

Dear Ben,

**RE: JUNE SHIRE COUNCIL SEWER TREATMENT PLANT CAPACITY –
192 WATERWORKS ROAD, JUNE**

June Shire Council wishes to advise that the sewer network capacity and associated Sewer Treatment Plant (STP) is considered to generally have adequate capacity to accept and process the additional load generated by the potential increase in residential area at 192 Waterworks Road.

Some upgrades may be required to extend the sewer from the site to a suitable location to facilitate the additional residential growth, however once connected, the STP will be able to treat this amount of additional residential input.

The STP was significantly upgraded in late 2020, including the construction of the following elements:

- *Inlet works comprising an inlet receival structure, spiral sieve mechanical screen, a manually cleaned bar screen downstream of the screen bypass pipe, a grit chamber, flow measurement flume unit and flow distribution structure. The inlet works has been designed to accept a maximum inflow of up to 199 L/s;*
- *An Intermittently Decanted Extended Aeration (IDEA) tank for biological oxidation, nitrification and denitrification of the wastewater with associated aeration, effluent decanting and waste activated sludge (WAS) pumping equipment;*
- *A Pasveer channel (offline) for biological treatment;*
- *Maturation ponds to attenuate flows from the IDEA and the Pasveer channel and provide disinfection;*
- *Sludge lagoons for stabilisation treatment, thickening and storage of waste sludge;*
- *Sludge drying beds for sludge dewatering;*
- *A wastewater return pumping station;*
- *Photovoltaic panels; and*
- *Site facilities including amenities building, switchroom, site drainage and lighting, etc.*

The existing augmented plant can cater for sewage load for 9,000 EP with biological treatment provided by a 7,000 EP IDEA tank and the 2,000 EP Pasveer Channel. The design process allowing the delivery of 9,000 EP is detailed in Section 2.3 of Councils Operations & Maintenance Manual for the STP. Appendix A summarises the calculations that support the STP catering for this sewage load.

In addition to this, Council has the capacity to reconnect a secondary IDEA tank to service a further 5,000 EP when required. In total, over the next 20 years the Sewer Treatment Plant can grow to support up to 14,000 EP.

The treated effluent is stored in a 140 ML storage dam, then filtered and disinfected by dosing sodium hypochlorite before being delivered to one of five reuse sites, namely Junee Golf Course, Junee High School, Burns Park, Loftus Oval or Laurie Daley Oval. Effluent is also reused onsite through a pressurised reticulation system. The effluent not used for reuse is either evaporated from the storage or released if the storage is full.

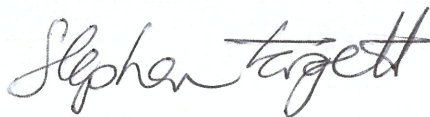
Some high level estimates around the capacity of the STP are detailed below.

Junee's Current population = 6450 EP
Expansion Proposed by Development = 700 EP
Total Load After Growth = 7200 EP
Existing Capacity = 9000 EP
Growth per year expected = 2%
Life of System = 17 years before second tank comes online, 40 with multiple tanks.

This capacity at the STP is considered to provide a fit for purpose facility for the future, accommodating the anticipated growth associated with this planning proposal. Appendix B contains a year-by-year calculation of the anticipated growth in EP of Junee until the end of life of the STP.

Junee Shire Council does not consider that the proposed residential growth at 192 Waterworks Road will significantly impact on the existing sewer network system, where necessary upgrade and extension works to service the site are provided in consultation with Council.

