Project Name:	A0144 Luddenham Rd Orchard Hills
Completed by:	Justin Taylor
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Revision:	Draft
Approved By and Date:	Droft only

To be approved by the Technical Manager

HACCP	Workshop Atter	ndees	Revision 1 Attendees	Revision 2 Attendees

DESIGN /			Be	fore Mitiga	tion	Afte	After Mitigation										CONSTRUCTION S	STAGE HA	ССР	COMMISSIONING / H	IANDOVE	NDOVER STAGE HACC			
Step	Potential Hazard	Preventative Measure	Likelihood	Consequen	Resid. Risk	Likelihood	Consequ l	Resid. Risk	Uncertainty	Decision		CCP/Q Criti	cal Levels	Monitoring		Corrective A	Action	Records	Action Checked	Ву	Date	Action Checked	Ву	Date	Closed Out
Process unit	Physical, chemical, biological, other		1 to 5	1 to 5	Likelihood + Consequence	1 to 5	1 to 5	Likelihood + Consequence		Y + N		Target	Action	How	What	Hov	W	Where							
1. Source water (sewage influent, collection lines, pump stations)	Biological Hazard: Contact with raw sewage	Plant designed so that contact with sewage in normal operation is not required. Plant room locked so people cannot readily enter. Covers on tanks and locks where appropriate. Trained operators to servicing plant.	3	3	6	1	2	3	±1	N N	1	No													
	Health Hazard: Source water is different to design specification and treatment plant cannot treat correctly.	Hant design conservative with some ability to remove short periods of our of specification sewage. Continuous online monitoring does not allow out of specification water to be delivered. Trade waste cannot be connected directly to the sewer. plr measurement in buffer tank may detect plr measurement in buffer tank may detect facilities with differ tank will differ short volumes of out of specification feed.	3	3	6	1	2	3	±1	r N N		No													
	Biological Hazard: Blockage upsteam of plant causes overflow	Upstream plumbing (by others) designed to comply with AS3500. Upsstream plumbing to have I/O points and gullies to facilitate contolled overflows and easy deanout.	3	3	6	1	2	3	±1	r N N		No													
2. Inlet Works - Prescreen and Buffer Tank	the screen to overflow	Level transducer on screen detects s prolonged high level and alarms. Screen overflows to buffer tank so there are no uncontained spills.	4	1	5	1	1	2	±1	Y N N		No													
	Physical Hazard: Screen mesh fails and allows oversize material into system.	Heavy particles will settle in buffer tank and not make it into the rest of the treatment plant	2	3	5	1	1	2	±1	r N N		No													
	Health Hazard: Screenings need to be remove from site	Ensure appropriately experienced and Kenneed contractors are used for maintenance of systems. Contractors use adequate PEC in miggate against ingestion, skin contact and inhalation. Remediate spills immediately and exclude public from the spill point until rectified.	5	3	8	1	3	4	±1	r N N	1	No													
	Health Hazard: Prescreen needs to be cleaned manually	Automatic sprays on pre-screen keep it clean reducing manual cleaning to once per month. Cleaning by trained operator wearing appropriate PPE.	5	3	8	1	3	4	±1	N N	1	No													
	Physical Hazard: Screenings are typically heavy and need to be disposed of periodically by the operator	Appropriate screening bin selected with the ability to use manual handling aids where required. Change screening bags frequently so the mass of each changeout is lower	5	3	8	1	3	4	±1	NN	1	No													
	Environment Hazard: Odour	Screen and buffer tank are sealed and vented through the odour scrubber. Screenings are contained in an endless bag which contains odour. The endless bag can be changed without creating an odour path.	4	1	5	1	1	2	±1	r N N	1	No													
3. Biological Treatment Process (Anoxic tank and Aerobic bioreactor)	that disrupt the proper biological treatment.	pH monitoring of the influent may detect chemicals early. Each tennant is required to treat their trade waste separately before discharge from their premises.	3	2	5	1	2	3	±1	r N N		No													
	Biological hazards: Biology tank foams over due t an event which upsets the biomass		3	3	6	3	1	4	±1	N N		No													
	Biological Hazard: Potential aerosols from aeration of bioreactor leading to exposure of workers in the plant room or contamination of surfaces.	All aerated tanks are airtight and vented through an odour scrubber.	3	2	S	1	2	3	±1	r N N		No													
	Environment Hazard: Odour	Biologiy tank is aerated and less likely to cause odour than buffer tank. All tanks are sealed and vented externally through an odour scrubber.	4	1	5	1	2	4	±1	r N N	1	No													

Step	Potential Hazard	Preventative Measure	Likelihood	Consequenc	Resid. Risk	Likelihood		Resid. Risk	Uncertainty	Decision			Critical	Levels	Monitoring	Corrective Action	Records	Action Checked	Ву	Date	Action Checked	Ву	Date	Closed Out
Process unit	Physical, chemical,		1 to 5	e 1 to 5	Likelihood +	1 to 5	ence 1 to 5	Likelihood +		Y + N		СР	Target	Action	How	What How	Where							
	biological, other Physical Hazard:	Tanks designed so that maintenance an	2	3	Consequence	1		Consequence	±1	y In In		No	g			1704	***************************************							
	Confined space.	calibration can be undertaken without the requirement to enter the tanks. Trained personnel only to enter confined space after completing appropriate confined space entry procedure.		3		-	-	J																
	Physical Hazard: Aerated liquid reduces ability to float in tank if person falls in	All lids and hatches secured by bolts or locks to prevent accidently falling in. Plant room only accessible to authorised	3	5	7	1	5	6	±1	Y N N		No												
		personnel.																						
