

Performance of the Paraparaumu Wastewater Treatment Plant

Council operates the Paraparaumu Wastewater Treatment Plant (PWWTP) under the WGN970255 resource consent. The consent requires Council to achieve a standard of effluent water quality before it discharges into the Mazengarb.

Condition 18 sets out what Greater Wellington expects for the PWWTP effluent Water quality:

- (18) After 31 March 2002, the permit holder shall sample the treatment plant effluent at the sample point provided in condition 12 and the following effluent sampling quality criteria shall apply:
- (a) Based on no fewer than 12 flow proportioned 24-hour composite samples per month (3 of which must be taken during a weekend) the quality of the effluent shall meet the following standards:
 - (i) BOD5: Geometric mean of 15 grams per cubic metre and no more than 1 sample of the 12 monthly samples shall exceed 25 grams per cubic metre.
 - (ii) Suspended Solids: Geometric mean of 15 grams per cubic metre and no more than 1 sample of the 12 monthly samples shall exceed 25 grams per cubic metre.
 - (b) Based on no fewer than 12 representative samples per month (such samples shall be taken on separate days within that month between the hours of 10.00 am and 5.00pm and three of which must be taken during a weekend) the effluent shall meet the following standard:

- (i) Faecal Coliform Bacteria: Geometric mean of 200 per 100 millilitres and no more than 1 sample of the 12 samples in each month shall exceed 5000 per 100 millilitres.
- (ii) The acidity or alkalinity of the effluent as measured by pH shall be kept within the range of 6.0 to 9.0.
- (c) Based on 36 consecutive and representative samples collected at rates of no fewer than 6 samples per month and 1 per week (all samples shall be taken on separate days and between the hours of 10.00 am and 5.00 pm and at least four samples shall be taken on separate weekends), the effluent shall meet the following standards:
 - No more than 3 samples of the 36 consecutive samples shall exceed 3.6g/m³ total ammonia as nitrogen.
 - No sample shall exceed 30g/m³ nitrate (measured as N).

The permit holder shall also analyse the samples collected for clause (c) for dissolved reactive phosphorus, g/m³ as P, and total phosphorus, g/m³ as P.

- (d) Based on 36 consecutive and representative samples collected at a rate of no fewer than 12 samples per month (such samples shall be taken on separate days within that month between the hours of 10.00 am and 5.00pm and three of which must be taken during a weekend) the effluent shall meet the following standard:

Dissolved Oxygen: No more than 3 samples of the 36 consecutive samples shall fall below 5 parts per million.

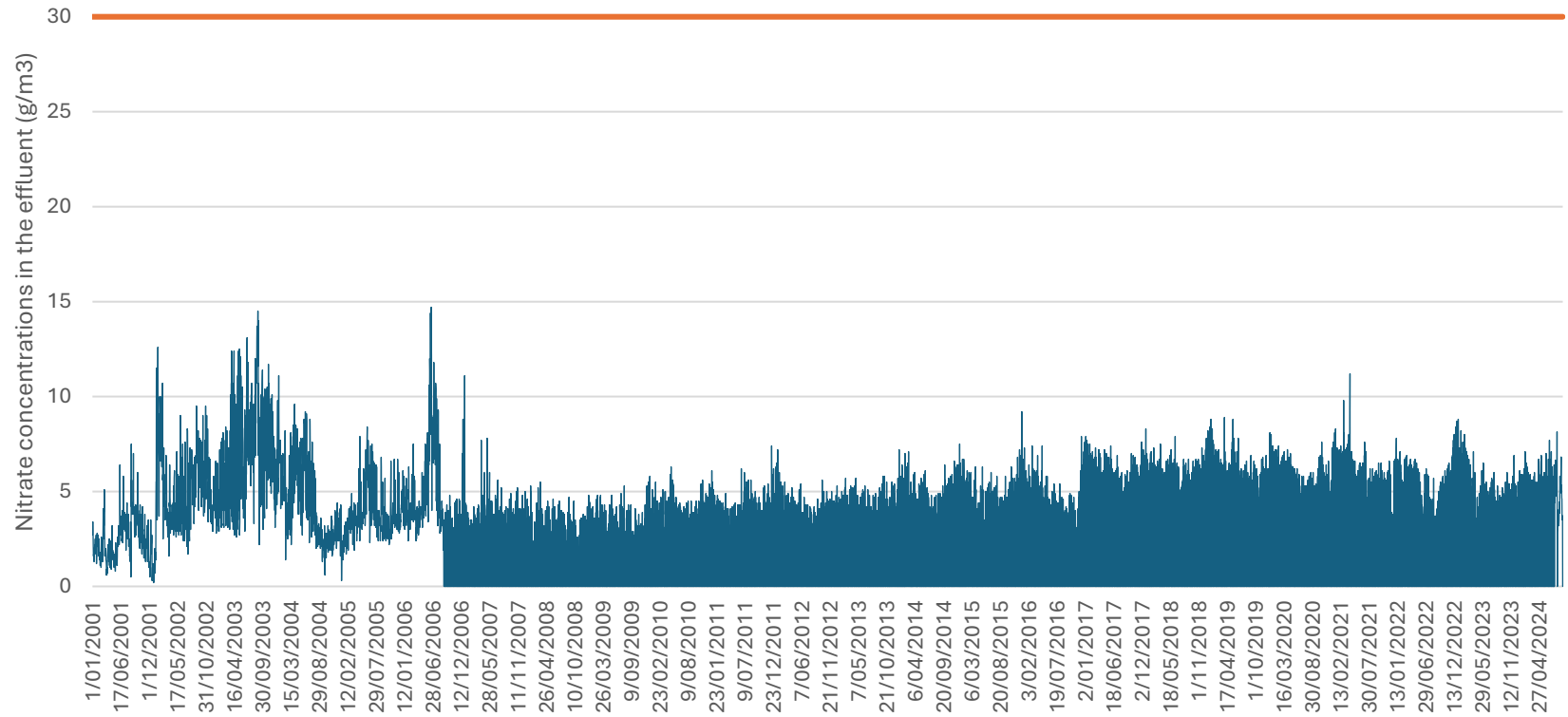
(e) Based on no fewer than 1 flow proportioned 24-hour composite sample per month, or at such frequency as directed by the Manager, Consents Management, Wellington Regional Council, the effluent shall meet the following standard:

- Arsenic (III) 0.01 g/m³
- Copper as the element 0.01 g/m³
- Chromium (VI) 0.01 g/m³
- Cadmium as the element 0.004 g/m³
- Nickel as the element 0.1 g/m³
- Mercury as the element 0.0002 g/m³
- Lead as the element 0.01 g/m³
- Zinc as the element 0.10 g/m³

The following pages show how the plant performed from 2012 to date against the consent conditions.

