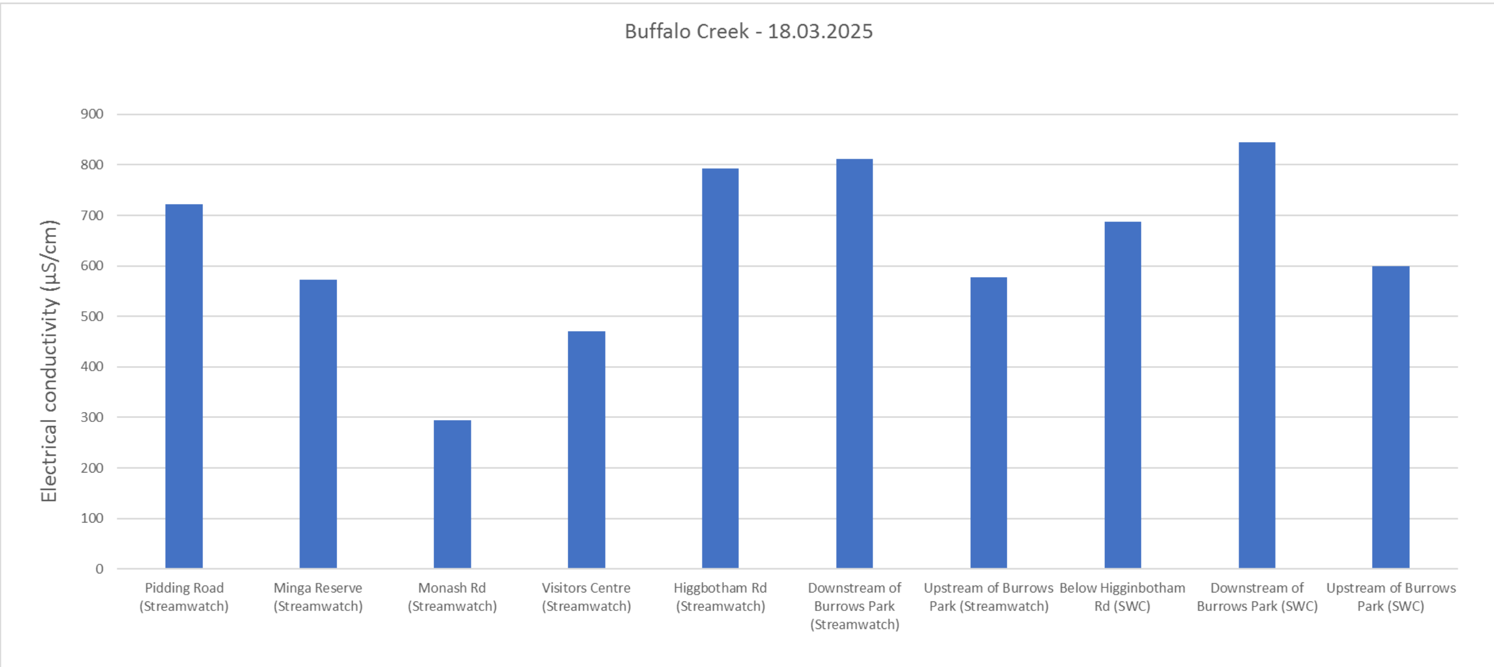


Figure (ii): Buffalo Creek conductivity data from Streamwatch and Sydney Water sampling programs

Shrimptons Creek Catchment

Data from the below Streamwatch sites were compared with the four Sydney Water sampling sites (Wilga Park, Kent Road, Bridge Road and Quarry Road). All Streamwatch sites were sampled on 18th March 2025, aside from Santa Rosa Park which was sampled on 22nd March 2025. Results are summarised in Figure iii below;

- Santa Rosa Park
- Greenwood Park
- Wilga Park
- Kent Road
- Bridge Road
- Quarry Road

Temperature results were within a close range across Shrimptons catchment. The highest result was at Sydney Water site, Quarry Road (20.4ºC). The lowest result was recorded at Streamwatch sites; Greenwood Park and Kent Road (18.7ºC). Dissolved oxygen results were highly variable across the catchment. The lowest result was at Streamwatch site Greenwood Park (1.3 mg/L). The highest was recorded at Sydney Water site, Quarry Road (8.12 mg/L). The pH results for the catchment ranged between 6.5 – 7.18 pH units. Turbidity results were low at each of the sites. Conductivity results were relatively stable (Figure iv). The highest result was at Sydney Water site Bridge Road (572 µS/cm). The lowest was at Streamwatch site Wilga Park (408 µS/cm).