Kind Regards,



Stephen Targett,
Director of Engineering
Junee Shire Council

APPENDIX A: Sewage Treatment Plant Design Capacity Calculations

Design Data		Value	Units
1. Loadings			
(a)	Design population Junee STP (2045)	7,000	EP
(b)	Design hydraulic loads for Junee STP		
(i)	Average dry weather flow, ADWF	19.44	L/s
(ii)	Design dry weather flow, DDWF, 3.3 x ADWF	64.2	L/s
(iii)	Peak wet weather flow, PWWF, 8.1 x ADWF	157.5	L/s
(c)	Design unit loading for Junee STP		
(i)	ADWF	240	L/EP.d
(ii)	Biochemical oxygen demand, BOD ₅	70	g/EP.d
(iii)	Suspended solids, SS	70	g/EP.d
(iv)	Total nitrogen, TN	12	g/EP.d
(v)	Total phosphorus, TP	2.7	g/EP.d
2. Effluent Quality Requirement, based on EPA Requirement for Discharge to Evaporation Ponds			
	Parameter	90 percent ile limit	
(a)	Biochemical oxygen demand, BOD ₅	< 10	mg/L
(b)	Non-filterable residue, NFR	< 15	mg/L
(c)	Total nitrogen, TN	< 10	mg/L
(d)	Oil & Grease, O&G	< 10	mg/L
(e)	Ammonia	< 2	mg/L
(f)	pH	6.5 – 8.5	units
3. Inlet Works			
(a)	Function: Receive sewage inflows from Junee and wastewater returned flow. Capture and removal of gross solids from incoming sewage.		
(b)	wastewater inflows from:		
(i)	Internal wastewater return	13	L/s
(ii)	Gravity sewage flow	186	L/s
(c)	Screening:		
(i)	Mechanical screen –		
	• Screen type	Spiral Sieve	
	• Number of screen units	1	No.
	• Make / model	CCS 700	
	• Maximum screen flow rate	199	L/s
	• Screen aperture/opening size	3	mm
	• Inclination/ Installation angle	35	°
	• Discharge height	5,800	mm
	• Motor output power	0.55	kW
	• Aperture Size	5	mm
	• Motor power voltage	415	V

Design Data		Value	Units
	• Motor frequency	50	Hz
	• Motor power	1.5	kW
(ii)	Vortex Grit Removal System		
	• Type	Vertex	
	• Make / model	VCS 300	
	• Number of press units	1	No.
	• Capacity	199	L/s
	• Chamber upper diameter	3,050	mm
	• Chamber depth	Approx. 5,050	mm
	• Grit paddle drive power	0.37	kW
(iii)	Grit Blower		
	• Grit blower model	RH-45TR positive displacement type	
	• No. of grit blowers	2	
	• Capacity, at 60 kPa	140	m ³ /hour
	• Grit blower power, each	7.5	kW
(iv)	Screw classifier:		
	• Type	Grit Separator	
	• Make / model	SGC 30	
	• Number of classifier units	1	No.
	• Overall length of classifier	3,750	mm
	• Main spiral (Ø - section)	Ø195	mm
	• Max. rated capacity of grit	0.4	m ³ /hr
	• Motor power rating	0.25	kW
	• Motor voltage	415	V
	• Motor frequency	50	Hz
(v)	Manual rake bar screen:		
	• Number of bar screen units	1	No.
	• Screen aluminium bar diameter	12	mm
	• Screen bar clear spacing	from 3 to 40	mm
	• Screen inclination/slope (to horizontal)	60	degrees
(d)	Flow measurement:		
(i)	Flow measure type	ARKON 267 throat width	
(ii)	Flow formula	$Q = 0.4965 h^{1.5}$	L/s
(iii)	Maximum flow measurement	200	L/s
(f)	(i) Inlet:		
	• Number of division streams	1	No.
	• Inlet chamber size (L x W x H)	15 x 0.85 x 1.7	m x m x m
	• inlet pipe diameter from Junee	450	mm
	• wastewater return PS	100	mm
	(ii) Outlets:		
	• Number of outlet chambers	3	No.
	• Outlet chamber size (L x W x H each chamber)	0.9 x 1.2 x 1.7	m x m x m
	• Outlet pipe diameter to IDEA reactor, each	375	mm
	• Outlet pipe diameter to Pasveer	300	mm