Dissolved Oxygen - WGN970255 Condition 18e - No more than 3 samples of 36 shall fall below 5 parts per million.

PWWTP performance for reducing Nitrates in the effluent

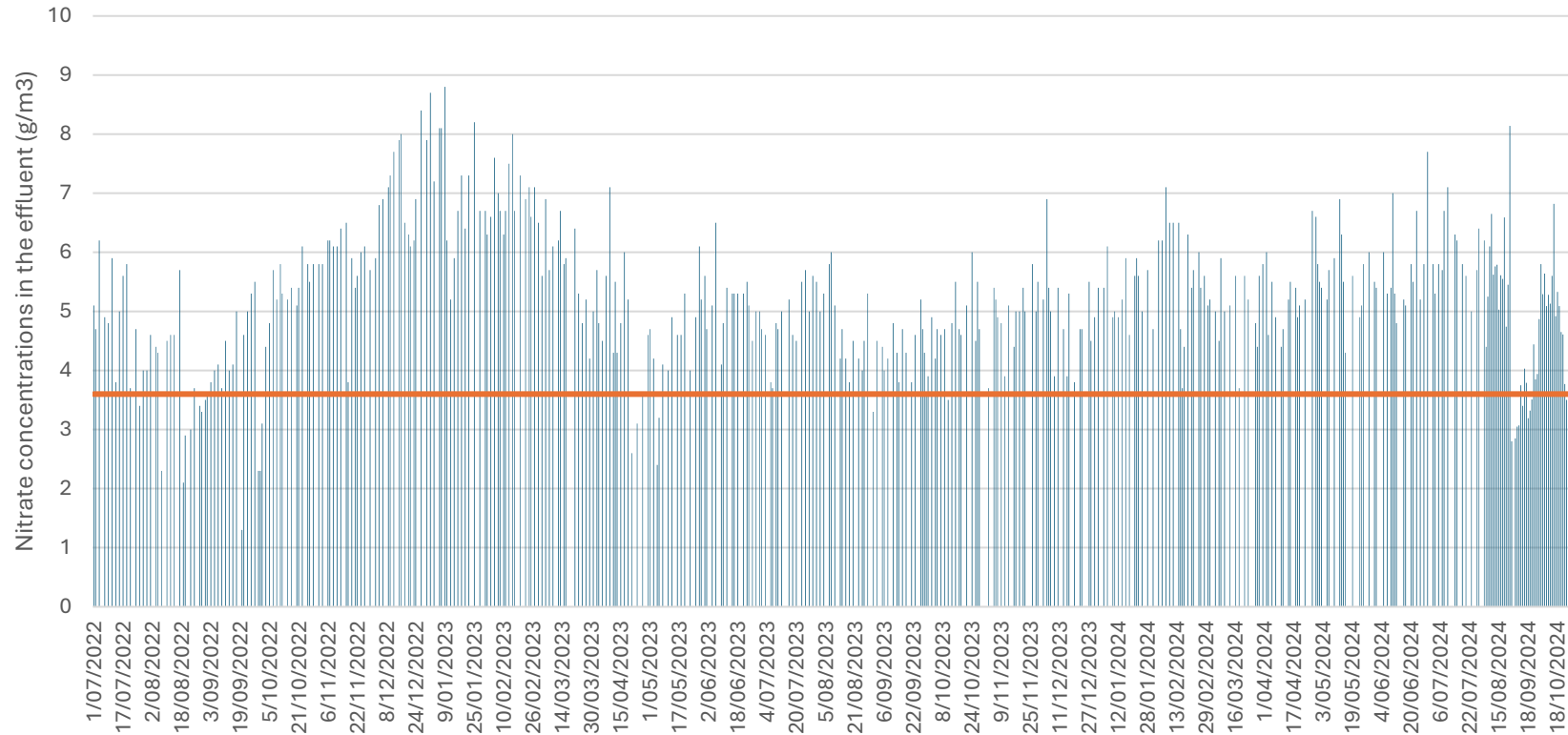


The current consent requires only three of the 36 samples over three months may exceed 30g/m³ of nitrates in the effluent. The plant has never exceeded this condition once.

— EFF NitraN - Adjusted Result

— EFF NitraN - Sum of NitraN Limit (g/m³)