(membrane tank,	Health Mazard: Membrane integrity is compromised leading to neduced disinfection	Turbidity constantly monitored to detunine membrane integrity.	4	4	8	1	4	5	±1	Y Y		CCP1	Alert level t > 0.15 NTU Critical Level t > 0.2 NTU	Operator alarm is alert level triggered. If critical level is exceeded, the MOS system recirculates for a period to see if the turbidity reduces. If turbidity deduces if the turbidity seed to come back within cange, the MOS system generates an alarm and goes into standby state.	montitoring of turbidity during filtration and reciculation by PLC and actuated valve		ite and investigate datalogging.	me						
	Health Hazard: Turbidity measurement does not reflect the current state of the water because there is no flow through the instrument	Flow switch installed in the instrument loop upstream of the trubidity meter	4	4	8	1	4	5	±1	Y		CCP1	No Flow	If no flow is detected, the MOS system recirculates for a period to see if the flow returns. If flow does not retuen, the MOS system generates an alarm and goes into standby state.	montitoring of turbidity during filtration and reciculation by PLC	MGS gene into standby if flow does not identify cause remutin during revolution. Production Differential entering the contents in task are within specification. In the contents in task are within specification.	ite and investigate datalogging.	ine						
	Health Hazard: Turbidity instrument faults	The turbidity instrument has a built in fault relay which is wired to the PLC	4	4	8	1	4	5	±1	Y		CCP1	Instrument fault	the MOS system	montitoring of	MOS goes into standby if fault does rectify during recirculation. Production Otherwise attend: resumed once cause is determined and contents in tank are within specification.	ite and investigate datalogging.	ine						
	Chemical Hazard: CIP requires operators to use chemicals	CIP process is automated. Chemicals are doued into the system automatically reducing which almost eliminates the requirement for the operator to handle chemicals. Chemicals can be neutralised within the system in a similar manner before they are sent back to the head of the works. Chemicals are common in water treatment plants and can readily be handled with appropriate PPE.	3	3	6	1	3	4	±1	Y Y N		No												
5. Ozone System	Physical Hazard: Membrane installation requires manual handling Chemical and Mealth Mazard:	Membranes have a life expectency of >5 years so the activity is rare. The plant room has been designed to leave space to make installation and replacement safe. Two people are used to replace or install membranes. Ozone generator equipped with failure /	3	3	6	1	3	3	±1 ±1	Y Y N	<	No												
	Ozone exposure and inhalation of ozone if leakage occurred	leak detection system that automatcally shuts down oxone production of gas is detected. Plant room designed with ventilation system, so a small leak will not caue an issue before the detection system acts to shut down generation				-		-																
	Health Hazare: Noise exposure from compressors high duty	If practical, enclose compressor in acoustic hood, PPE to be eworn by operators if compressors are not enclosed.	3	3	6	1	3	4	±1	Y N Y	Y	No												
6. Biological activated Carbon (BAC) Filter	Physical Hazard: Presence of carbon fines during loading of the carbon vessel.	Operator training and use of dust mask.	3	1	4	1	1	2	±1	Y N N		No												
	Loading bags of carbon into	Use vacuum or "slurpee" to remove used carbon. Assign two people to the task if necessary. Use a funnel to make filling the vessel easier.	3	3	6	1	3	4	±1	Y N N		No												
7. UV disinfection	Health Hazard: Excessive suspended solids material interfering with the efficiency of the UV disinfection system	UV is downstream of UF process. See UF membrane filtration section for control measures to ensure membrane integrity etc.	4	4	8	1	4	5	±1	Y Y N		No												
	Health Hazard: Low UV dose leading to poor UV disinfection	UV dose contranly monitored by UV unit sisting flow rate, measured UVI and measured UVT. UV unit outputs dose to the PLC so it can be monitored and acted upon	4	4	8	1	4	5	±1	Y			Alert level dose < 60mJ/cm2 Critical Level dose < 58mJ/cm2	alert level triggered. Plant diverts to off	montitoring and diversion by PLC	Plant automatically diverts to off-spec. Identify cause rem train. Production resumed once cause of Otherwise statems is determined and contents in tank are within specification.	ite and investigate datalogging. struments and other	ine						