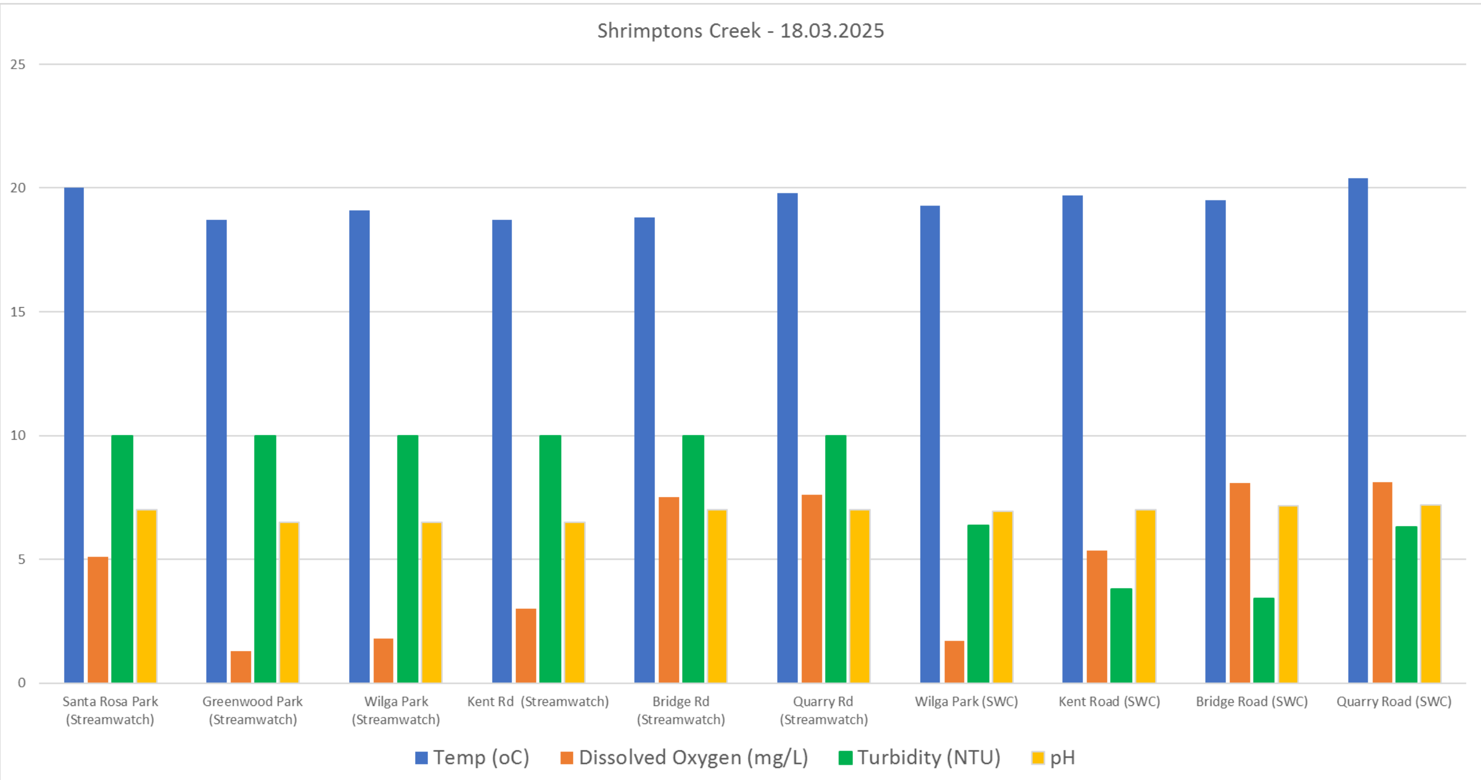


Figure (iii): Shrimptons Creek catchment data from Streamwatch and Sydney Water sampling programs

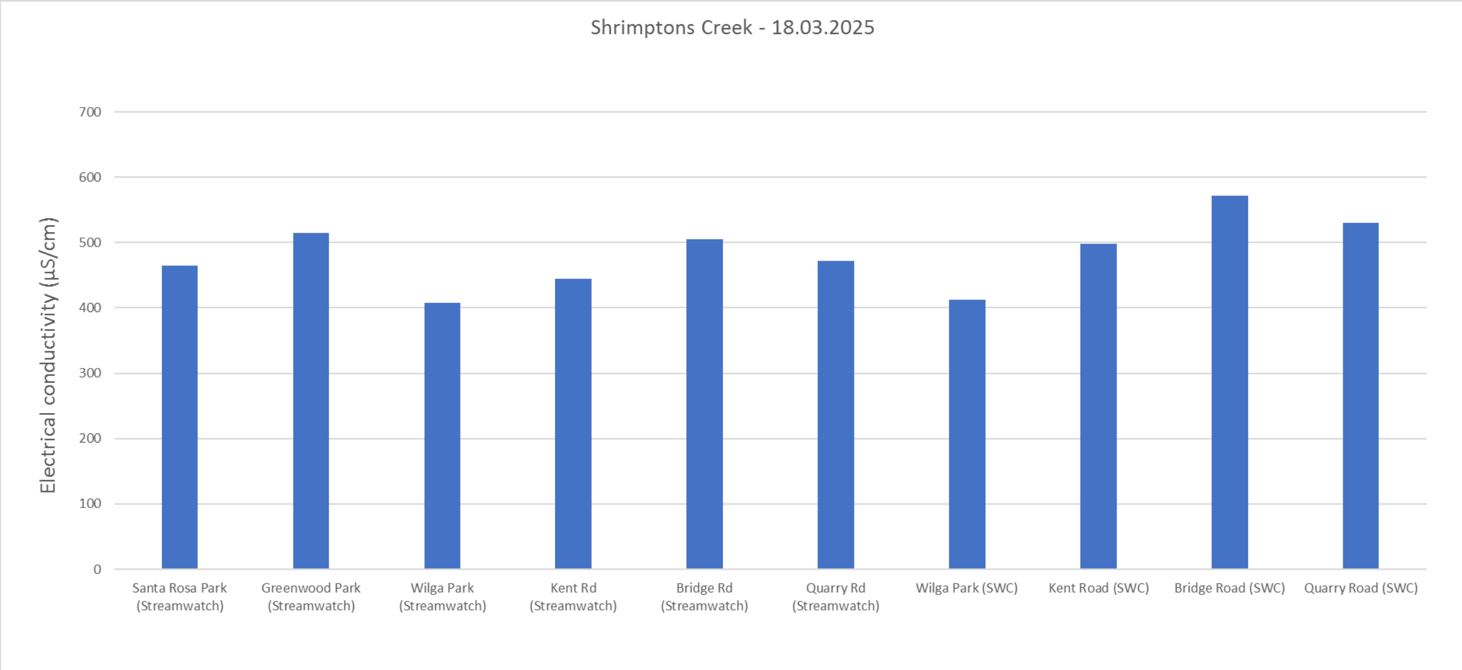


Figure (iv): Shrimptons Creek conductivity data from Streamwatch and Sydney Water sampling programs