Efforts to reduce nitrates further for new consent conditions

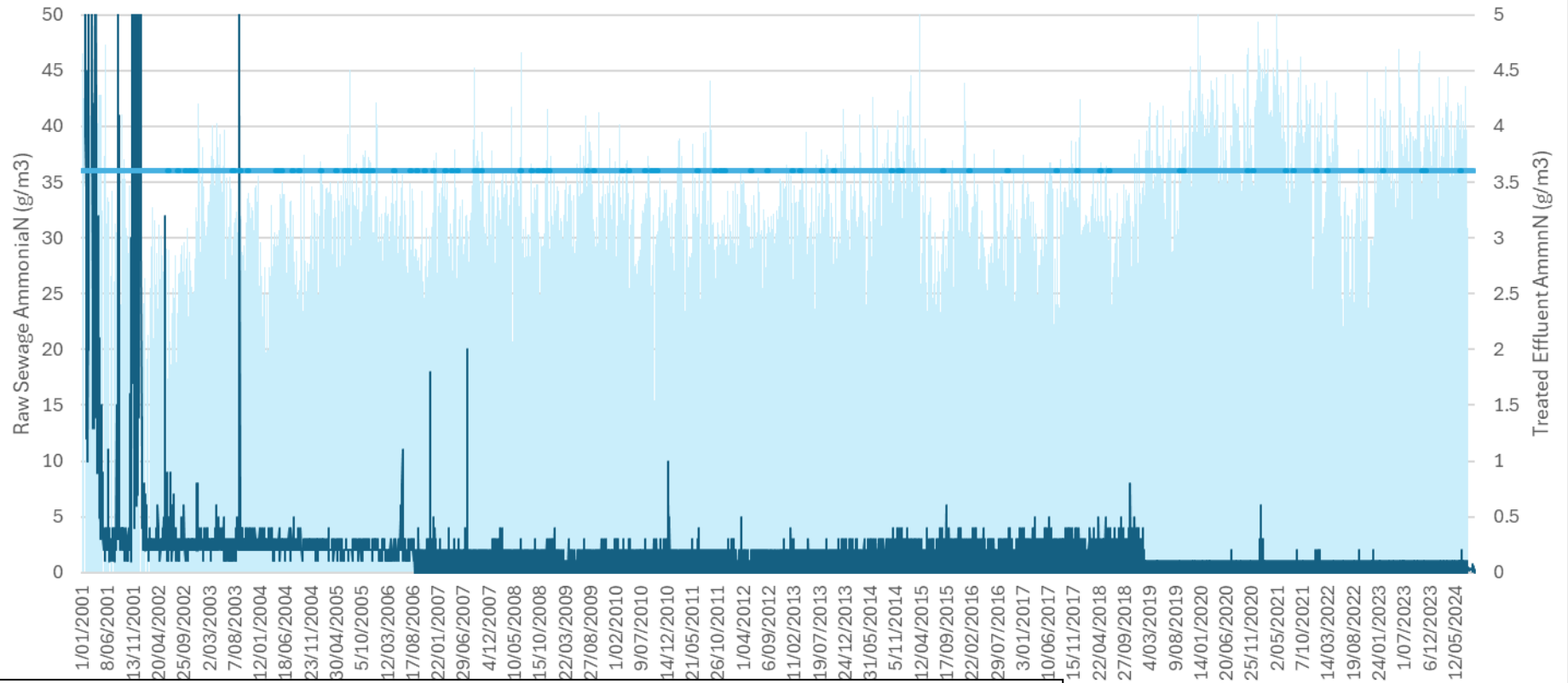


In January 2023, Council trialled a refinement to the treatment processes to reduce the Nitrates further. Council noticed a further reduction of around 1 g/m³. Council made the trials permanent, and processes now changed. After upgrading Air Recycling pumps over Nov 24- Dec 24, Council confident of achieving further reduction. The orange line shows the likely new Nitrate limit.

EFF NitraN - Adjusted Result
EFF NitraN - Sum of New Nitrate Level

Adjusted Result AmmnN Limit (g/m3)

PWWTP performance for reducing AmmnN



The consent requires no more than 3 of the 36 samples taken each three months may exceed 3.6g/m3 levels of ammonia in the effluent. The graph shows since the early configuring of the plant in 2000-2002 never exceed this condition. The nitrate trials held in 2023 also improved performance of plant to reduce Ammonia. Further trials possible after the completion of Activated sludge Recycling system which is underway.

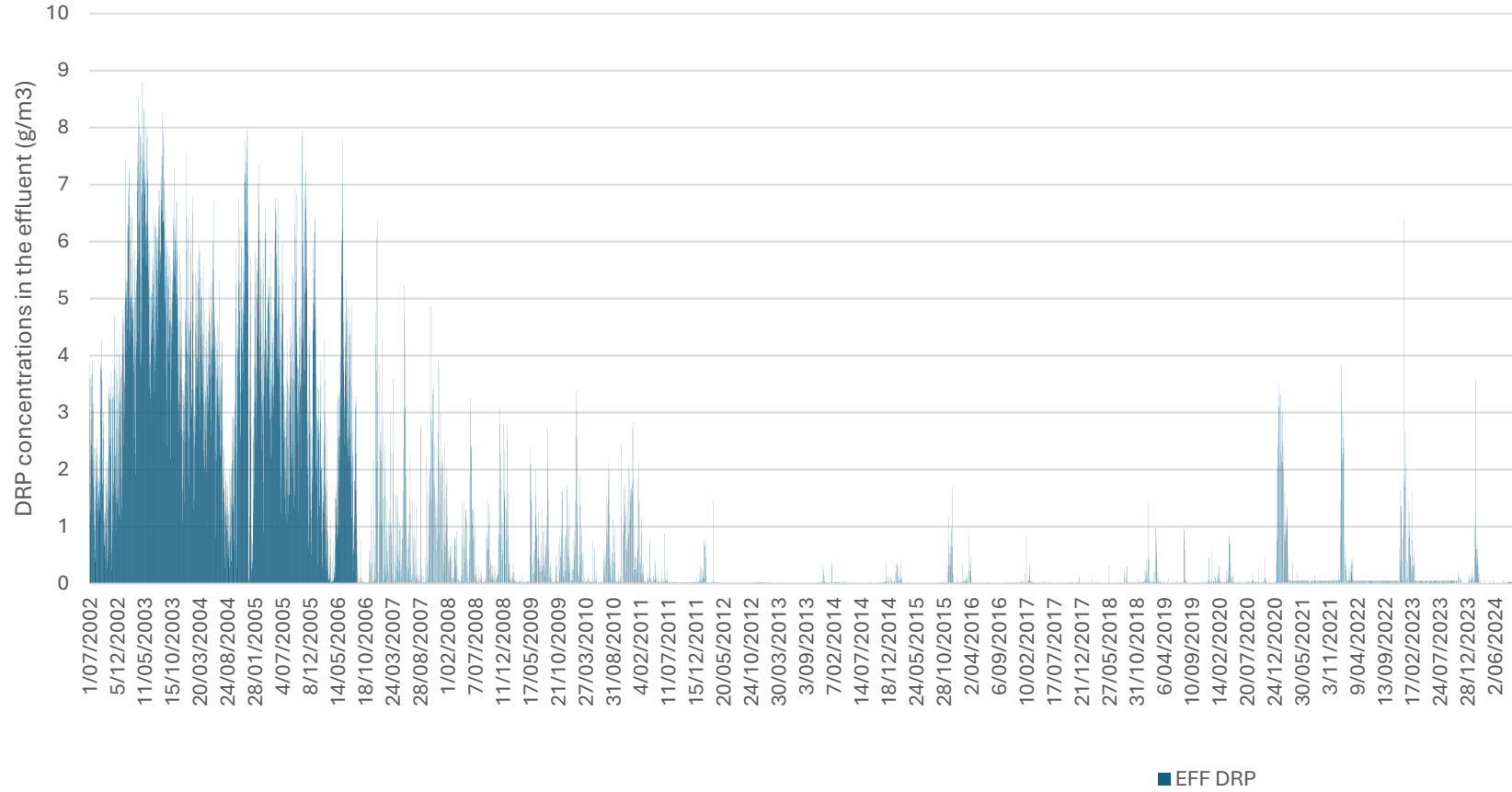
Attribute

Values

- Raw CompAmmN - Adjusted Result
- EFF AmmnN - Adjusted Result
- EFF AmmnN - AmmnN Limit (g/m3)

