

Previous Relevant Documentation

- G 27/7/15 28/7/15 Council resolved to approve the project proposal to upgrade the infrastructure at the Tims Thicket Septage Facility.
- G 32/6/15 20/6/15 Council defers consideration of item pending an Elected Member briefing on environmental issues raised at the meeting.
- G 16/6/13 25/6/13 Council resolved to formally close the Tims Thicket Septage Facility, effective from 1 October 2013.
- G 21/12/13 17/12/13 Council resolved to continue the operation of the Tims Thicket septage facility for the foreseeable future.

Background

The septage facility is designed to treat both septage and grease trap waste from Mandurah and the local region and has an annual design capacity of 6500 m³. The facility is managed by Transpacific Cleanaway under the City's Strategic Alliance Waste Outsourcing Agreement.

The septage facility consists of a concrete receival tank, three anaerobic (plastic lined) ponds, a facultative (plastic lined) pond, an oxidative (plastic lined) pond and an overflow infiltrative area.

The facility was constructed in 1995 and has generally served the local community well over the last 20 years. Volumes in late 2010 reduced significantly due to reduced disposal rates being offered at a privately operated waste treatment facility in the region. Council resolved in June 2013 to formally close the septage facility, but delayed the closure date until 31 October 2013 due to external influences and a short term lack of alternative facilities within Perth and the Peel region.

Council further resolved in December 2013 to continue the operation of the septage facility as the lack of alternative facilities was not a short term issue, and based on site usage it became apparent that there was need for this type of infrastructure within the region.

Due to the lack of alternative liquid waste facilities in the Perth Metropolitan area and the Peel region, the septage facility was well patronised during 2014 and reached its annual throughput licence allowance of 5,000 m³ in October 2014. An approach to the DER to temporarily increase the licence volume requirement was denied (even though the design capacity is 6,500 m³) so the Waste Alliance had no option other than to temporarily close the liquid waste operations.

The Waste Alliance took this opportunity of temporary closure to de-sludge anaerobic pond 1 in readiness for re-opening in early January 2015 (when the annual licence volume throughput is reset). The DER stipulated that the liner integrity of anaerobic pond 1 was to be independently tested and confirmed to be in a sound condition prior to the site re-opening.

Liner integrity testing was carried out by Geotest (using electrical sensitivity testing) and confirmed that the liner in anaerobic pond 1 was in poor condition and in need of replacement. Due to the poor results, further testing of the remaining ponds (ponds 1, 2, 4 and 5) was undertaken by Geotest and confirmed they were also in poor condition and in need of replacement. Pond 3 could not be tested as it was currently full – however, it was assumed that it will also need replacing.

Due to the results of the liner integrity tests, the septage facility has remained closed since 31 October 2014. The DER have also suspended the septage licence for Tims Thicket and a Licence Amendment application will be required before the septage site can re-open.

Comment

Formal discussions with DER officers about a potential upgrade of the pond infrastructure at the site have confirmed the following:

- A Licence Amendment will only be required (in lieu of a full Works Approval).
- The infiltrative area can no longer be used as a temporary overflow from the oxidative pond. Effluent disposal and re-use options need to be explored, including landscape irrigation, dust suppression, etc.
- The Licence amendment application document will need to include information on liner specifications, water balance calculations, effluent disposal options and staged commissioning/works program specifications.

In addition, the DER imposed an improvement condition on the licence for the Tims Thicket Inert Landfill that required a full detailed groundwater assessment of the entire site, which included an assessment of the current groundwater monitoring network and groundwater contamination status.

Talis Consultants were engaged to conduct the required groundwater analysis and prepared a detailed report for DER's consideration. The report was submitted to the DER in December 2015. To date, no formal feedback on the groundwater analysis report has been received from the DER.

City officers liaised with other Council's within the state that operate similar liquid waste facilities. The Shire's of Broome and Port Headland have recently undertaken major upgrades of liquid waste infrastructure within their municipalities. Both Shires have explored options of incorporating bioreactors into their waste water treatment systems in order to reduce the nutrient loading within the final effluent as it was to be re-used onsite.

The bioreactor is comprised of a four plastic tanks (32,000 L capacity) connected in series that are aerated and automatically dosed with a bacterial rich solution and is designed for a Biological Nutrient Removal process (i.e. reduction of Biological Oxygen Demand (BOD), Total Nitrogens (TN), Total Phosphorus (TP), suspended solids, etc. Each tank has 2 zones – the top zone is aerobic (presence of oxygen) and the bottom zone is anaerobic (absence of free oxygen) – to ensure biological nutrient removal.