	Health Hazard: UVT is too low meaning the unit is operating ourside its validated range.	UV has inbulld UVT instrument which is used withing the device, but also ourput to the PLC.	4	4	8	1	4	5	± 2	Y			Alert level UVT < 45% Critical Level UVT < 35%	Operator alarm is alert level triggered. Plant diverts to off spec if critical level triggered.	diversion by PLC	Plant automatically diverts to off-spec tank. Production resumed once cause Otherwise attend is determined and contents in tank are within specification. It is a specification tools as appropriat	ite and investigate datalogging.	ine						

Step	Potential Hazard	Preventative Measure	Likelihood		Resid. Risk	Likelihood		Resid. Risk	Uncertainty	Decisio	n Tree		Critica	l Levels	Monitoring	Corrective Action	Records	Action Checked	Ву	Date	Action Checked	Ву	Date	Closed Out
Process unit	Physical, chemical,		1 to 5	e 1 to 5	Likelihood +	1 to 5	ence 1 to 5	Likelihood +		Y+	- N	СР	Target	Action	How	What How	Where							
	biological, other Health Hazard:	UV unit monitors lamp age based on actual	4		Consequence	,		Consequence				CCP2	Alert level	Operator alarm is	Continous online	Disinfection system geos into Identify cause remotely i								
	UV disinfection not effective due to excessive lamp age,	run time. Other indicators such as UV dose offer a secondary way to monitor poor lamp performance.	4	4	8	1	4	5	±1	, ,			hours > 10,000 Critical Level hours > 12,000	alert level triggered. Disinfection system goes into shutdown	montitoring and diversion by PLC and actuated valve when required.	shutdown. Production resumed once cause is determined and contents in tank are within specification. Otherwise attend site an using hand held into tools as appropriate.	I investigate datalogging.							
	Health Hazard: UV unit malfunctions or faults	UV has inbulk monitoring that identifies warnings and faults. These outputs are monitored by the PLC so the status of the UV unit is known at all times	4	4	8	1	4	5	±1	Y		CCP2	Instrument Fault	Operator alarm is alert level triggered. Disinfection system goes into shutdown	Continous online montitoring and diversion by PLC and actuated valve when required.	Oisinfection system geos into shutdown. Production resumed onne cause is determined and contents in tank are within specification. In the content of the co	d investigate datalogging.							
	Health Hazard: Flow rate through UV unit takes the unti outside validated range, or doesn't provide sufficient UV dose	Flowmeter immediately downstream of the UV monitors flow.	4	4	8	1	4	5	±1	Y		CCP2	Critical Level flow > 385 L/min	Operator alarm is alert level triggered. Disinfection system goes into shutdown		Disinfection system geos into shutdown. Production resumed once acuate is determined and contents in tank are within specification. Identify case removing the definition of the content	d investigate datalogging.							
	Physical Hazard: UV lamps are harmful to humans if viewed directly	UV unit is completely sealed so that no light is visible during operation. UV is designed so that the power cable must be removed to access the lamps. This prevents accidentally accessing the lamps while that are lit.	4	4	8	1	4	5	±1	Y	N	No												
	Environmental Hazard: UV lamps are harmful if not disposed correctly	Dispose of used UV lanmps at an appropriate disposal site.	2	2	4	1	1	1	±1	YY	N	No												
8. Chlorine disinfection (chlorine, dosing pump)	Health Hazard: Insufficient chlorine or chlorine is too high and may cause harm.	System designed to meet minimum Ct in relevant legislation Contact tank designed so that minimum Ct is always achieved Free residual chlorine monitoring	3	2	5	1	2	3	±1	Y		CCP3	Alert Level pH < 6.5 pH >8.5 Critical Level pH < 6.0 or FRC > 9.0	alert level triggered.	diversion by PLC	Plant automatically diverts to off-spec tank. Production resumed once cause tis determined and contents in tank are within specification.	investigate datalogging.							