Raw SampleDate

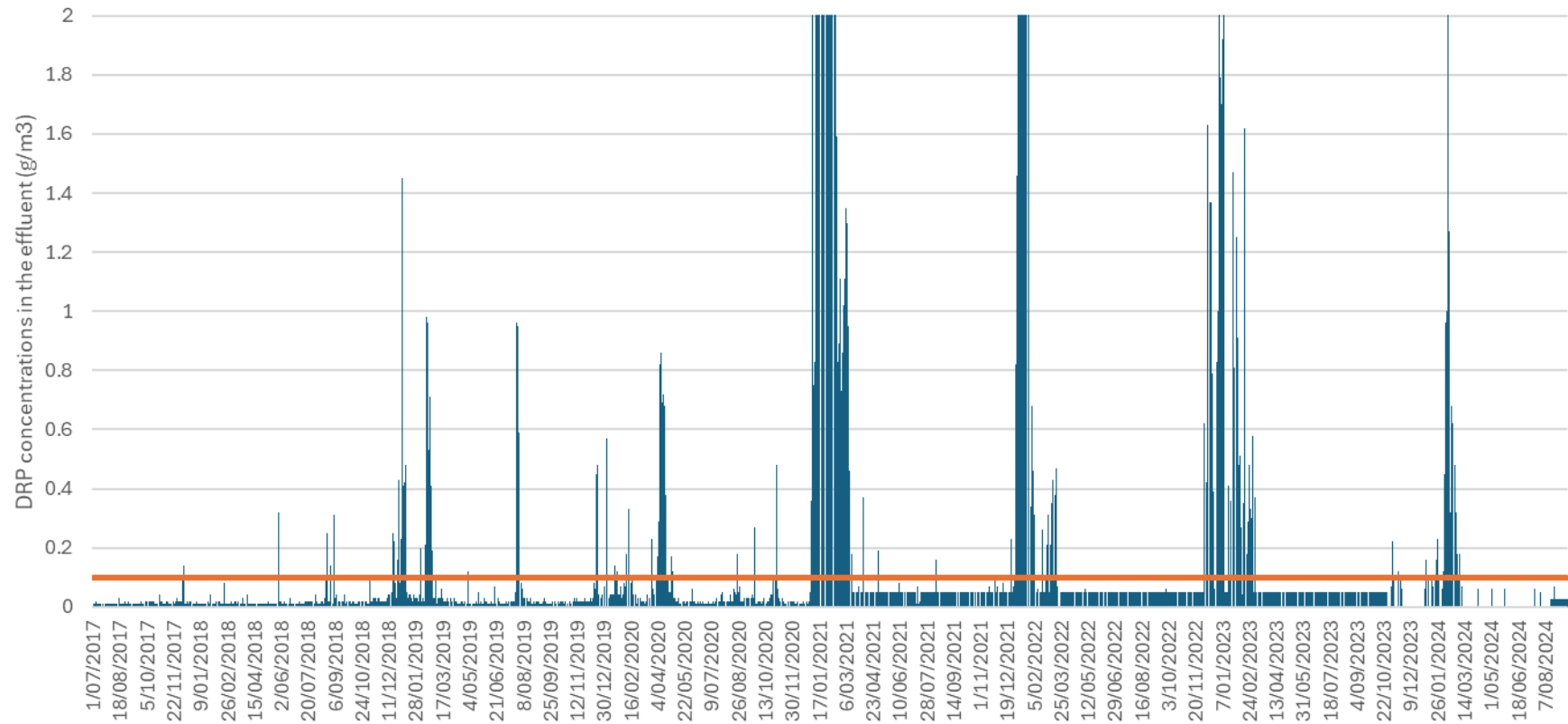
PWWTP performance in reducing Dissolved Reactive Phosphorous (DRP)



FY

Adjusted Result Sum of New DRP Limit

PWWTP performance in reducing Dissolved Reactive Phosphorous (DRP)



It is observed that during the summer period there is a spike in DRP, options to mitigate is being looked into. Any possible upgrade could be after the completion of the ongoing upgrade works and pending resource consent decision.

