



Annual Audit Compliance Report Form
Environmental Protection Act 1986, Part V Division 3

Once completed, please submit this form either via email to info@dwer.wa.gov.au, or to the below postal address:

Department of Water and Environmental Regulation
Locked Bag 10
Joondalup DC WA 6919

Section A – Licence details			
Licence number:	L9166/2018/1	Licence file number:	DER2018/000550-1
Licence holder name:	CW Water Management Group Pty Ltd		
Trading as:	Yelverton Bio Industries		
ACN:	167 178 627		
Registered business address:	26 Brown Street, Busselton		
Reporting period:	6 / 12 / 2019 to 6 / 12 / 2020		

Section B – Statement of compliance with licence conditions
Did you comply with all of your licence conditions during the reporting period? (please tick the appropriate box)
<input checked="" type="checkbox"/> Yes – please complete: <ul style="list-style-type: none"> • section C; • section D (if required); and • sign the declaration in Section F.
<input type="checkbox"/> No – please complete: <ul style="list-style-type: none"> • section C; • section D (if required); • section E; and • sign the declaration in Section F.

Section C – Statement of actual production	
Provide the actual production quantity for this reporting period. Supporting documentation is to be attached.	
Prescribed premises category	Actual production quantity
61	4,796,500 L

Section D – Statement of actual Part 2 waste discharge quantity	
Provide the actual Part 2 waste discharge quantity for this reporting period. Supporting documentation is to be attached.	
Prescribed premises category	Actual Part 2 waste discharge quantity
61	4,922,890 L

Section F – Declaration

I / We declare that the information in this Annual Audit Compliance Report is true and correct and is not false or misleading in a material particular¹.

I / We consent to the Annual Audit Compliance Report being published on the Department of Water and Environmental Regulation's (DWER) website.

Signature ² :		Signature:	
Name: (printed)		Name: (printed)	
Position:		Position:	
Date:	29.1.2021	Date:	
Seal (if signing under seal):			

¹ It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular.

² AACRs can only be signed by the licence holder or an authorised person with the legal authority to sign on behalf of the licence holder.

Yelverton Bio Industries – L9166/2018/1

Annual Monitoring and Environmental Report

Reporting Period: December 2019 to November 2020

To accompany the Annual Audit Compliance Report

Monitoring

Condition 8

All sampling of groundwater was undertaken in accordance with AS/NZS 5667.11

Condition 9

All water samples required in Schedule 3 were submitted to ARL. ARL maintains current NATA registration for the analysis specified. Analysis reports are available on request.

Condition 10

This report has been completed to satisfy Condition 11 of the current Department of Water and Environmental Protection Licence L9166/2018/1.

Condition 11

a) Assessment of the Monitoring Results against Licence Limits for the Period;

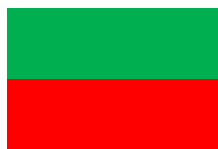
Irrigation water and groundwater monitoring results are provided in Tables 1, 2 and 3. No specific licence limits are provided in the licence to be used as comparison for monitoring results onsite.

Table 1: Irrigation Water Monitoring Results

Month	Sample No	Date Sampled	ARL Job No	pH	Total Elemental Phosphorus	Total Elemental Nitrogen	Biochemical Oxygen Demand	Total Suspended Solids	Total Chlorine	E. Coli
				pH Units	mg/L	mg/L	mg/L	mg/L	mg/L	CFU/50mL
				6.5-8.5	27	149		<30	0.2-2.0	<1000
December	WQ2054	18/12/2019	19-21832	8.0	22	130	6	19	3.0	<1
January	WQ2062	29/01/2020	20-01782	7.7	14	92	310	30	0.0	17,000
February	WQ2066	19/02/2020	20-03290	7.9	15	150	410	80	3.0	<1
March	WQ2071	25/03/2020	20-05665	7.9	25	58	<5	15	0.2	<1
April	WQ2076	29/04/2020	20-07572	8.3	13	23	<5	13	0.5	<1
May	WQ2077	27/05/2020	20-09409	8.1	19	160	<5	27	0.5	54
June	WQ2078	24/06/2020	20-10996	7.9	29	180	19	59	2.5	<1
July	WQ2083	29/07/2020	20-13136	8.2	18	150	<5	18	1.0	<1
August	WQ2090	26/08/2020	20-14817	8.01	24	270	<5	68	0.5	<1
September	WQ2091	23/09/2020	20-16685	7.90	20	160	<5	16	1	>2,400
October	WQ2097	28/10/2020	20-18988	8.05	5.4	240	<5	14	1.5	<1
November	WQ2098	2/12/2020	20-21484	7.92	1.6	270	<5	26	3	<1