	Biological Hazard: Treated Water outside of target pH range	On-line treated water pH monitoring. pH correction installed as part of the plant.	1	3	4	1	2	3	±1	YY		CCP3	Alert Level pH < 6.5 pH >8.5 Critical Level pH < 6.0 or FRC > 9.0	alert level triggered.	montitoring and diversion by PLC	Flant automatically diverts to off-spec tank. Production resumed once cause (Otherwise attend ate an is determined and contents in tank are within specification.	investigate datalogging.							
	Health Hazard: Equipment failure in the chlorine loop means current reported reading of pH or chlorine is not accurate	Monitor the flow through the instrumentation loop to ensure it is continuous. Monitor the instrument status	3	2	5	1	2	3	±1	Y N	Y Y	CCP3	Flow through recirc loop must be continuous. Instrument must always be healthy.	Plant diverts to off spec if critical level triggered.	switch mounted in instrument cell and	Plant automatically diverts to off-spectank. Production resumed once cause of its determined and contents in tank are within specification.	d investigate datalogging.							
	Health Hazard: Insufficient disinfection because due to variations in temperature.	On-line temperature monitoring, calculate CT for ambient temperature around storage tanks.	3	2	5	1	2	3	±1	YY		CCP3	Alert level t < 16 deg C Critical Level t < 15 deg C	Operator alarm is alert level triggered. Plant diverts to off spec if critical level triggered.	Continuous online Tepmerature probe.	Plant automatically diverts to off-spec tank. Production resumed once cause of the determined and contents in tank are within specification. Idea of the content tools as appropriate.	d investigate datalogging.							
		Chlorine contact is in a pipe of fixed volume which fixes one variable in the calculation. Flowmeter upstream of the contact tank and chlorine levels allow Ct to be calculated constantly in the PLC	3	2	5	1	2	3	±1	Y		CCP3	Alert level Ct < 4.2 mg.min/L Critical Level Ct < 4.0 mg.min/L	Operator alarm is alert level triggered. Plant diverts to off spec if critical level triggered.	Continuous online calculation from flowmeter and chlorine probe.	Flant automatically diversit to off-spec. Identify cause remotely it and. Production resumed once cause is determined and contents in tank are using hand held instrumenthin specification.	d investigate datalogging.							
9. Distribution System and Storage Tanks (lines, end use Off-spec tank)	Health Hazard: Improper use of recycled water.	Education program for occupants. Lilac coloured pipes and fittings. Signage indicating recycled water usage. No taps accessible to the public.	3	2	5	1	2	3	±1	Y Y	N	No												
	Health Hazard: Long period until use and all residual chlorine consumed	Chlorine is monitored in the treated water recirculation loop. Plant diverts to off spectank if chlorine out of range.	3	2	5	1	2	3	±1	Y N	Y	QCP1	Alert Level FRC < 0.6mg/L or FRC > 4.6mg/L Critical Level FRC < 0.5mg/L or FRC > 5.0mg/L	Operator alarm is alert level triggered. Plant diverts to off spec if critical level triggered.	montitoring and diversion by PLC	Flant automatically diverts to off-spec tank. Production resumed once cause in the content of t	d investigate datalogging.							
	Health Hazard: pH drifts out of specification	pHis monitored in the treated water recirculation loop. Plant diverts to off spec tank if chlorine out of range.	1	3	4	1	2	3	±1	Y N	YY	QCP1	Alert Level pH < 6.5 pI >8.5 Critical Level pH < 6.0 or FRC > 9.0	alert level triggered. Plant diverts to off spec if critical level triggered.	montitoring and diversion by PLC and actuated valve when required.		dinvestigate datalogging.							
	Equipment failure in the chlorine loop means current reported reading of pH or chlorine is not accurate		3	2	5	1	2	3	±1	Y N	YY	QCP1	Flow through recirc loop must be continuous. Instrument must always be healthy.	Plant diverts to off spec if critical level triggered.	switch mounted in instrument cell and	Plant automatically diverts to off-spectank. Production resumed once cause of the diversities attend site and within specification.	d investigate datalogging.							