Enquiries were made with companies that design and install bioreactors to ascertain the suitability of installing this type of infrastructure into the Tims Thicket facility. Due to the type of waste received at the Tims Thicket facility (septage and grease trap waste), it was determined that an integrated system that incorporated both a pond system and a bio-reactor would be required to achieve the required effluent quality to enable effluent re-use onsite.

Over the last 20 years of septage facility operation, both contractors and City staff have noted the following issues with the current infrastructure:

- Access driveway to receival tank slopes is in the wrong direction
- Receival tank requires modifications to contain spillages and wastewater from truck wash-downs
- Inlet pipes to all anaerobic ponds are too deep resulting in frequent blockages
- Valves between the receival tank and anaerobic ponds are old and require replacement.
- All ponds need to be located within a secure 1.8m perimeter fence to prevent animal and other unauthorised access.

Any proposed upgrade of the septage facility needs to adequately address the above issues and would require specialist engineering advice to ensure that the future design meet current and best practice standards for liquid waste treatment facilities.

The City subsequently engaged Talis Consultants to provide this specialist advice, and carry out the following tasks:

- Evaluation and redesign of the concrete receival tank area
- Redesign of inlet pipes into the anaerobic ponds, including valve replacement
- Evaluation and assessment of waste water treatment system, including the integration of a Bioreactor into the back end of the system to reduce nutrient loads in the final effluent
- Develop a methodology for desludging all ponds to enable relining
- Develop a specification for replacement/upgrade of existing pond liners
- Preparation of an operational water balance model to ensure that the pond and bioreactor system had sufficient storage capacity during the winter period. This calculation would determine if all existing ponds required relining
- Evaluation of final effluent re-use options
- Evaluation of options for future de-sludging of ponds (i.e. to minimise future damage to pond liners)
- Preparation of Licence Amendment Documentation for submission to DER for consideration and approval.

Talis Consultants have now completed the above tasks and prepared the necessary documentation ready for submission to the DER. The new waste treatment process is detailed as follows:

- Receival Tank
- Anaerobic Ponds
- Balancing Pond (Former Oxidative Pond)
- Bioreactor (Biological Nutrient Removal Plant)
- Storage Pond (former Facultative Pond)
- Evaporation and Landscape Irrigation

The proposed septage upgrade works can be summarised as follows:

1. Construction of new receival access area – sufficient in size to accommodate semi-trailer liquid tanker trucks
2. Modifications and improvement to existing concrete receival tank
3. Demolition and removal of existing valves and inlet pipes between receival tank and anaerobic ponds 1, 2 and 3
4. Installation of a new sump and pump and above ground HDPE pipes to transfer effluent from receival tank to anaerobic ponds
5. Removal of septage contents from anaerobic ponds, including limestone layer and infiltrative pipework and cleaning of existing liners ready for installation of new liner.
6. Decommission drainage sumps at the end of each anaerobic pond and make good the penetration into the pond
7. Removal of septage contents from facultative and oxidative ponds, including limestone layer and cleaning of existing liners ready for installation of new liner
8. Installation of new 1.5 mm HDPE liner to all 5 ponds. New liner to overlay the existing liner
9. Installation of protective Geotextile material to base of all 5 ponds
10. Construction of 125 mm reinforced concrete slab on top of protective Geotextile material on the base of all 3 anaerobic ponds (to enable future desludging of ponds without potential damage to liner)
11. Installation of 200 mm compacted limestone layer on top of protective Geotextile material on the base of the Balancing and Storage ponds
12. Installation of new extraction pump side riser sleeves to all ponds
13. Demolition and removal of underground pipes between Anaerobic Pond and Facultative pond
14. Demolition and removal of underground pipes between Facultative Pond and Oxidative pond
15. Installation of new below ground gravity pipe network between Anaerobic Pond and Balancing pond
16. Installation of Bioreactor (Biological Nutrient Removal system)
17. Installation of pump and above ground pipework between Balancing Pond and Bioreactor

18. Installation of pump and above ground pipework between Bioreactor and Storage Pond
19. Extension of existing sludge drying bed to accommodate future desludging of anaerobic ponds and installation of new pump sump at outlet of drying bed
20. Installation of pump to Storage Pond and associated pipework to irrigation field (adjoining reserve), includes new sand filter and chlorination equipment to treat final effluent prior to dispersal to the sub soil irrigation area.
21. Installation of vegetated irrigation area
22. Decommission and removal of overflow pipe from Oxidative pond, 'V' notch weir and leach drain system.