Table 2: Groundwater Depth Monitoring

	Dec	March	June	Sept
Piezometer No.	2019	2020	2020	2020
1	Green	Green	Green	Green
2	Green	Green	Green	Green
3	Green	Green	Green	Green
4	Green	Green	Green	Red
5	Green	Green	Green	Red
6	Green	Green	Green	Green
7	Green	Green	Green	Red
8	Green	Green	Green	Red
9	Green	Green	Green	Red
10	Green	Green	Green	Red
11	Green	Green	Green	Red



More than 2m separation
Less than 2m separation

Table 3: Groundwater Monitoring Results

	Units	Bore 1				Bore 2				Bore 3				Bore 4			
		Dec-19	Mar-20	Jun-20	Sep-20	Dec-19	Mar-20	Jun-20	Sep-20	Dec-19	Mar-20	Jun-20	Sep-20	Dec-19	Mar-20	Jun-20	Sep-20
pH	pH Units	6.4	6.5	5.8	6.3	7.2	6.5	6.7	7.02	7.6	6.9	7	7.1	6.2	4.7	4.6	5.14
Total Residual Chlorine	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Biochemical Oxygen Demand	mg/L				<5				<5				<5				<5
Total Dissolved Solids	mg/L	130	130	250	160	260	130	530	380	560	410	250	610	280	280	350	310
Total Nitrogen	mg/L	0.4	0.4	0.6	0.5	1.1	0.7	0.7	0.6	4.1	1.8	7.9	3	0.9	0.5	0.4	1.6
Total Phosphorus	mg/L	0.04	0.14	0.06	0.02	0.2	0.14	0.19	0.05	0.73	0.56	0.34	0.24	0.07	0.06	0.5	0.01
Aluminium	mg/L				0.03				<0.01				0.35				1
Arsenic	mg/L				<0.001				<0.001				0.001				<0.001
Cadmium	mg/L				<0.0001				<0.0001				<0.0001				<0.0001
Cobalt	mg/L				<0.001				<0.001				<0.001				<0.001
Chromium	mg/L				0.002				0.001				0.002				0.02
Copper	mg/L				<0.001				<0.001				0.001				<0.001
Iron	mg/L				0.03				<0.01				0.15				0.03
Mercury	mg/L				<0.0001				<0.0001				<0.0001				<0.0001
Manganese	mg/L				<0.01				<0.01				<0.01				0.01
Molybdenum	mg/L				<0.001				<0.001				<0.001				<0.001
Nickel	mg/L				<0.001				<0.001				0.002				<0.001
Lead	mg/L				<0.001				<0.001				<0.001				0.002
Vanadium	mg/L				<0.01				<0.01				<0.01				<0.01
Zinc	mg/L				0.011				<0.005				0.012				0.007
Fluoride	mg/L				0.1				0.2				0.8				0.2

b) Cumulative Monthly Volumes of Treated Effluent Discharged to the Irrigation Areas;

Monthly and the cumulative volumes of effluent discharged to the irrigation area are provided in Table 4.

Table 4: Irrigation Volumes

WQ2 - Discharge Volumes		
	Discharged Volume	Cumulative Discharge Volume
Month	(L)	(L)
December	185,500	185,500
January	182,636	368,136
February	177,229	545,365
March	214,120	759,485
April	770,166	1,529,651
May	821,217	2,350,868
June	1,125,679	3,476,547
July	470,870	3,947,417
August	189,770	4,137,187
September	282,733	4,419,920
October	237,589	4,657,509
November	265,381	4,922,890
	Total	4,922,890

c) **Calculation of the Annual Nutrient Loading Rates Applied to the Irrigation Areas**

Annual nutrient loading rates applied for reporting period over the 16.4ha irrigation area are provided in Table 5.