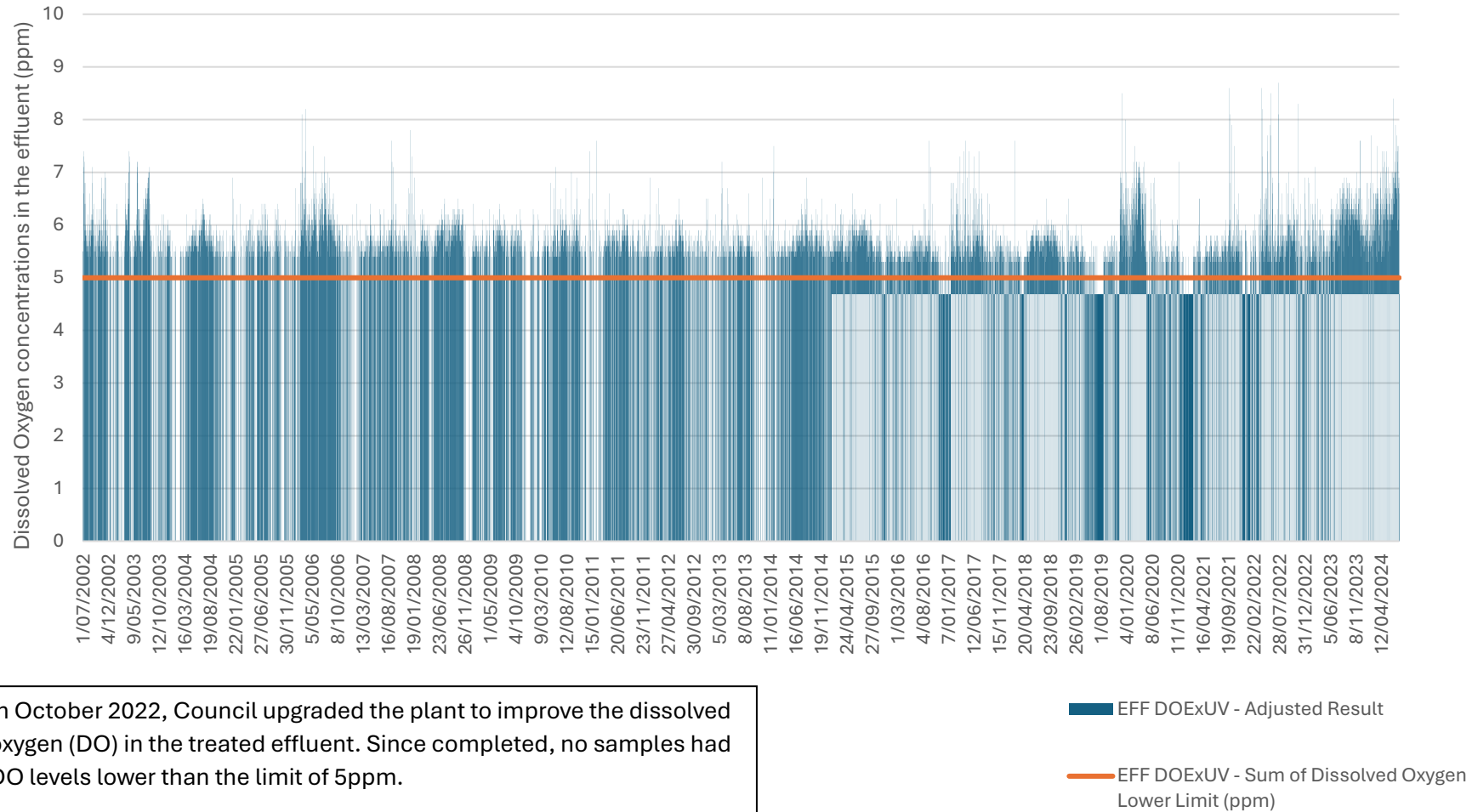
Attribute

Values

- EFF DRP - Adjusted Result
- EFF DRP - Sum of New DRP Limit

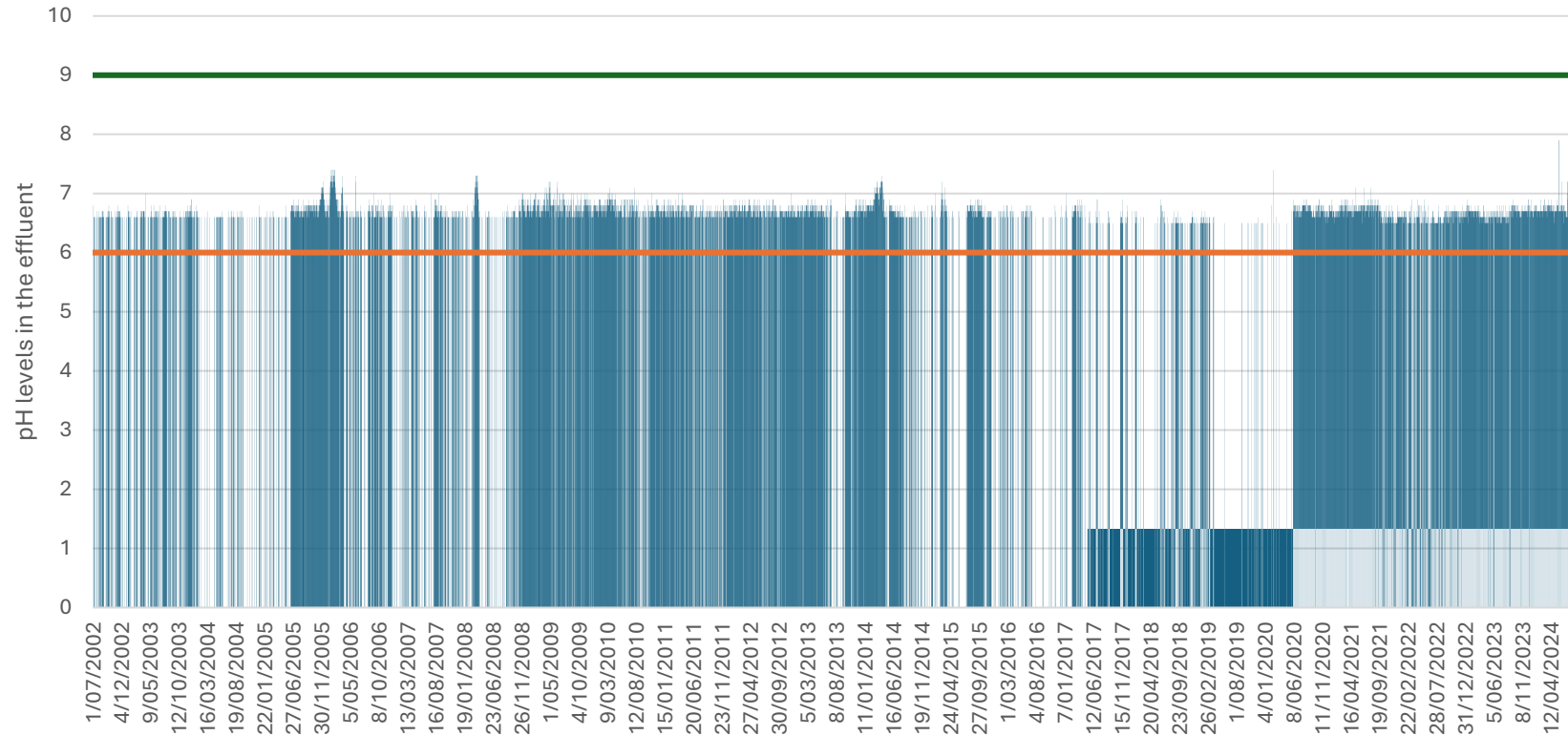
Raw SampleDate

PWWTP performance in improving Dissolved Oxygen levels in the treated effluent



In October 2022, Council upgraded the plant to improve the dissolved oxygen (DO) in the treated effluent. Since completed, no samples had DO levels lower than the limit of 5ppm.

