0 40 80
metres

Legend

Proposed AWT and Composting Facility Platform

Project Boundary

Additional catchment flowing to Patonga Creek - existing conditions

Client: GOSFORD CITY COUNCIL

Project: Environmental Assessment of Proposed Alternative Waste Technology and Composting Facilities at Woy Woy WMF

Title: **ADDITIONAL CATCHMENT FLOWING ONTO THE SITE - EXISTING CONDITIONS**

URS

Drawn: AJW	Approved: FINAL	Date: 13/02/2007
Job No: **43177409**	File No: 43177409-013.wor	

Figure: **9.3**

Chapter 9 Hydrology and Surface Water

9.3 Existing Surface Water Quality

Council undertakes environmental monitoring at the Woy Woy WMF in accordance with the sites Environment Protection Licence (Licence No. 6053). Surface water monitoring is undertaken at seven locations as shown in Figure 9.1 and compared to ANZECCs Guidelines for the Protection of Aquatic Ecosystems – 95% Fresh Water, (ANZECC 2000) criteria where available.

Two of these monitoring points (S01, S02) are within Patonga Creek, located to the south of the proposed development area, while S03 is located within the existing sedimentation pond. The results of the quarterly monitoring, carried out in 2006, are summarised below.

9.3.1 Field Measurements

Key field measurements taken within Patonga Creek (sampling point S01 upstream of the Woy Woy WMF and S02 downstream) are described below.

- *pH*: The surface water within Patonga Creek was slightly acidic, with pH varying from 5.63 to 6.29 which is typical of the water. These pHs are typical of the soil landscapes at the site (pH 4.5-5.8) as reported by Murphy (1993);
- *Total Dissolved Solids* (TDS): TDS ranged from 0.07 parts per thousand (ppt) to 0.12ppt within Patonga Creek;
- *Redox potential:* The redox potential ranged from 49 milliVolts (mV) to 223 mV; and
- *Temperature:* temperature varied from 15.0 (^{o}C) to 20.8.

9.3.2 Laboratory Analytical Results

Key analytical results for samples obtained from Patonga Creek (sampling points S01 and S02) are described below.

- *Ammonia as N:* Ammonia results ranged from <0.005 mg/L to 0.023mg/L, well below the adopted criteria (ANZECCs Guidelines for the Protection of Aquatic Ecosystems – 95% Fresh Water, (ANZECC 2000) of 0.9mg/L.
- *Other Inorganics:* The results for inorganics including Sulphate, Magnesium, Sodium, Potassium Fluoride, Reactive Phosphorus and Chloride were all below the adopted criteria.
- *Metals:* In general result for metals were all below the adopted criteria for samples within Patonga Creek, except for Aluminium, which exceeded the criteria for all samples, and Chromium which was 1.1mg/L in S01 for the sampling event on 24th October 2006, slightly above the adopted criteria of 1.0mg/L. As noted in the quarterly monitoring report (Golder, 2006), the elevated aluminium results are considered a feature of the natural conditions, as they occur in sampling locations both up gradient and down gradient of the Woy Woy WMF.

As noted in the last quarterly monitoring report (Golder, 2006) "*based on the field and analytical results, the surface water conditions did not appear adversely affected by the landfill".* There was no significant difference in the water quality results for samples obtained within Patonga Creek up gradient of the Woy Woy WMF (S01) and down gradient (S02).

9.4 Surface Water Impacts

9.4.1 Construction Impacts

During the construction period, approximately 3 hectares of land would be disturbed in order to construct the operational area and access road and remove an existing access road. Rainfall on these disturbed sites may cause soil erosion and runoff may contain high levels of sediments which could then enter the natural drainage system. Rainfall may also mobilise other contaminants found at the site, as well as spills and gross pollutants and these may enter the natural drainage system if no mitigation measures are put in place.

There is the potential for adverse impacts on surface water quality during the construction phase. These could arise from stormwater contacting exposed soil and/or waste during construction.