Table 5: Annual Nutrient Loading Rates

Month	Volume (L)	Nitrogen			Phosphorus		
		TN (mg/L)	Applied N (kg)	Cumulative Applied N (kg)	TP (mg/L)	Applied P (kg)	Cumulative Applied P (kg)
December	185,500	130	24.1	24	22	4.1	4.1
January	182,636	92	16.8	41	14	2.6	6.6
February	177,229	150	26.6	68	15	2.7	9.3
March	214,120	58	12.4	80	25	5.4	14.6
April	770,166	23	17.7	98	13	10.0	25
May	821,217	160	131.4	229	19	15.6	40
June	1,125,679	180	202.6	432	29	32.6	73
July	470,870	150	70.6	502	18	8.5	81
August	189,770	270	51.2	554	24	4.6	86
September	282,733	160	45.2	599	20	5.7	92
October	237,589	240	57.0	656	5.4	1.3	93
November	265,381	270	71.7	727	1.6	0.4	93
Total	4,922,890 L			727 kg			93 kg
			Annual Nutrient Loading	34.8 kg/ha/yr	Annual Nutrient Loading	4.46 kg/ha/yr	
			DWER Licence Limit	50 kg/ha/yr	DWER Licence Limit	8.3 kg/ha/yr	

d) Assessment of actual plant growth against the total nutrient plant uptake;

The total nutrient loading to the irrigation area through wastewater application was very low, and in order to maintain flower production at commercial levels, additional nutrient application needs to be supplemented to achieve sustainable levels. Due to the mixed species over the flower farm, no data is available as to the total nutrient uptake by the plants other than what is provided in (e) and in (f).

e) Discussion of Total Nutrient Application Rates in relation to the estimated volume of nutrients exported (from harvested biomass) from the premises during the annual period

Due to the complexity of the crop that is removed from the site, including foliage, flowers and timber, it has been difficult to quantify the export of nutrients from the premise. In an attempt to do so, Western Horticultural Holdings were commissioned in July 2018 to collect vegetation samples in order to estimate of nutrients exported, with results summarised in Table 6.

Table 6: Biomass Removal Calculations

	Yield	Phosphorus	Nitrogen	Dry weight	Crop removal	Crop removal
Species	Stems per ha	%	%	g/stem	kg P/ha	kg N/ha
Poly gum	81481	0.1	1.6	330	27	430
Magnolia	95444	0.1	1.4	300	29	401
Viburnum	27778	0.19	1.9	181	10	96
Gold Cup	47228	0.08	0.93	122	5	54
				Average	17	245

This investigation concluded that approximately 245kg N/ha.yr and 17kg P/ha.yr was removed from site through the export of foliage and flowers. This data suggests that an application of TN in the order of 50kg/ha is likely to only partially satisfy the nutrient requirements of the vegetation, and as such unlikely to have a negative impact on the receiving environment

f) Breakdown in nutrient application during winter months to match growth rates as determined by plant tissue analysis for the first two years of operation.

Compared with almost all other crops, native flowers maintain a consistent growth rate throughout the year. This is shown by the constant crop factor for all months of the year (<https://www.agric.wa.gov.au/irrigation-calculator>, DPIRD, 2020) indicating are continuously in a growth phase, compared with annual and/or deciduous crops) and will maintain nutrient uptake throughout the year.

During winter of 2020, Leucadendron, which are grown in each irrigation area, were sampled and analysed for nitrogen and phosphorous, results of which are shown below. As can be seen, the Leucadendron plants are only partially satisfied from nitrogen requirements.

Table 7: Plant Tissue Analysis

Sample Number	Description	% N	Target %	Result	% P	Target %	Result
IA1084	Irrigation Area 1	0.76	1.00 - 2.20	Marginal	0.08	0.050 - 0.13	Normal
IA2085	Irrigation Area 2	0.76	1.00 - 2.20	Marginal	0.08	0.050 - 0.13	Normal
IA3086	Irrigation Area 3	1.01	1.00 - 2.20	Normal	0.12	0.050 - 0.13	Normal
IA4087	Irrigation Area 4	0.97	1.00 - 2.20	Marginal	0.24	0.050 - 0.13	Above normal
IA5088	Irrigation Area 5	1.1	1.00 - 2.20	Normal	0.25	0.050 - 0.13	Excess