Terrys Creek Catchment

Streamwatch data from the below sites in the Terrys Creek catchment have been graphed with Sydney Water sites sampled on the same day;

- Forsyth Park
- Somerset Park
- Forrester Park

The lowest temperature result was recorded at the Sydney Water site; Terrys Creek at Somerset Park (18.0ºC). The highest result was at Streamwatch site, Somerset Park (20.0ºC). Dissolved oxygen results were within a close range with the lowest recorded at 5.4 mg/L (Somerset Park, Streamwatch) and the highest at 7.46 mg/L (Forrester Park, Sydney Water). Turbidity results were low and conductivity results were within a close range. The lowest conductivity was recorded at Streamwatch site, Somerset Park (328 µS/cm) while the highest was at 585 µS/cm (Figure vi).

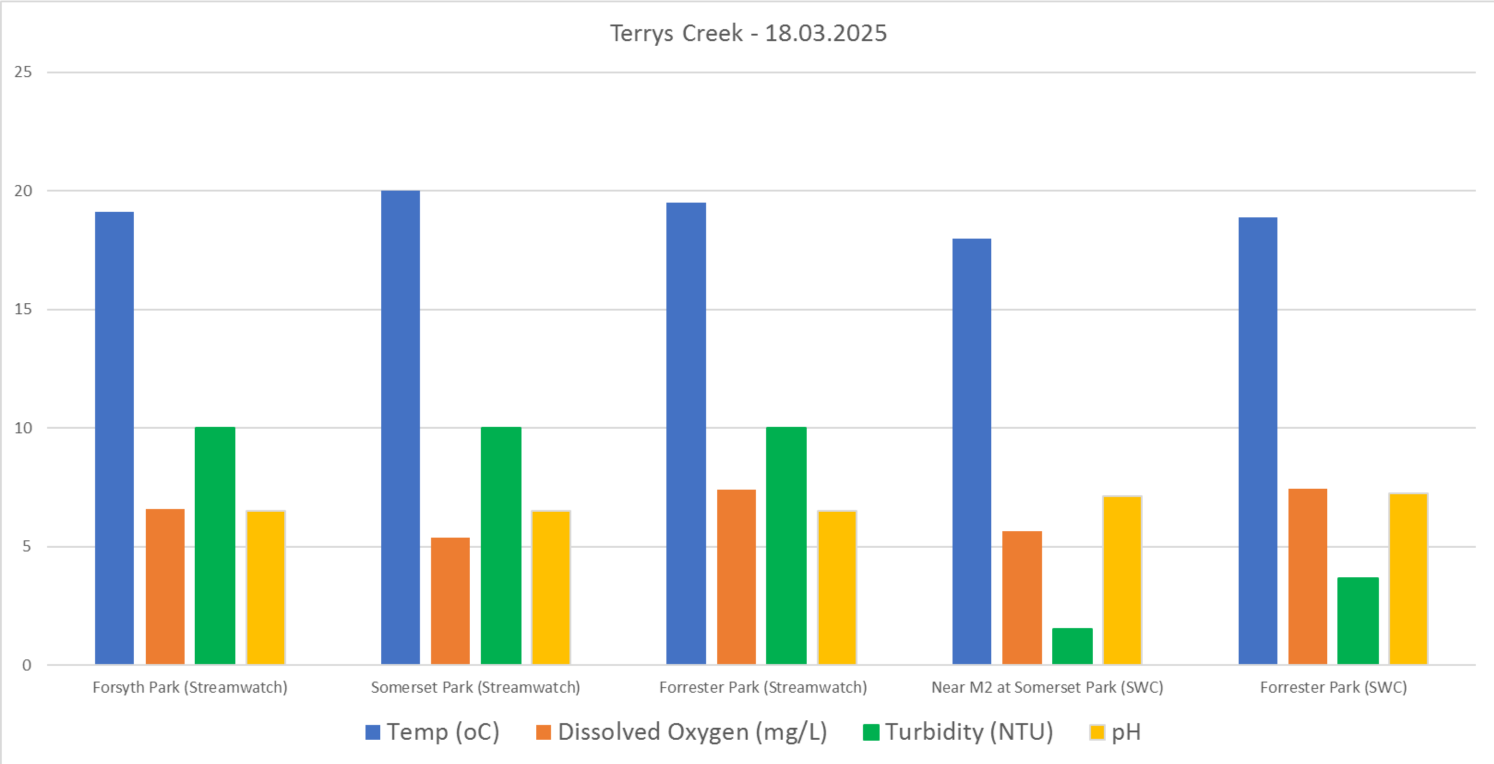


Figure (v): Terrys Creek catchment data from Streamwatch and Sydney Water sampling programs