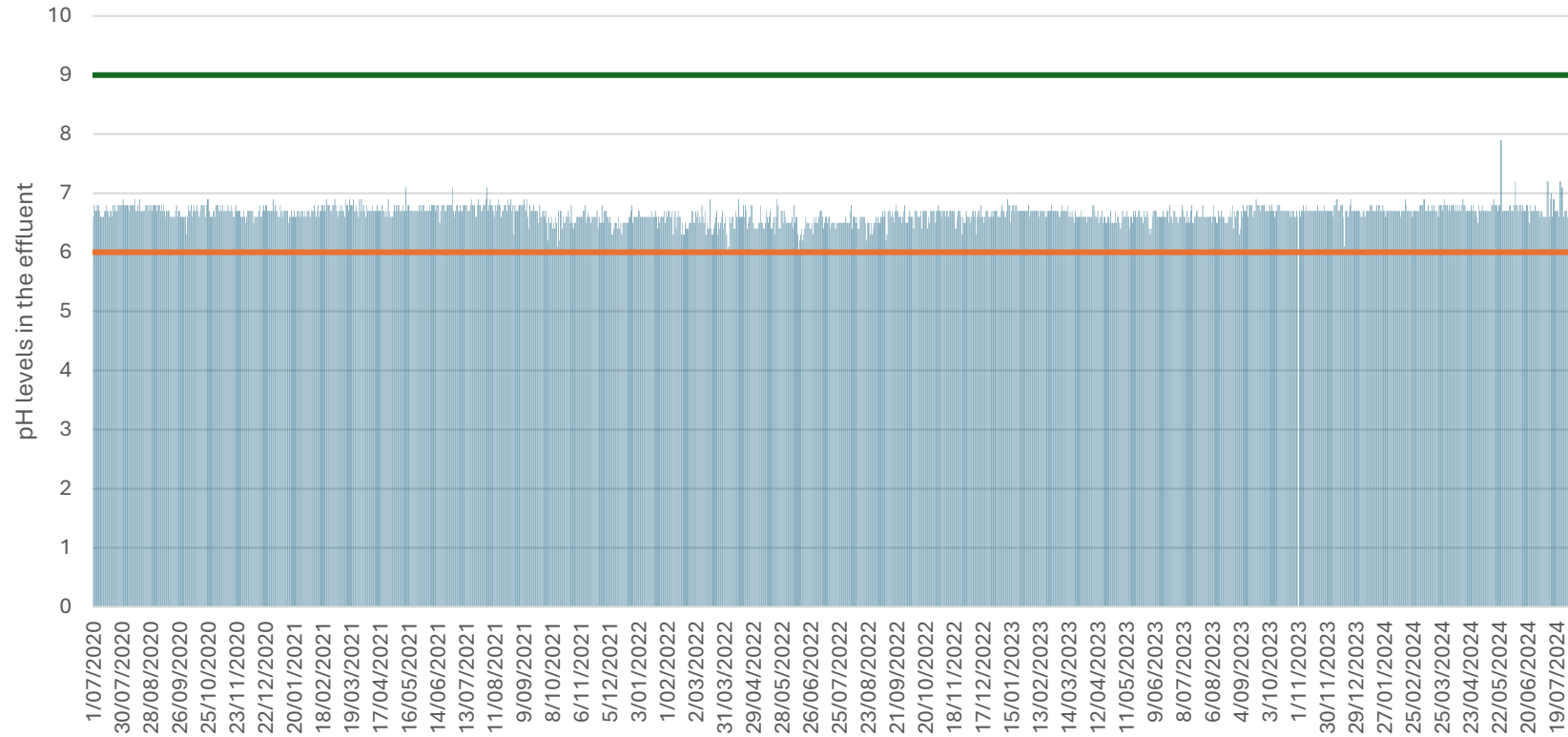
Efforts to improve the pH of the treated effluent from the PWWTP



In October 2024, Council commissioned the new plant to improve the pH of the treated effluent. Recent samples show the effluent averaging levels slightly higher than the neutral level of 7 (averaging 7.3).

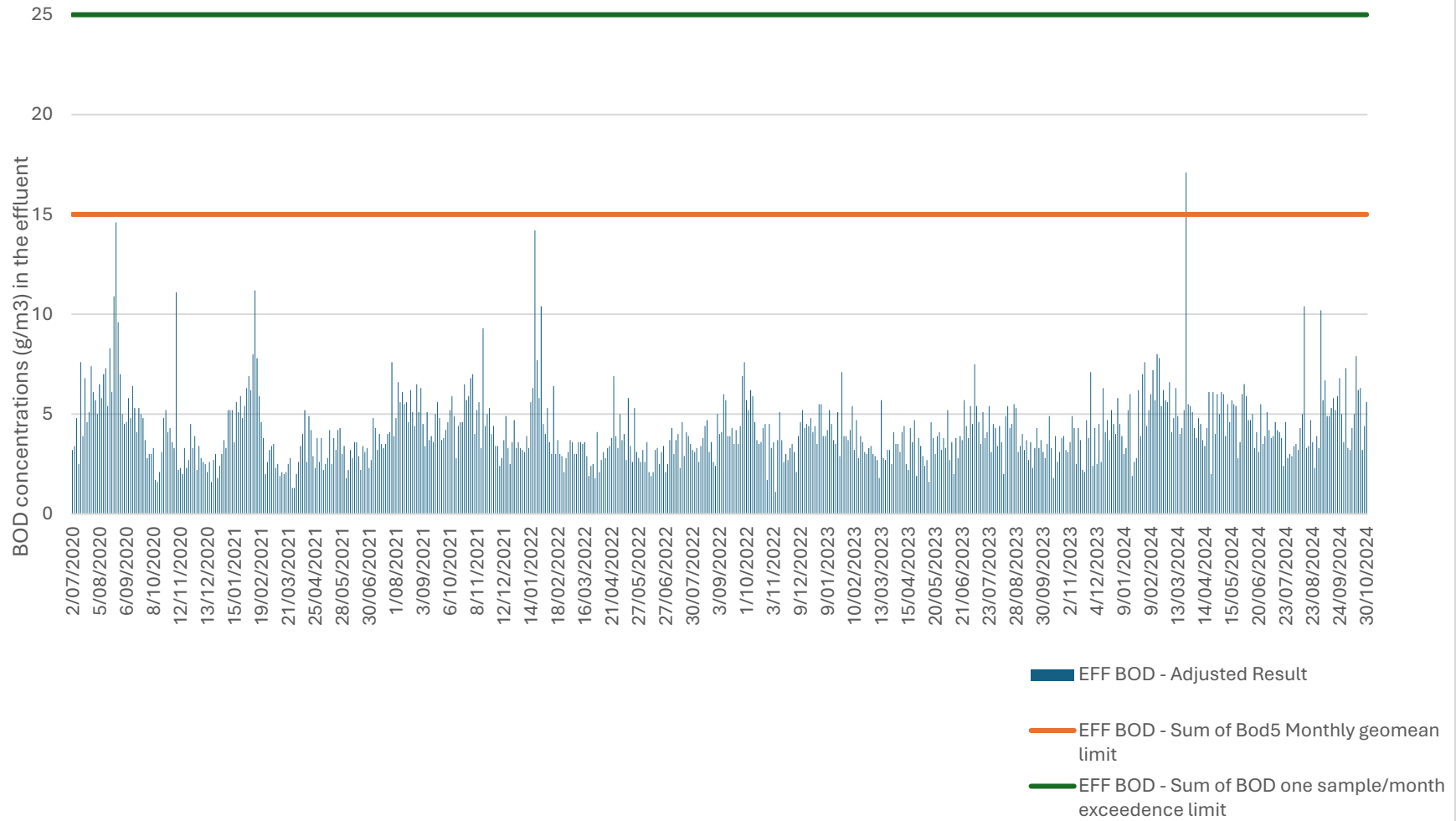
- EFF pH - Adjusted Result
- EFF pH - Sum of pH lower limit
- EFF pH - Sum of pH upper limit