The existing sedimentation pond would be filled in as part of the construction phase. Before the existing sedimentation pond is filled in, it may be emptied. It may be possible that this water contains substances which could cause pollution or could be discharged to the environment in a manner that could cause environmental harm.

The impact on flora and fauna in the dam has been discussed in Chapter 18.

9.4.2 Operational Impacts

Runoff from the storage/processing areas could potentially contain high concentrations of pollutants including gross pollutants, oil and greases, heavy metals, nutrients, pathogens, oxygen-demanding substances and others.

Runoff from the access road and parking areas could potentially be contaminated with gross pollutions, oils and greases and sediment.

Runoff from roof areas is unlikely to contain significant concentrations of pollutants.

Runoff from impervious areas including the buildings and access roads would be both greater and faster than runoff from the existing areas. Most of the area drains to Patonga Creek, and this additional runoff would result in a higher volume of flow in the creek than is natural and higher than current conditions, unmitigated this would also cause a flow rate higher than the natural peak flow rates, in turn potentially leading to environmental damage due to cause erosion and sedimentation.

Surface runoff may also be released in one location causing a concentration of flows over and above what would normally occur. This could then cause localised soil erosion and deposition downstream in Patonga Creek.

Some steep batters currently exist at the site and these may be modified for the proposed works. Without mitigation, this could lead to erosion of the slopes and downstream deposition of sediments.

The existing dam was constructed in order to act as a sedimentation pond during a previous phase of the landfill operation. This pond is not required for the existing, or any proposed landfill operations. Therefore, other than issues addressed under construction impacts, the removal of the pond is not expected to cause any additional long-term environmental impact.

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9.5 Mitigation Measures

9.5.1 Construction Mitigation Measures

All construction works would be undertaken in a manner to minimise the potential for soil erosion and sedimentation. At a minimum, construction activities would comply with Gosford City Council's D6.46 *Erosion Sedimentation Control* and the measures outlined in the *Managing Urban Stormwater – Vol 1 Soils and Construction* (the Blue Book) would be implemented. Prior to commencement of construction, a soil erosion and sedimentation control plan would be prepared by the Contractor and submitted to Council for approval. This plan would, amongst other issues, provide for the following mitigation measures:

- Minimisation of the time that disturbed land is exposed;
- Placement of temporary surface water diversion barriers along the active excavation areas to prevent run-off entering the construction site;
- The stormwater outlet points for site run off shall be identified and the drain(s) would be bunded with a combination of sandbags and hay bales wrapped in silt fencing material to minimise sediment entry into the storm drains or creek system. These would also capture gross pollutants. Any hay bales used at the site would be selected and maintained to avoid propagation of non-indigenous seeds that could otherwise be contained in the hay bales;
- Early installation of permanent stormwater drainage structures;
- Early revegetation or installation of non-erodable surfaces;
- Installation of silt fences around the perimeter of the temporary soil stockpiles and downstream slopes of the construction site to minimise potential migration of sediment. Silt fence construction shall consist of geofabric strung between steel or timber posts with the geofabric extending into the soil excavation. Hay bales may be required if the anticipated volume of sediment is large. The silt fences would be inspected regularly by the Contractor for damage throughout construction phase. Inspections would also be required immediately after rain to ensure that the effectiveness of the system is maintained. Deposited sediment shall be removed by the Contractor and disposed of either directly into the excavation or to temporary soil stockpiles;
- All possible pollutant materials would be stored well clear of site boundaries and stormwater drainage lines. They would be stored in a designated covered area. Containment bunds would be constructed with provision for collection of any spilt material. Waste collection areas would be designated and appropriate bunding would be installed and appropriated containers would be provided. Waste disposal and collection would be properly undertaken. All vehicle and equipment washing and maintenance would be undertaken offsite; and
- Vehicles leaving the site shall be inspected to ensure that soil is not transported off site through wheel treads.

Staff would use the existing facilities at the landfill so that pollutants, including wash water are not conveyed from the site in stormwater.

The structures or equipment mentioned above shall be inspected regularly to ensure that they are in good conditions and if necessary, upgraded or repaired.