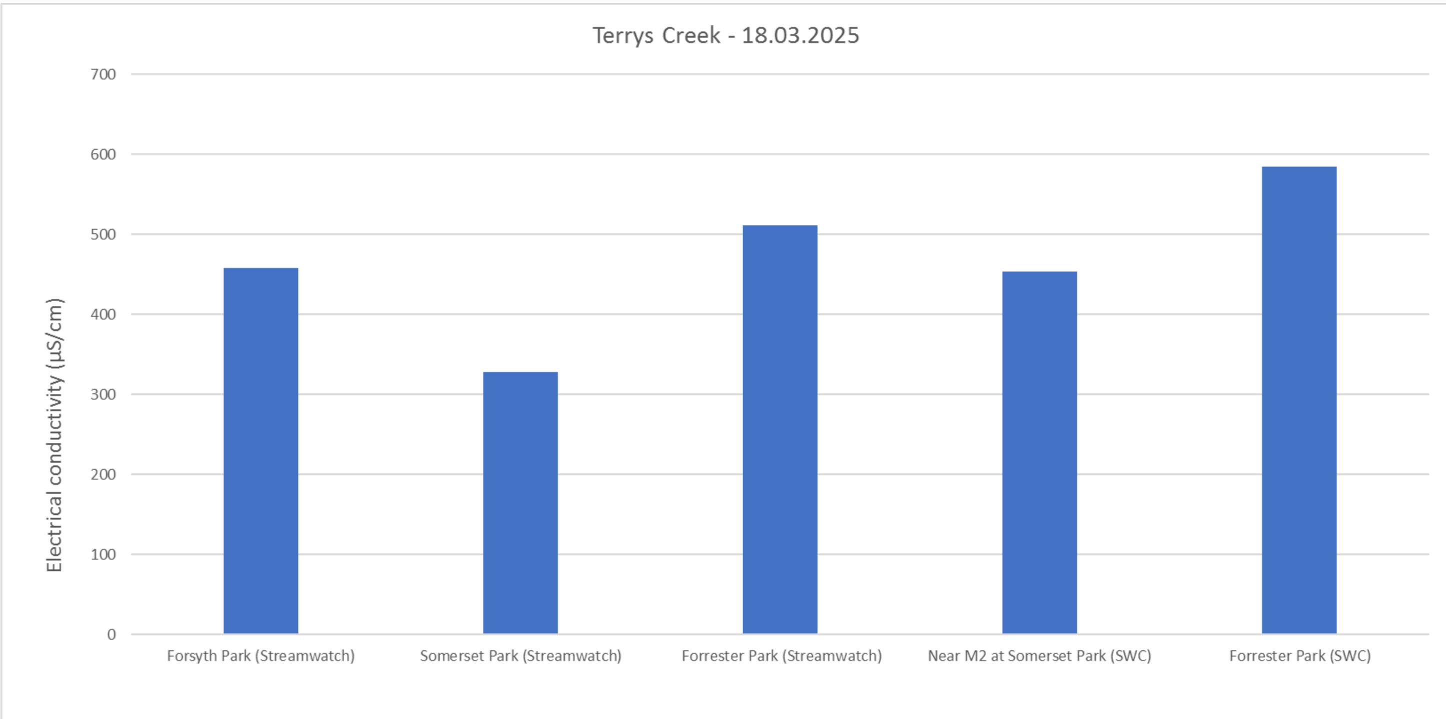


Figure (vi): Terrys Creek conductivity data from Streamwatch and Sydney Water sampling programs

Archers Creek Catchment

Data from the Streamwatch site Maze Park at Archers Creek catchment have been graphed with Sydney Water Archers Creek site sampled on the same day (Figure vii). Temperature results were similar between both sampling sites; Streamwatch (20.8 ºC) and Sydney Water (20.0 ºC). Dissolved oxygen was slightly higher at the Streamwatch site (6.3 mg/L) than the Sydney Water site (4.78 mg/L). Turbidity was low for both sites and conductivity results were within a similar range; Streamwatch (416 µS/cm) and Sydney Water (446 µS/cm), Figure viii.