	Biological Hazard: Delivery pipes and fittings leaking or burst leading to uncontained spill	Plumbing installed according to AS/NZS 3500:200. Any leaks reported to Buliding management according to tennant information brochure.	2	3	5	2	3	5	±1	Y N	N	No												
10. Sludge Handling including WAS Tank	Handling of sludge	System is fully automatic and does not require the operator to come into direct contact with sludge. Disposal bins will be designed so they can be handled with appropriate manual handling device.	2	3	5	1	2	3	±1	Y N	N	No												
	Environmental Hazard: Odour	Waste activate sludge does not typically have a strong odour. Dewatering system is vented through the odour scrubber.	2	2	4	1	2	3	±1	Y N	N	No												

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Environmental Hazard: Raund of irrejected water from inglation to prevent executive watering, and the properties of the pro		
Raundfoll frecycled water from irrigation to prevent excessive watering, irrigation copic dome to that of applicity study indentification and dome in the contact with people to determine soils irrigation appeals; foreignmental listanch face/det water from irrigation with an irrigation applicity and irrigation appeals; foreignmental listanch face/det water from irrigation with an irrigation to the irrigation of the irrigation of the irrigation with a plant with a second with a secon		
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Recycled water from irrigation which mitigates disolved contaminants that could introduce assing through the plant. contamination into the last remembal to the plant is distincted to the streamentation such as plf man indicate.		
Recycled water from irrigation which mitigates disolved contaminants that could introduce assing through the plant. contamination into the last remembal to the plant is distincted to the streamentation such as plf man indicate.		
contamination into the Instrumentation such as pH man indicate		
Environmental Hazard: Tank sizes are designed to buffer 3 3 6 1 2 3 ±1 Y N N NO Overflows or spills inflows and outflows from the plant.		
exposing people to All tanks have appropriately sized		
partially treated sewage or loverflows directed back to the wet chemicals. well.		
Facilities to pump out system in the event of threadown causes high task deep the control of the system of the control of the		
levels. All chemical tanks bunded with		
bunds compliant with Australian Standards.		
Biological Hazard: Plant is designed so the operator has 3 3 6 1 2 3 ±1 Y N N No	+	
Operators exposed to minimal contact with		
SEWAGE Uperators must be experienced with several seve		
Riant operations are vaccionated.		
Souden power outages leading (go possible on power down. to the palms storging in a state Marc outde de configured for out off a		
that could lead to uncontrolled generator if required. discharges in the event of a wide spread outlage, the		
promises feeding the plants are unlikely to be been present and the present and the plant of the present and t		
Wet well has some capacity for short outlines.		
Environmental Hazard: Aside from the possibility of some odour, 1 1 1 1 1 1 1 1 1 1 N N N N N N N N N		
that the glains his fille and glains the filled glain to filled glain to fill the glain of the glain goes supplied.		
Biological Hazard: Site not near known water sources that 1 4 5 1 4 5 ±1 V N N N	+-+	
Garbone weather (flooding) causing severate on with with the vederlooment would have		
stormwater runoff condidered forseeable rain events and designed drainage for them.		
Biological Hazard: Site not lown to be prone to siesmic 1 4 5 1 4 5 ±1 7 N 7 No	+	
Earthquake austing damager to Lettichy tanks or equipment that		
results in uncontained spill	\bot	
Environmental Hazard: No finammable goods or chemicals are used 1 4 5 1 4 5 ±1 Y N N No Processing training tra		
plastic tanksor pipework starting. burning. System is in an industrial state that will		
have appropriate fire services and hydrants should a fire break out.		
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Physical Research Service (page equipment of the youth prescribed purpose principled on rath 5 a 3 a 6 1 a 3 4 ± 1 Y N N N N N N N N N N N N N N N N N N		
mechanical aids		

Step	Potential Hazard	Preventative Measure	Likelihood	Consequenc	Resid. Risk	Likelihood	Consequ	Resid. Risk	Uncertainty	Decision	Tree CC	P/Q	Critical Levels	Monitor	ing	Corrective A	Action	Records	Action Checked	Ву	Date	Action Checked	Ву	Date	Closed Out
				e			ence				CP														
Process unit	Physical, chemical,		1 to 5	1 to 5	Likelihood +	1 to 5	1 to 5	Likelihood +		Y + N		Tar	rget Action	How	١	What How	ow .	Where							
	biological, other				Consequence			Consequence																	
		Confined spaces identified. Only trained and authorised personnel to enter spaces after completing appropriate confined space entry procedures. Plant has been designed so that maintenance can be conducted without the requirement to enter tanks.	3	5	8	1	5	6	±1	Y N N	No														