

# EFFECTIVE LEACHATE TREATMENT AND DISPOSAL



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Lagoon Definition “an artificial pool for the treatment and/or collection of effluent and/or overflow from surface drains during heavy rain” also commonly referred to as “run off”. Run off can be storm water or contaminated water.

One aim is to **minimize the collection of storm water that is not polluted on site by investing in drainage and surface drains that can cope with rain events.** This will effectively **reduce the volume** to be treated, stored or disposed off site or on site.





BUNTING ROAD BROOKLYN



Lagoon Construction is normally intentional, otherwise unintentional being the result of a one in one hundred year rain event, flooding the existing 1 Mg/l lagoon and making a new 30 Mg/l Lagoon as part of the landfill cell, effectively saturating the cell.



BUNTING ROAD BROOKLYN



**Leachate Treatment** - normally addressed when the lagoon becomes odorous with the risk of the odour crossing the boundary and causing a nuisance to neighbors. This is particularly a problem when the lagoons are already built on the boundary fence and the asset owner is not sure what to do in order to effectively manage the nuisance



CRANBOURNE LANDFILL



**BUILD THE LAGOONS, STORE THE LEACHATE AND WE WILL TREAT IT WHEN WE NEED TO.**

“Engineered Lagoons” similar to “Engineered Cell” construction results in a higher standard of construction due external statutory regulation and compliance (e.g. EPA) or organisational compliance sometimes also known as “Best Practice”.



VICTORY ROAD

Generally all Engineered Lagoons will be Lined With HDPE. Some lagoons will also have Geofabric placed over the HDPE to protect the HDPE from damage and to allow grip on the HDPE. Very few lagoons containing leachate constructed in the last 10 years will only have a clay liner as the barrier and even fewer will be allowed to be built without an HDPE liner.

HDPE lined Lagoons are relatively inexpensive to construct and can often contain large volumes of water effectively.



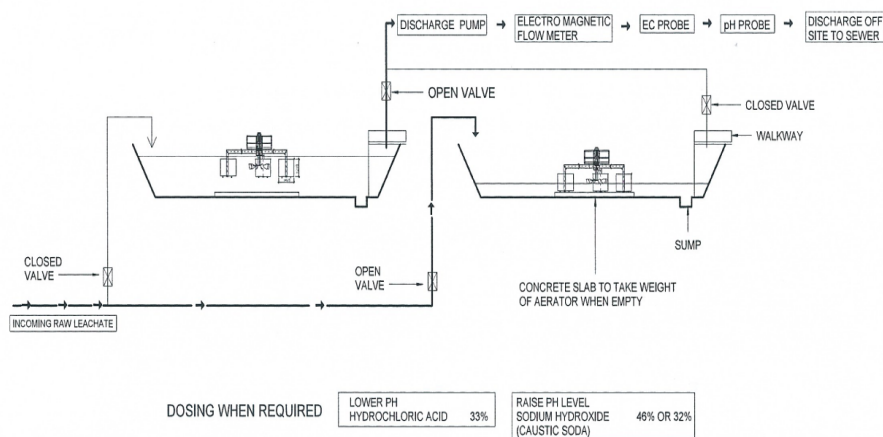
Concrete Lined Lagoons are not common due to the high cost of construction.



MORWELL



### BATCH LEACHATE TREATMENT AND DISCHARGE





BIOLOGICAL TREATMENT – REMOVING AMMONIA, CONVERTING AMMONIA  $\text{NH}_3$  TO A NITRITE  $\text{NO}_2$  AND THEN TO NITRATE  $\text{NO}_3$  THEN SUITABLE DISCHARGE NO CHEMICAL USED ONLY FOR PH CORRECTION.



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AERATOR IN LAGOON AT END OF DISCHARGE. RESTING ON CONCRETE PAD



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AERATOR IN LAGOON AT END OF DISCHARGE, RESTING ON PAD, STARTING TO FILL.



HALLAM ROAD



LIFTING AERATOR INTO LAGOON FROM SERVICE PAD



HALLAM ROAD



CRANE/MAINTENANCE PAD SET BUILT ADJACENT TO LAGOONS  
SO ALLOWING SMALLER CRANES TO WORK



#### **“BATCH TREATMENT”**

Effective treatment requires minimum of two lagoons. One lagoon can be ideal for smaller landfills that can store leachate in sumps while discharging to sewer.

The most effective method found over the last 20 years has been to pump leachate from any number of sumps into one leachate lagoon. Aerate the lagoon with one or two surface aerators to make sure the lagoon is fully mixed. Depths for the lagoon will be from 2 metres to 5 metres.



ELIZABETH DRIVE

Gravity discharge is rare. It is most commonly used where leachate is produced from Organic/Composting or Windrow pads.