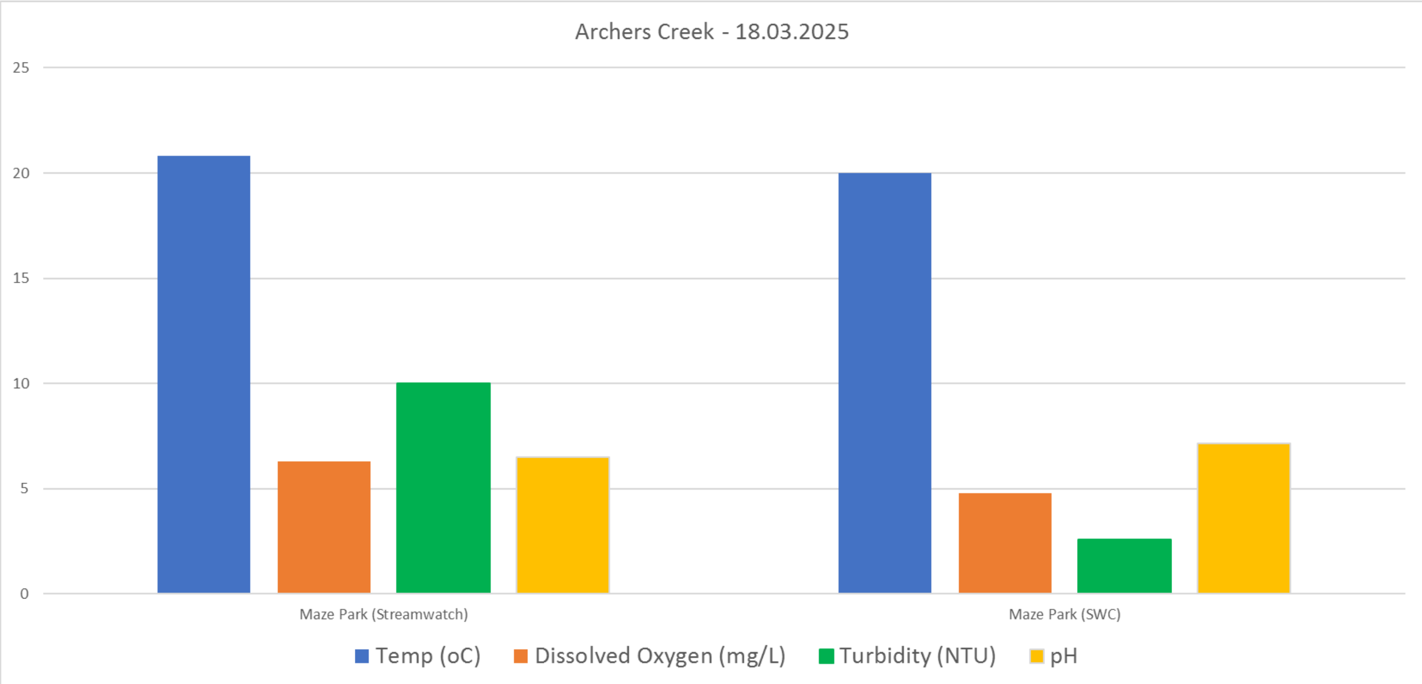


Figure (vii): Archers Creek data from Streamwatch and Sydney Water sampling programs

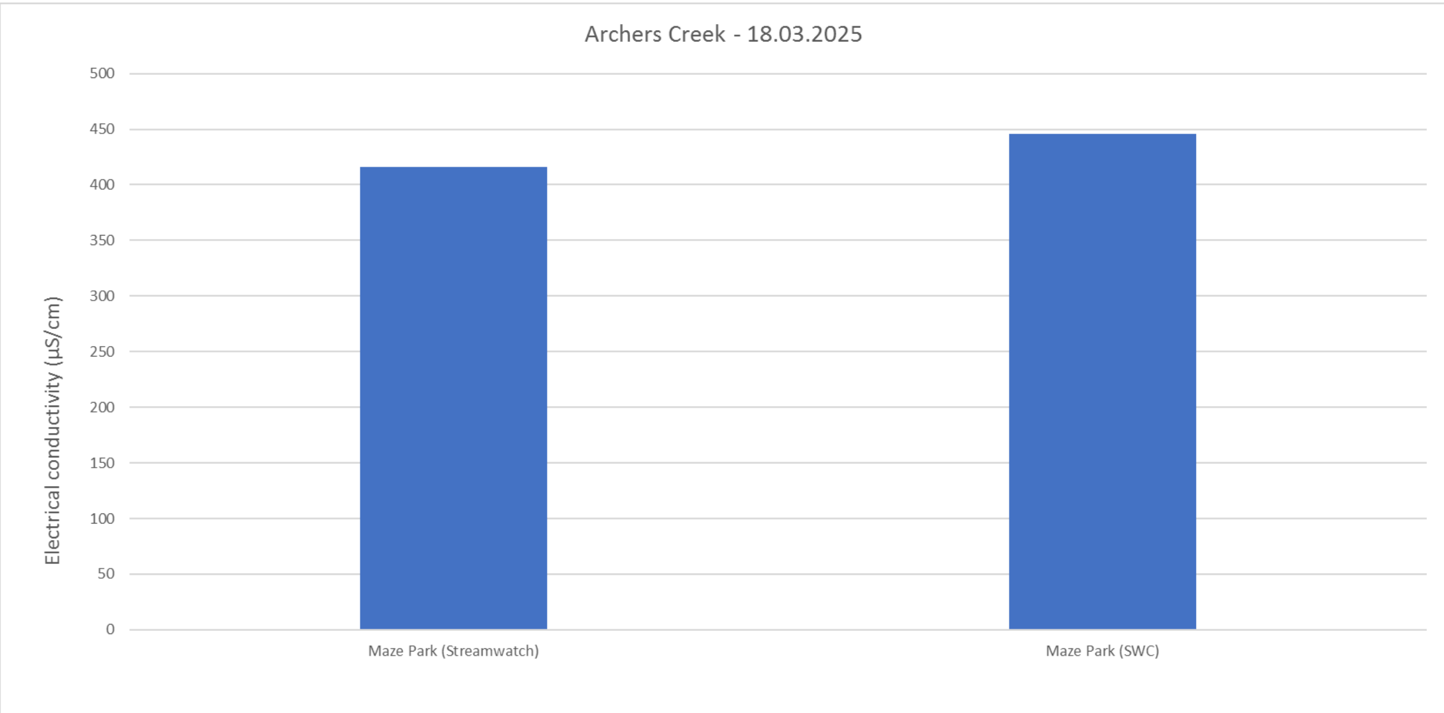


Figure (viii): Archers Creek conductivity data from Streamwatch and Sydney Water sampling programs

16 Appendix 3: Detailed Methodology

1 Water Quality

City of Ryde council provided the water quality monitoring design and study locations for this sampling program. The procedures are consistent with their previous monitoring programs. Water quality sampling was conducted by trained Sydney Water staff who conformed to standard [AS/NZS 5667:1998] and relevant Sydney Water occupational health and safety procedures. Samples were collected in bottles pre-labelled with a unique identifying laboratory number as well as the sample site code, location, and date of collection. Field measurements and observations for each site were recorded at the time of sampling. The sampling procedures used for this program are detailed below.

(i) Sampling schedule and frequency

A bi-annual sampling schedule was prepared by the Aquatic Ecology Project Leader in communication with the client to ensure milestones and deliverables were met according to the agreed timeframes. Routine water quality monitoring was undertaken in September 2024 (Spring) at the five core sites and nine water quality only sites. Autumn sampling has been scheduled for March 2025.