Efforts to improve the pH of the treated effluent from the PWWTP



- EFF pH - Adjusted Result
- EFF pH - Sum of pH lower limit
- EFF pH - Sum of pH upper limit

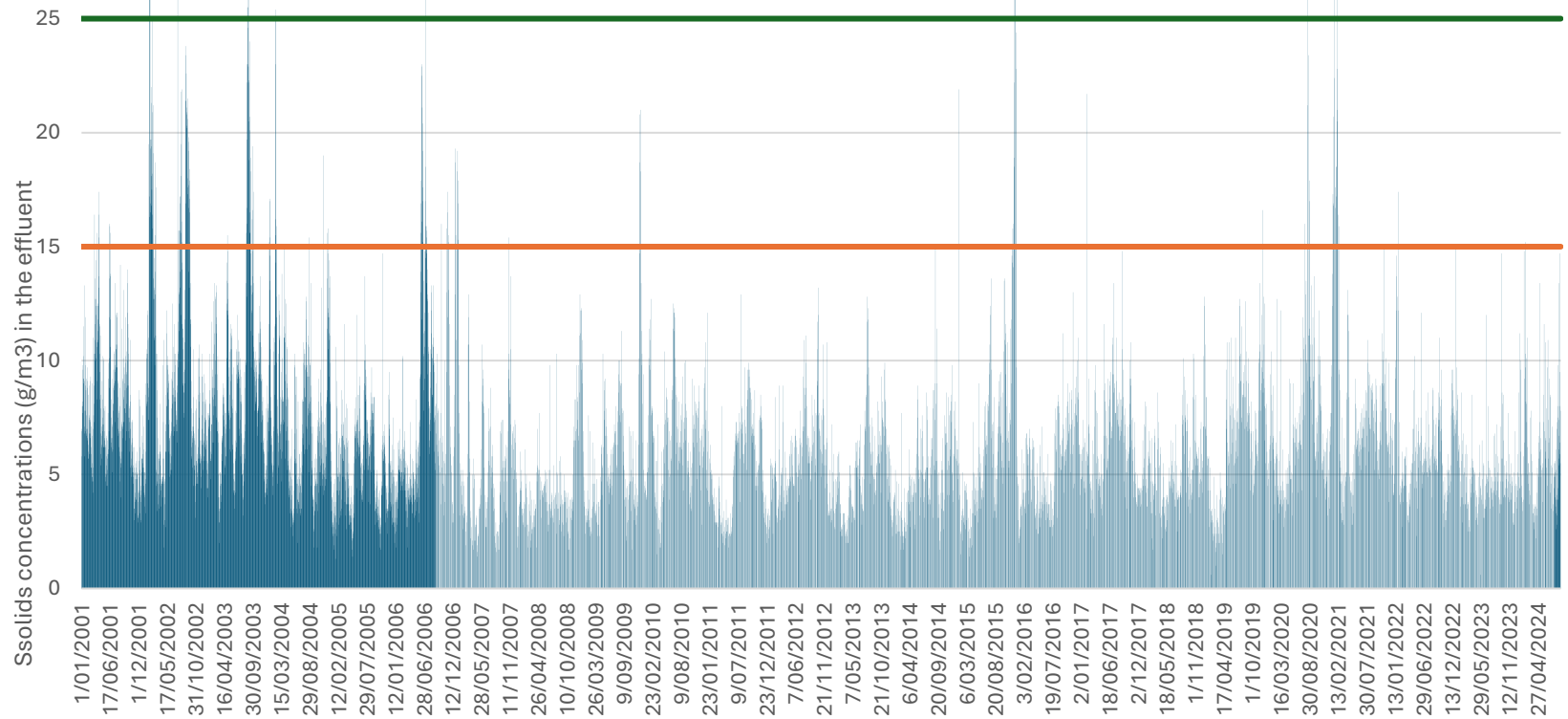
PWWTP Biological Oxygen Demand Levels (BOD) in the treated Effluent



Financial Year	95 th percentile BOD5 (g/m3)	Number times BOD exceeded 15 g/m3 each year	Number of year BOD samples exceed 25g/m3 each year
2002/2003	11.37	0	0
2003/2004	12.57	2	0
2004/2005	7.14	0	0
2005/2006	10.07	2	0
2006/2007	9.50	1	0
2007/2008	6.99	0	0
2008/2009	6.79	0	0
2009/2010	7.36	0	0
2010/2011	5.60	0	0
2011/2012	5.99	1	0
2012/2013	6.00	0	0
2013/2014	5.27	0	0
2014/2015	6.80	0	0
2015/2016	7.27	2	0
2016/2017	5.39	0	0
2017/2018	4.79	0	0
2018/2019	5.30	0	0
2019/2020	6.69	1	0
2020/2021	7.77	0	0
2021/2022	6.77	0	0
2022/2023	5.70	0	0
2023/2024	6.94	1	0
2024/2025	7.690	0	0

This table shows the values where 95% of all results either are equal or less than the results shown.