## pH CORRECTION – HYDROCHLORIC ACID



HALLAM ROAD



## BATCH TREATMENT – SODIUM HYDROXIDE 46% - SEPARATE BUNDS



HALLAM ROAD





**BATCH TREATMENT**

3mm MARINE GRADE METERING POWDER COATED ALUMINIUM SWITCHBOARD  
CONTAINS AERATOR STARTERS, PLC. TELEMETRY AND METING PLUS SPARE CAPACITY



HALLAM ROAD

**BATCH TREATMENT**

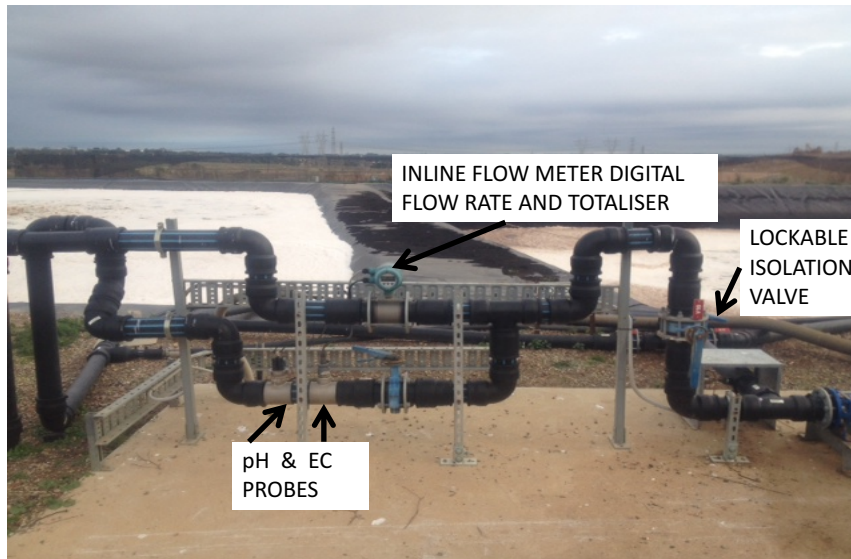
DISCHARGE PUMP ONE PUMP WILL DISCHARGE, ONE LAGOON AT A TIME TO THE  
MAXIMUM FLOW RATE ALLOWED, CONTROLLED BY A VARIABLE SPEED DRIVE IN THE  
SWITCHBOARD, OPERATOR CAN SET AGAINST FLOW METER DISPLAY.



HALLAM ROAD



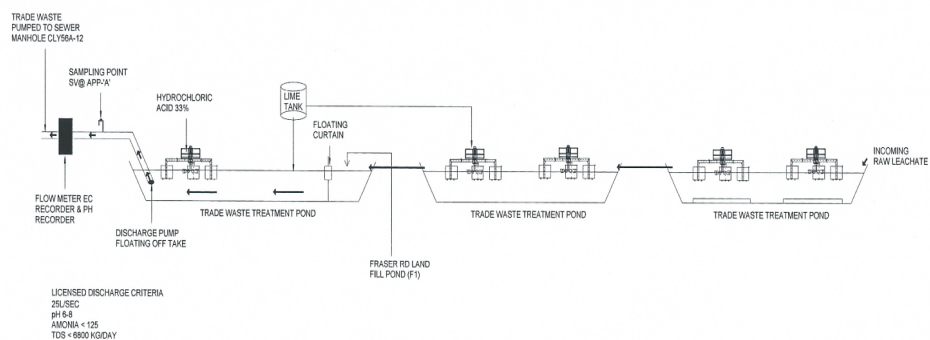
BATCH TREATMENT-DISCHARGE MANIFOLD, FLOW METER, pH & EC DISCHARGE  
CAN DRAW FROM EITHER LAGOON



HALLAM ROAD



CONTINUOUS FLOW LEACHATE TREATMENT AND DISCHARGE



Continuous Treatment revolves around high flows, relatively stable leachate inflow, smaller footprints and discharge volume limits. Treatment process is very similar to that of the Batch Treatment System with gravity flow (Hydraulic Flow) from lagoon one (full mix), lagoon 2 (Full mix) and then lagoon 3 (Silt curtain and partial mix at discharge point).