(ii) Sampling procedure

The below procedure was followed to avoid contamination during sample collection:

- sampling officers wore disposable latex gloves
- samples were collected using aseptic techniques
- sampling equipment was sterilised and rinsed between sites
- sample bottles not containing preservative were rinsed before filling
- microbiological samples were collected before other samples

The following procedures were followed to ensure the representativeness of samples:

- disturbed areas of the creek bank were avoided; where disturbance was evident the sample was collected upstream
- rinse water was discarded downstream or away from the sampling point
- issues impacting sample integrity, such as distance from bank(s), number and distribution of samples, substrate, ponds and aeration, were considered in determining sampling sites
- surface scum was avoided

Samples were collected from 20-30 cm below the water surface. Where the depth was less than 50 cm, the sample was taken at half the depth. In the instance where the waterway was shallow, surface samples were collected to allow sampling without disturbing the sediment. This has the potential to compromise sample quality as surface samples may contain surface contaminates, such as scum, dust or pollen, which may not be present below the waterway surface. Therefore, where applicable, collection of surface samples was noted on the Water Quality Sampling Field Sheet. A sampling pole and/or jug were used to collect samples. A list of water chemistry analytes sampled, along with their unit of measurement and collection container are provided in Table 3.

(iii) Field measurements

It is necessary to measure some water chemistry analytes in the field using various instruments (Table 1). To ensure accuracy of results, instruments are calibrated according to the manufacturers' recommendations, field procedure requirements, relevant sections of NATA ISO/IEC 17025 Field Application Document and other reference material.

Table 1 Water chemistry parameters and field analysis methods

Analyte	Method
Dissolved Oxygen (% saturation)	WTW Multiliner Universal Meter
Dissolved Oxygen (mg/L)	WTW Multiliner Universal Meter
Conductivity (µS/cm)	WTW Multiliner Universal Meter
pH (pH units)	WTW Multiliner Universal Meter
Turbidity (NTU)	HACH Turbidimeter
Temperature (°C)	Digital Thermometer

To ensure traceability of calibration in accordance with NATA ISO/IEC 17025 Sydney Water uses both in-house and purchased calibration standards. In-house standards are made only from analytical grade materials of appropriate purity. The assays of these materials are traceable to the National Institute of Standards & Testing (NIST). Purchased calibration standards are regarded as critical materials and are accompanied with a certificate of analysis showing traceability to NIST.

(iiii) Field observations

Field observations were recorded to assist in the interpretation of results. At each site the field observations listed below were recorded:

- sample clarity
- algae presence
- recent rain
- visual pollution
- flow rate (visual assessment)

(v) Sample preservation and transportation

Water samples collected for laboratory analysis that required refrigeration were placed in an ice filled esky immediately after collection. Samples were delivered to the Sydney Water analytical laboratory at West Ryde with the appropriate Chain of Custody form.

(vi) Analysis

All Sydney Water laboratory analytical work was performed as per the requirements of AS ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories. In general, most of the methodologies used are American Public Health Association (APHA) or United States Environmental Protection Agency (USEPA) standard methods. Where standard methods are not available, analytical procedures have been developed from in-house research or published methods from analytical journals. All analysis was carried out according to the requirements of the customer and the laws and regulations of relevant authorities. Sydney Water laboratories' NATA technical accreditation numbers are listed in Table 2 below.

Table 2 Sydney Water laboratories NATA accreditation numbers

Field of Testing	Number		Accredited	Standard
Chemical testing	63		1952	ISO/IEC 17025
Biological testing	610		1966	ISO/IEC 17025

2 Macroinvertebrates

The Sydney Water Biology Group carry out sampling activities according to the requirements of the in-house test method *SS0001 Rapid Field Assessment of Macroinvertebrates for River, Stream (lotic) and Wetland (lentic) Waters*. All field sampling staff must be competent in identifying macroinvertebrates to a family-level. This requirement ensures that field staff are experienced in identifying animals of varying morphologies to facilitate high quality field sampling and processing techniques. As identifiers they must comply with the requirements of the In-house test method *SSWI433 Macroinvertebrate Cataloguing, Identification and Counting*.

(i) Sampling Procedure

At each of the five core sampling sites, two replicate macroinvertebrate samples were collected from edge habitat using a hand-held dip net. An 'edge' habitat is defined as a zone with little to no current, for example, areas adjacent to stream banks. The sampling net was swept from open water towards the stream bank, working over a bank length of approximately 10 meters. This process stirs up deposits of silt and detritus so that benthic and surface-dwelling animals are suspended and caught in the net.

(ii) Qualitative sample collection

The net contents were emptied into a large white sorting tray with a small amount of water to allow live macroinvertebrate specimens to be picked out with fine forceps and pipettes for a minimum period of 40 minutes. If new taxa were collected between 30 and 40 minutes, sorting continued for a further 10 minutes. If no new taxa were found after 10 minutes, picking ceased. If new taxa were found, the 10-minute processing cycle continued up to a maximum total sorting time of 1 hour. All specimens collected were preserved in small glass specimen jars containing 85% un-denatured ethanol with a clear label indicating site code and location, date, habitat, and initials of both the sampler and picker. Sampling equipment was washed thoroughly between samples to prevent the cross contamination of animals.

(ii) Sample processing

Macroinvertebrate samples were processed as per *SSWI433 In-house Test Method Macroinvertebrate Cataloguing, Identification and Counting*. Quality assurance was conducted as per *SSWI434 In-house test method Quality Control of Macroinvertebrate Identification, Counting and Archiving of Collections.* Both methods comply with the requirements of AS ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories under technical accreditation number 610 issued by the National Association of Testing Authorities (NATA). Macroinvertebrate identifications were performed using compound and stereo microscopes (Leica Microsystems) that are maintained via a strict calibration schedule.