Design Data		Value	Units
	channel		
	(iii) Bypass:		
	• Number of outlet chambers	1	No.
	• Outlet chamber size (L x W x H each chamber)	0.7 x 0.9 x 1.7	m x m x m
	• Emergency bypass pipe diameter	375	mm
4. Intermittently Decanted Extended Aeration (IDEA) Tanks			
(a)	Function: Treatment of combined sewage from Junee with provision of biological secondary treatment that includes biological oxidation of carbonaceous material, biological nitrogen removal and separation of sludge solids from treated effluent (clarification and activated sludge wasting) and also includes denitrification and chemical dosing for phosphorus removal.		
(b)	Number of tanks	1	No.
(c)	Design capacity per tank	7,000	EP
(d)	Dimension of tank (length x width at base)	49.2 x 15	m x m
(e)	BWL (depth above tank floor)	3.0	m
(f)	TWL (depth above tank floor)	3.547	m
(g)	Volume below BWL	3,105	m ³
(h)	Volume between TWL and BWL		m ³
(i)	Design mixed liquor suspended solids (MLSS) concentration at BWL	3,300	mg/L
(j)	F/M ratio	0.040	$\frac{\text{kg BOD}}{\text{kg MLSS}}$
(k)	Design sludge age	25	days
Aerators			
(a)	Type	Low Speed Non-Ragging Aerator	
(b)	No. of aerators per tank	4	No.
(c)	Maximum SOTR at BWL, design value	145	kgO ₂ /h
(d)	Average SOTR at BWL, designed value	97	kgO ₂ /h
(e)	Aeration time at DDWF	12	hrs/day
(f)	Motor power, each	30	kW
(g)	Gearbox	Bonfiglioli	
	• Type	Helical Parallel Shaft Gearbox	
	• No. of gearbox	4	
	• Reduction ratio	14.1:1	
	• speed	70	rpm
	• Recommended oil	ISO VG 320 Gear Oil	
	• Oil quantity	10	L
(h)	Electric Motor	WEG 30 kW 3PH 6P B5 IP66 R/HAT	
	• No. of motors	4	
(i)	Pontoons		
	• No. of pontoons for each aerator	3	
	• Diameter	1,406	mm
	• Length	1,321	mm
Decanter			
(a)	Decanter	Centre trough decanter	
	• Type		
	• No. of decanters per tank	1	No

Design Data		Value	Units
	• Drawdown TWL-BWL	0.424	m
	• Length of decanter	15.18	m
	• Maximum decant flow rate at DDWF	157.5	L/s
	• Decant flow rate at DDWF	64.2	L/s
(b)	Gear reducers and gearmotors		
	Type	Rossi	
	• No. of gearbox	1	
(c)	Membrane manufacturer	Leichhardt Engineering	L
Cycle Phases (DDWF)			
(a)	Aeration phase time	90	mins
(b)	Mixing/settling phase time	45	mins
(c)	Decanting phase time/Decanter raise/rest	45	mins
(d)	Total dry weather cycle time	180	mins
Cycle Phase (DDWP)			
(a)	Storm Switch Level (height above BWL)	0.267	m
(b)	Aeration phase time	33	mins
(c)	Mixing/settling phase time	44	mins
(d)	Decanting phase time	61	mins
(e)	Total storm cycle time	138	mins
WAS pump			
(a)	Type	Flygt 3085 sewage pump	
(b)	No. of installed pumps	2	No.
(c)	Pump capacity at 8.3 m water head	9.6	L/s
(d)	Power	1.46	kW
5. Pasveer Channel (currently offline – standby unit if/when required for additional loading)			
(a)	<i>Function:</i> Provision of biological secondary treatment that includes biological oxidation of carbonaceous material, biological nitrogen removal and separation of sludge solids from treated effluent (clarification and activated sludge wasting) and includes denitrification.		
(b)	Number of Pasveer channels	1	No.
(c)	Design capacity of Pasveer channel	2,000	EP
(d)	Length overall	72.3	m
(e)	Width overall	17.3	m
(f)	BWL (depth above tank floor)	1.29	m
(g)	TWL (depth above tank floor)	1.60	m
(h)	Volume below BWL	749	m ³
(i)	Design mixed liquor suspended solids (MLSS) concentration at BWL	5,000	mg/L
(j)	F/M ratio	0.02- 0.04	$\frac{\text{kg BOD}}{\text{kg MLSS}}$
(k)	Design sludge age	28	days
Aerators			
(a)	Type	Brush Aerators	
(b)	No. of aerators per tank	4	No.
(c)	Maximum SOTR at BWL	27.4	kgO ₂ /h
(d)	Average SOTR at BWL	12.9	kgO ₂ /h
(e)	Aeration time at DDWF	12	hrs/day
Decanter			