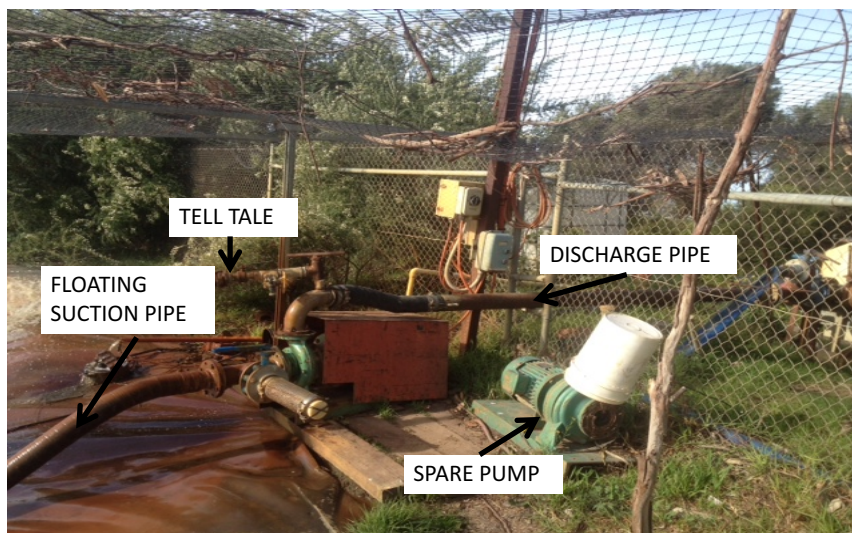


REGIONAL

CONTINUOUS TREATMENT & DISCHARGE, NETTING ON LAGOON TO KEEP PLASTIC, ANIMALS AND BIRDS OUT.



CONTINUOUS TREATMENT DISCHARGE PUMP, SPARE PUMP SHOWN & TELL TALE.



REGIONAL LAGOON C





CONTINUOUS TREATMENT & DISCHARGE pH & EC PROBE – WATER AUTHORITY ADDITION TO  
TRADE WASTE AGREEMENT NO DISCUSSION – YOU PAY AN EXTRA \$40,000  
FOR PRIVILEGE OF ONLINE MONITORING PLUS ALL MAINTENANCE



REGIONAL



CONTINUOUS DISCHARGE FLOW METER

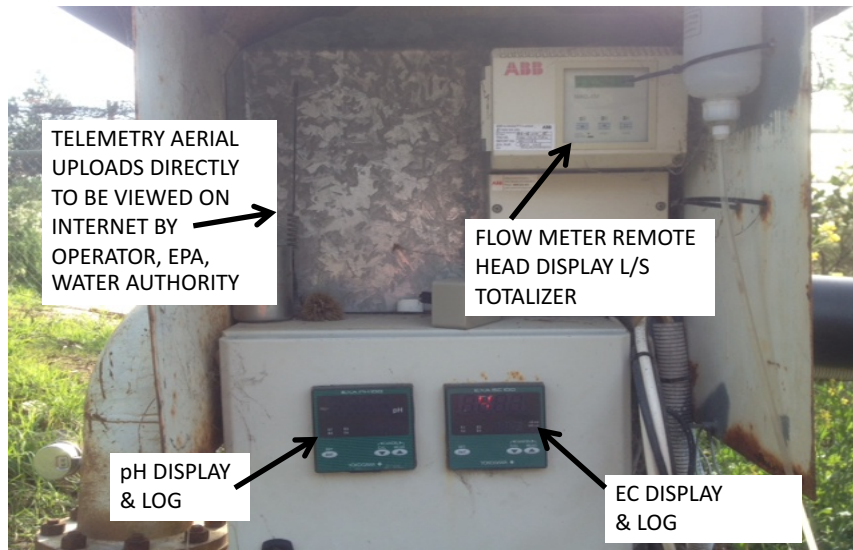


REGIONAL





CONTINUOUS DISCHARGE, OFF SITE TELEMETRY & RECORDING, FLOW pH, & E.C.



REGIONAL



**Lagoons are used for effective treatment for a number of reasons:**

- Most Landfills already have Lagoons on site.
- Mechanical and electrical works are easy to fit and retrofit.
- Easy and cost effective to operate.
- Process can be forgiving due to volumes and acceptance of shock loadings.
- For example - mechanical and electrical cost for the continuous model of 2.2 Mg/l per day is \$450,000 installed plus operational cost of electricity and chemical of \$840 per day and operator labour of \$16,425 (annualized costs). Does not include cost of lagoon.



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By-Jas Engineering has Built and Augmented over 500 Waste Water Treatment Plants (WWTP's) since its' inception, prior to 1978 it was trading as the "Environmental Division" of Evans Deakin Industries Limited. It has comprehensive workshops in Hastings Victoria, where design, fabrication, fitting, machining, refurbishment and blasting and painting is carried out in house and on one site. The By-Jas Range of Fixed and Floating Surface Aerators are designed and made in our premises for supply to Australia and parts of Asia. The By-Jas Surface Aerator design is also made under license in North America and Europe.



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