Reference material used in the Aquatic Ecology laboratory includes:

- Current published taxonomic keys
- Voucher specimens, many confirmed by national experts
- Sydney Water in-house keys and digital voucher photographic database

Macroinvertebrates were identified and enumerated to the family taxonomic level, except Chironomids which were identified to sub-family. Aquatic worms were identified to Naididae sub-families as required while Aquatic mites were identified to Order level (Acarina). Identification data was verified before being entered into Sydney Water's electronic database (LIMNOS). Raw macroinvertebrate data files were extracted and verified by a senior staff member before analyses were performed. At the end of this process, quality assurance was conducted on 5% of edge samples identified for this study. Identifications are chosen at random for quality assessment.

(iii) Rainfall data

Rainfall data was extracted from the Australian Bureau of Meteorology website. The North Ryde Bureau station (066213) data was used for this report. Daily, monthly, and cumulative rainfall data prior to the sampling date was collated and graphed. Rainfall levels were observed to ensure that rainfall volume did not exceed 10 mm in the days preceding sampling to ensure representative sample collection.

3 Analysis Methods

(i) Water quality

Water quality results were used to characterise each study creek against ANZECC (2000) guidelines for Aquatic Ecosystems (Lowland River in South-Eastern Australia), Recreational Water Quality and Aesthetics (Secondary) and toxicants (95% species protection level). The ANZECC (2000) toxicant trigger values have been used for metals. These guidelines provide four sets of protection levels derived as chemical-specific estimates of the concentrations of contaminants that should have no adverse effects on aquatic ecosystems (ANZECC 2000). The 95% species protection level is commonly applied to aquatic ecosystems that have been modified in some way and has been used in this report as a comparison for the stream water quality results. ANZECC (2000) recommends that the toxicity trigger values for hardness-related metals (in this study: cadmium, copper, lead, and zinc) are adjusted to account for local water hardness. This is important because the trigger values for these metals have been derived for soft waters (30 g/m3 CaCO3), corresponding to high toxicity. The adjustment values for water hardness categories are detailed in Table 4.

Table 3 ANZECC (2000) indicator analytes and associated trigger values

Indicator	Guideline value	Unit	Analysis	Source
Dissolved oxygen	85 to 110	% saturation and mg/L	In-field	Protection of aquatic ecosystem (ANZECC 2000)
pH	6.5 to 8.5	pH unit	In-field	Protection of aquatic ecosystem (ANZECC 2000)
Turbidity	50	NTU	In-field	Protection of aquatic ecosystem (ANZECC 2000)
Conductivity	125 – 2500	µS/cm	In-field	Protection of aquatic ecosystem (ANZECC 2000)
Ammonia nitrogen	900	µg/L	Laboratory	Protection of aquatic ecosystem (ANZECC 2000)
Oxidised nitrogen	40	µg/L	Laboratory	Protection of aquatic ecosystem (ANZECC 2000)
Total nitrogen	350	µg/L	Laboratory	Protection of aquatic ecosystem (ANZECC 2000)
Total phosphorus	25	µg/L	Laboratory	Protection of aquatic ecosystem (ANZECC 2000)
Faecal coliforms	1000	CFU/100mL	Laboratory	Secondary contact recreation (ANZECC 2000)
Chromium	0.001	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Manganese	1.9	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Iron	ID	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Copper	0.0014	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Zinc	0.008	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Arsenic	0.013	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Cadmium	0.002	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Lead	0.0034	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)
Mercury	ID	mg/L	Laboratory	Toxicants at 95% level of protection (ANZECC 2000)

Table 4 Relevant ANZECC (2000) trigger value (TV) adjustments for water hardness

Hardness category mg/L as $CaCO_3$	Hardness range (mg/L as $CaCO_3$)	Cadmium	Copper	Lead	Zinc
Soft	0 – 59	TV	TV	TV	TV
Moderate	60 -119	x 2.7	x 2.5	x 4.0	x 2.5
Hard	120 – 179	x 4.2	x 3.9	x 7.6	x 3.9
Very hard	180 – 240	x 5.7	x 5.2	x 11.8	x 5.2
Extremely hard	400	x 10.0	x 9.0	x 26.7	x 9.0

3 Analysis Methods
(ii) Macroinvertebrates

Two biological indices were used to analyse macroinvertebrate data: SIGNAL_SF and Taxa Richness.

SIGNAL
The SIGNAL (*Stream Invertebrate Grade Number Average Level*) biotic index is a relatively simple and inexpensive method to assess stream health. This index assigns 'sensitivity scores' to macroinvertebrate taxa that are collected using the rapid assessment sampling method. The original version was developed for Sydney Water for assessing the Hawkesbury-Nepean catchment and required identifications to the Family taxonomic level (Chessman, 1995). The original SIGNAL index was refined to include the response of SIGNAL to natural and anthropogenic environmental factors (Growns et al. 1995), variations in sampling and sample processing methods (Growns et al. 1997;) and the objective setting of sensitivity grades of the taxa (Chessman et al. 1997; Chessman et al. 2002).