A concept drawing of the proposed upgrade works is enclosed as **Attachment 1**.

As detailed above the upgrade works to the septage facility infrastructure are significant and varied. This upgrade process has become very complicated due to the fact that no overflow from the oxidative pond can occur to the environment. The surface area of the ponds are large and they do receive a significant amount of water from rainfall during the winter months. Over the facility's 20 year life, 22.7 million of litres was discharged to the environment through the leach drain system, with 3.2 million litres being discharged in its last year of operation (2014).

The water balance model required by the DER is based on a septage inflow of 6.5 million litres, rainfall into the ponds is based on a 1 in 10 wet year followed by a median year, and average evaporation rates. The model calculation shows that the effluent re-use system for the plant upgrade has to be capable of accommodating 4.7 million litres of effluent (worst case scenario).

Council approved a capital budget of \$445,000 for the Tims Thicket Septage upgrade project in 2015/16. Some funds have been expended in 2015/16 to get the project to its current status with the remaining capital funds (\$380,000) being carried over into 2016/17. While the upgrade works are extensive, as detailed above, officers are in the process of costing the upgrade project (based on the advice by Talis Consultants), but still believe that the project can be delivered within the existing project carry over funds.

It is understood that the upgrade project is important for the region, due to limited disposal options for liquid waste within the metropolitan area and Peel region. Officers remain confident that a new upgraded plant can be installed and operational by the end of 2016. This project timeline is however subject to the City having no major time delays in achieving the required Licence Amendment approval from the DER.

Consultation

- Waste Alliance
- Department of Environment Regulation
- Talis Consultants
- Suppliers

Statutory Environment

The Tims Thicket Septage Facility was previously licensed as a *liquid waste facility* by the Department of Environment Regulation (DER) under the provisions of the *Environmental Protections Act 1986*. The previous licensee of the facility is the City's Waste Alliance partner, Transpacific Cleanaway.

An upgrade of the septage ponds will require the City to submit a Licence Amendment Application to the DER for assessment. This documentation has been prepared by Talis Consultants and is ready for submitting. Based on previous experience, the DER normally take about 1-2 months to process a Licence Amendment Application.

Policy Implications

Policy FS – P01 – Procurement of Goods or Services through Direct Purchasing and Procurement of Goods or Services through Public Tendering will be complied with.

Economic Implications

The remaining capital budget for the project is \$385,000. The costing for the project upgrade works are currently being finalised by officers, although it is anticipated that the project can still be delivered within the allocated budget.

Strategic Implications

The following strategies from *City of Mandurah Strategic Community Plan 2013-2033* are relevant to this report:

Organisational Excellence:

- Deliver excellent governance & financial management

Conclusion

The Tims Thicket Septage Facility is now 20 years old and can no longer operate as it does not meet DER requirements. The facility ceased operations in November 2014. Council at its meeting in July 2015 approved the upgrade of infrastructure at the Tims Thicket Septage Facility, subject to a number of conditions and approval from the Department of Environment Regulation.

Discussions with DER officers has confirmed that any upgrade of the facility would need to incorporate replacement of existing liners and their protection from future operational activities, an upgraded waste water treatment system and an exploration of alternative end point disposal options.

The City subsequently engaged Talis Consultant to assist in the total redesign of the facility, which incorporated an appraisal of options for effluent reuse, and to prepare the necessary documentation and specifications for submission to the DER for the necessary environment approvals.

It is recommended that Council note the actions taken by officers to date, to reinforce its commitment to the septage facility upgrade project, to authorise officers to proceed with obtaining the required Licence Amendment from the Department of Environment Regulation and to implement the necessary construction works as soon as possible.

NOTE:

- Refer **Attachment 1: Concept Drawing of Proposed Septage Facility Upgrade Works**

An officer will make a presentation on this item at the meeting.

RECOMMENDATION

That Council:

1. **Notes the current status of the Tims Thicket Septage Facility upgrade project.**
2. **Reconfirms its commitment to upgrading the infrastructure at the Tims Thicket Septage Facility and recommencing liquid waste treatment operations at the site.**
3. **Authorises officers to proceed with obtaining the necessary Licence Amendment from the Department of Environment Regulation to enable the upgrading works to proceed at the Tims Thicket Septage Facility and to implement the construction works as soon as possible.**