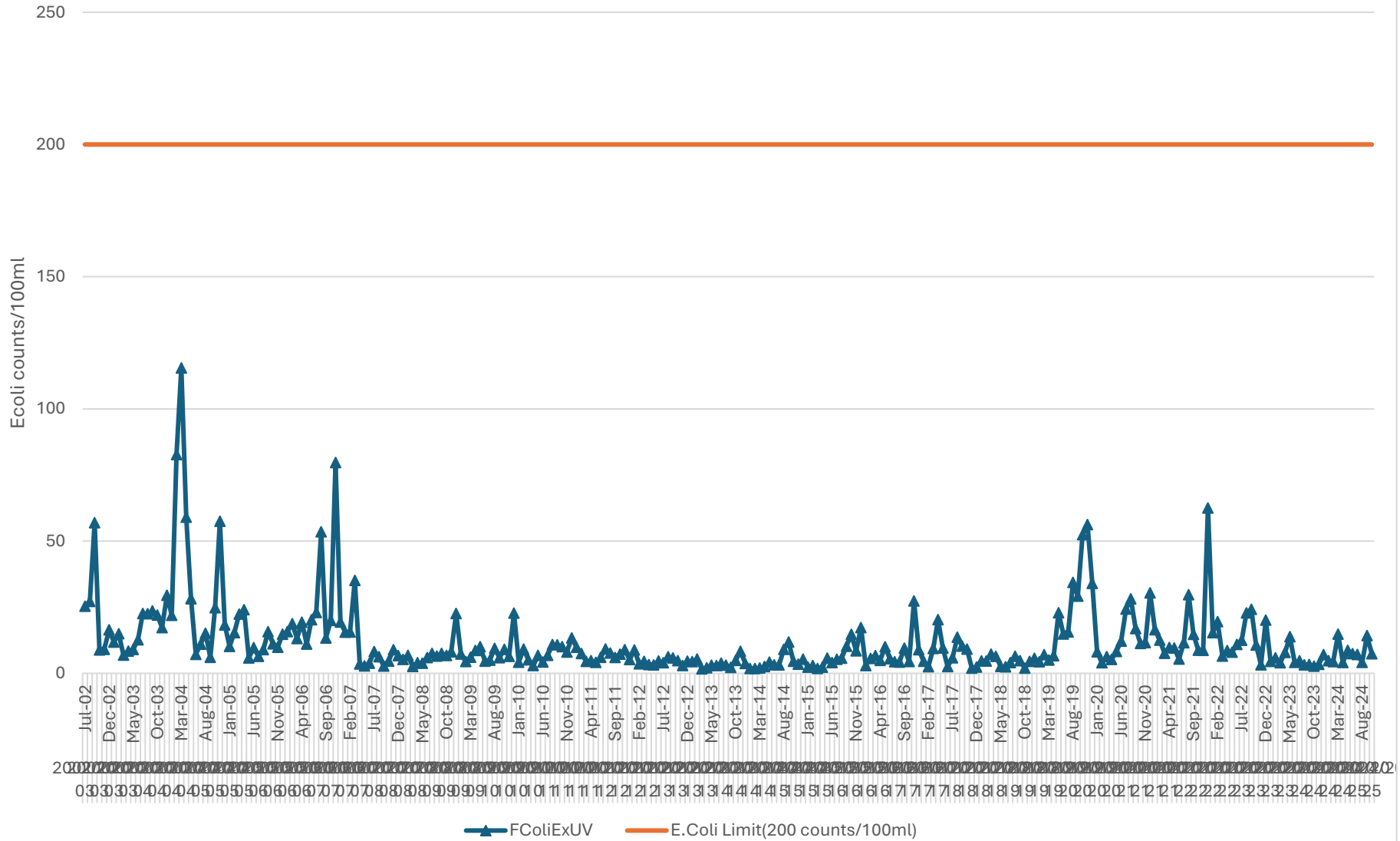
PWWTP Suspended Solids Levels (SSolids) in the treated Effluent



- Eff EFF SSolids - Adjusted Result
- Eff EFF SSolids - Sum of Ssolids monthly limit
- Eff EFF SSolids - Sum of Ssolids one sample/month exceedence limit

	Suspended Solids (g/m3)	Number times SS exceed 15 g/m3/year	Number of times in a year SS samples exceed 25g/m3
2002/2003	19.04	41	0
2003/2004	19.63	41	0
2004/2005	11.76	4	0
2005/2006	12.04	13	0
2006/2007	16.23	22	1
2007/2008	8.43	1	0
2008/2009	9.92	0	0
2009/2010	12.11	4	0
2010/2011	9.21	0	0
2011/2012	8.81	0	0
2012/2013	9.33	0	0
2013/2014	8.92	0	0
2014/2015	8.61	2	0
2015/2016	15.80	10	1
2016/2017	9.21	1	0
2017/2018	9.41	0	0
2018/2019	10.11	0	0
2019/2020	12.01	1	0
2020/2021	20.51	23	3
2021/2022	10.92	1	0
2022/2023	8.70	0	0
2023/2024	10.80	1	0
2024/2025	8.710	0	0

Ecoli presence in the PWWTP effluent (July 2002 - August 2024)



Faecal Coliforms cfu/100mls (geo mean)	
2002/2003	88.800
2003/2004	258.750
2004/2005	143.200
2005/2006	72.000
2006/2007	130.200
2007/2008	23.000
2008/2009	36.550
2009/2010	28.000
2010/2011	26.000
2011/2012	20.000
2012/2013	12.000
2013/2014	13.800
2014/2015	35.000
2015/2016	64.750
2016/2017	80.200
2017/2018	31.800
2018/2019	39.600
2019/2020	129.750
2020/2021	67.000
2021/2022	94.000
2022/2023	39.600
2023/2024	19.300
2024/2025	34.650