SIGNAL_SF
Chessman et al. (2007) saw the development of a Sydney-specific SIGNAL biotic index that drew on family and genus level macroinvertebrate data from the greater Sydney region. The water quality status of 'clean water' was established using data from near pristine reference sites in the bushland fringes of Sydney and determining the 10th percentile of the average score of those sites (Table 5). SIGNAL-SF allows a direct measure of test site condition and incorporates abundance information gathered from the rapid assessment sampling. 'S' indicates the Sydney region version and 'F' indicates that the taxonomy is at the family level. The first step in calculating a SIGNAL-SF score is to apply predetermined sensitivity grade numbers (from 1, tolerant to 10, highly sensitive) to each family count for a given habitat sample. Families without a grade score that are present in a sample are removed from the SIGNAL-SF calculation. The square root transformed count (treated to remove bias of taxa with high abundance counts) of each family is then multiplied by the sensitivity grade. The products are summed and then divided by the total square root transformed number of individuals in all families. A location-specific average is then calculated for each sampling site.

Table 5 Interpretation of SIGNAL-SF scores (Chessman *et al.,* 2007)

SIGNAL-SF score	Water quality status
>6.5	Clean water
5.2 – 6.5	Possible mild organic pollution
3.8 – 5.2	Possible moderate organic pollution
<3.8	Possible severe organic pollution

Taxa Richness
Taxa richness is the overall variety (total taxa) of macroinvertebrates observed in a community assemblage. It is an indicator of stream health that can be measured at any specific taxonomic level and operates under the assumption that taxa richness will be higher in healthy streams and lower in streams of poor health. The composition of macroinvertebrate abundances within taxa groups was included in this report. Taxa were for the most part placed into Class and Order groups.

The composition of macroinvertebrate abundance at the basic level is limited in its ability to indicate water body health. However, it can give an indication of the habitat and biological holding capacity of the waterways being studied. Taxa richness can be a useful tool for indicating the general health of a water body. However, it should be used with caution, as taxa numbers may be attributable to factors other than stream health and/or anthropogenic impacts. For example, taxa richness may increase with elevated levels of organic pollution and may not be a good indication that stream health is better than areas with lower levels of organic pollution.

17 Glossary

Item	Meaning
Abundance	The total number of individual specimens; in a sample, community, ecosystem etc.
Algae	Comparatively simple chlorophyll-bearing plants, most of which are aquatic and microscopic in size.
Alkalinity	The ability of a solution to neutralise acid (or buffer).
Ammonia	A colourless gas. In the aquatic environment, it exists in the relatively harmless form ammonium (NH4) and the toxic form ammonia (NH3).
Analyte	The physical and chemical parameters (indicators) to be measured.
Anthropogenic	Impacts on an environment that are produced or caused by humans
ANZECC	ANZECC is a forum for member governments to develop coordinated policies about national and international environment and conservation issues.
Catchment	The area that is drained by a river, lake or other water body.
Community	Assemblage of organisms characterised by a distinctive combination of species occupying a common environment and interacting with one another.
Concentration	The quantifiable amount of a chemical divided by the total volume of a mixture.
Conductivity	The measure of salt content in soil or water; it refers to the ability of the substance to transfer an electrical charge.
Dissolved Oxygen	The measurement of the concentration of oxygen that is dissolved in a water body.
Diversity (Biological)	The measure of the number and/or degree of available organisms in an environment.
Eutrophication	Enrichment of a water body with nutrients that results in increased aquatic plant growth and low oxygen levels.
Faecal Coliforms	Bacteria which inhabit the intestines of humans and other vertebrates and are present in faeces. Used as a primary indicator of sewage pollution in the environment.
Guideline (water quality)	Concentration limit or narrative statement recommended to support and maintain a designated water use.
Habitat	The place where a population lives and its surroundings, both living and non-living.
Indicator	A parameter (chemical, biological or geological) that can be used to provide a measure of the quality of water or the condition of an ecosystem.
Macroinvertebrate (Aquatic)	Animals without backbones that when mature are greater than 1 millimetre; live in the water column, on the water surface or on the bottom of a waterway.
Nitrogen (Aquatic)	An element that is essential for plant and animal growth, it occurs in three forms Nitrate, Nitrite and ammonium.
Nutrients	Compounds required for growth by plants and other organisms. Major plant nutrients are phosphorus and nitrogen.

Item	Meaning
pH	A measure of the degree of acidity or alkalinity; expressed on a logarithmic scale of 1 to 14 (1 is most acid, 7 neutral and 14 most alkaline).
Phosphorus	Is an element that is essential for plant and animal growth, excess concentrations can lead to eutrophication.
Physico-Chemical (Aquatic)	The measure and relationship between the physical and chemical identities of a water body.
Sensitive organism	An organism that's survival is highly susceptible to shifts in environmental conditions.
Sewage	The wastewater from homes, offices, shops, factories and other premises discharged to the sewer. Is usually 99% water.
SIGNAL SF	SIGNAL (Stream Invertebrate Grade Number Average Level) is a biotic index using aquatic macroinvertebrates to assess stream health.
Stormwater	Rainwater that runs off the land, frequently carrying various forms of pollution such as litter and detritus, animal droppings and dissolved chemicals. This untreated water is carried in stormwater channels and discharged directly into water bodies.
Stormwater system	The system of pipes, canals and other channels used to carry stormwater to bodies of water, such as rivers or oceans. The system does not usually involve any significant form of treatment.
Tolerant organism	Is an organism that can survive in highly variable environmental conditions.
Turbidity	A measure of the amount of suspended solids (usually fine clay or silt particles) in water and thus the degree of scattering or absorption of light in the water.

18 Acronyms and abbreviations

Acronyms/ Abbreviation	Meaning
ANZECC	Australian and New Zealand Environment and Conservation Council
CFU	Colony Forming Unit
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
SIGNAL SF	Stream Invertebrate Grade Number Average Level – Sydney Family
µg/L	Micrograms per litre
µS/cm	Micro-siemens per centimetre (unit of conductivity)