Design Data		Value	Units
(a)	Type	Bellmouth Trough Decanter	
(b)	No. of decanters	2	No
(c)	Total weir length	6	m
WAS pump			
(a)	Type	Submersible pump	
(b)	No. of installed pumps	1	No.
(c)	Pump capacity at 13.4 m water head	1.6	L/s
6. Maturation Ponds, Wetlands and Storage Dams			
(a)	<i>Function:</i> attenuation of high decant flow rate from the IDEA tank and Pasveer Channel, and treated effluent to be used for irrigation or discharged to Creek for final disposal.		
(b)	No. of ponds	3 maturation, 2 wetlands, 2 dams	No.
(c)	TWL depth	1.63	m
(d)	Detention time @7,000 EP	17 d plus storage in dams up to 90d	days
7. Sludge Treatment Handling			
<i>Sludge Lagoons</i>			
(a)	<i>Function:</i> To stabilize and store wasted activated sludge (WAS) pumped from the IDEA reactor. Stabilized sludge is pumped into the sludge drying bed for dewatering.		
(b)	No. of sludge lagoons	2	
(c)	Sludge lagoon effective volume, each	2,668	m ³
(b)	TWL depth of sludge lagoon	3.2	m
(d)	Dimension of sludge lagoon (length x width) at base	24 x 24	m x m
(e)	Freeboard	0.5	m
(f)	Slope	3:1	H:V
(g)	WAS volatile ratio	0.7	kgVSS/ kgTSS
(h)	Biological sludge (WAS) production	0.80	kgTSS/ kgBOD ₅
(i)	Volatile solid reduction after 6 months of lagoon stabilisation	40	%
(j)	Design thickened sludge concentration	2.5	%
(k)	Months of stabilisation for sludge lagoons	7	Months
(l)	Pontoon sludge pump	1	No.
	• Capacity	20	L/s
	• Motor rated power	3.1	kW
(m)	Pontoon mixer	1	No.
	• Propeller size	SR4650	mm
	• Motor rated power	5.5	kW
8. Sludge Drying Beds			
(a)	<i>Function:</i> to dewatering sludge pumped from the sludge lagoons, the drainage from the sludge drying beds flows into the wastewater pumping station. Dried sludge is transported to off-site for land fill.		
(b)	No. of sludge drying beds	2	No.
	Design value	73	Kg/m ³ /year
(c)	Total area of sludge drying beds	1,680	m ²
Design Data		Value	Units
(d)	Dimension of each sludge drying bed (length x width)	48 x 16	m x m
9. Wastewater Pumping Station			
(a)	<i>Function:</i> Collection of wastewater from administration building, supernatant from the sludge tank, drainage from sludge drying, drainage from the inlet works and pump of collected wastewater to the inflow receival structure of the inlet works.		
	Type	Flygt 3127	
(b)	No. of pumps	2	No.
(c)	Flow capacity at 17.4 m water head	14	L/s
(d)	Dimension of pump station (diameter x depth)	2.1 x 5.0	m x m
(e)	Duty pump cut in level above the well floor	0.85	m
(f)	Duty pump cut out level above the well floor	0.45	m
(g)	High level alarm populated level above the well floor	1.10	m
(h)	Motor power, each	4.03	kW

APPENDIX B: LIFE OF PLANT – EP GROWTH CHART

Year	Life of Plant from Today	Estimated Population	Equivalent	Notes
2024	1	6450		
2025	2	6579		
2026	3	6710.58		
2027	4	6844.7916		
2028	5	6981.687432		
2029	6	7121.321181		
2030	7	7263.747604		
2031	8	7409.022556		
2032	9	7557.203007		
2033	10	7708.347068		
2034	11	7862.514009		
2035	12	8019.764289		
2036	13	8180.159575		
2037	14	8343.762766		
2038	15	8510.638022		
2039	16	8680.850782		
2040	17	8854.467798		Existing Secondary IDEA Tank System to come online.
2041	18	9031.557154		
2042	19	9212.188297		
2043	20	9396.432063		
2044	21	9584.360704		
2045	22	9776.047918		
2046	23	9971.568877		
2047	24	10171.00025		
2048	25	10374.42026		
2049	26	10581.90866		
2050	27	10793.54684		
2051	28	11009.41777		
2052	29	11229.60613		
2053	30	11454.19825		
2054	31	11683.28222		
2055	32	11916.94786		
2056	33	12155.28682		
2057	34	12398.39256		
2058	35	12646.36041		
2059	36	12899.28761		
2060	37	13157.27337		
2061	38	13420.41883		
2062	39	13688.82721		
2063	40	13962.60376		End of Life of Plant