The existing sedimentation pond would be emptied before placement of fill. The water in the pond would be tested prior to emptying. If conditions at the pond change significantly between testing and disposal (for example due to heavy rainfall), water would be retested before discharge. The water would be discharged to Patonga Creek or Woy Woy creek in accordance with *Protection of the Environment and Operations (POEO) Act.* Further the flow rate would be restricted to that which would not cause damage to the downstream environment, temporary erosion control measures may be constructed at the outlet of this pipe if required. If water cannot be discharged in accordance with the POEO act, it would be discharged into the Woy Woy WMF existing leachate treatment system or collected by tanker and used for the irrigation of local sporting fields (dependant upon meeting relevant water quality standards for irrigation).

9.5.2 Operational Mitigation Measures

The development area selected is suitable for the proposed works. It is not prone to flooding. The area has been disturbed and the construction would restore some eroded hillsides, preventing further soil erosion. While the site is located on a saddle it is understood that the groundwater table is relatively high. The proposed works would be designed taking this into account. Outlined below are the proposed mitigation measures for managing water during operation.

Clean Stormwater Runoff

Runoff flowing onto the development area from the southern side of the saddle would be directed to Patonga Creek, as was the case in the natural situation. Runoff flowing onto the development area from the northern side of the saddle, would be directed to Woy Woy Bay, as is the case in the existing situation. These flows would be captured in catch drains at the development area boundaries (above cuts) and directed around the area. Energy dissipation measures would be constructed at the southern outlet to minimise the effects of the concentration of this flow. These energy dissipation measures would include spreading the flow over a wide area, as was the case in the natural situation. Flows from the northern side would flow into the drainage system of the existing landfill. During the detailed design phase the spare capacity of the existing landfill's stormwater system would be assessed and compared to the additional flow directed into the system. The existing drainage system (including sedimentation ponds) would be augmented if required.

During the detailed design phase, the detention basins would be sized and located on site. Further during the detailed design phase the spare capacity of the existing landfill's stormwater system would be assessed and compared to the additional flow directed into the system for the part of the hillside north-east of the site and other additional flows. The existing drainage system (including sedimentation ponds) would be augmented if required. This would result in flow regimes being closer to natural than is currently the case.

To minimise erosion of batter slopes, catch drains would be constructed at the top of batters (as noted previously). This would minimise the volume of water flowing down steep sites. Further where there is adequate soil cover, the slopes would be planted with species native to the area, in order to stabilise the slopes and to minimise the risk of soil erosion. The catch drains would be properly maintained during operations.

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Runoff from Waste Receival, Storage and Processing

Flows from the waste receival, storage and processing areas would be collected, treated and reused in the Composting or AWT treatment processes. Any excess flows would be discharged to the leachate collection sump as described in Chapter 4.

Runoff from Roofs, Roads and Car Park

Stormwater runoff from roof tops would be contained within rainwater tanks onsite and reused in the waste treatment process. Runoff from roads and car parking areas are also likely to contain pollutants. As a result, runoff from these areas, along with any excess stormwater runoff from the roofs, would be collected in detention basins on site, treated and the effluent used in the AWT or Composting treatment process. Detention basins would be designed in order to not discharge flows higher than that from the natural situation.

Any excess treated stormwater runoff would be discharged into Patonga Creek. Due to the amphibian habitat downstream, runoff from site and treated flows to Patonga Creek would need to be similar to the receiving waters in quantity and quality in order to mimic natural flows. Therefore the stormwater runoff discharged to Patonga Creek would be treated to a standard which meets the existing water quality within the creek. The treatment device would be selected and/or designed during the detailed design phase and a maintenance, monitoring and operations plan written at this time.

The water quality and quantity criteria for discharge to Patonga creek would be outlined in the Operational Environmental Management Plan (OEMP) and Environmental Protection Licence (EPL) for the proposed facilities.

9.6 Conclusion

The proposed construction works could result in temporary and long term impact on surface water quality due to potential disturbance and exposure of soils during construction and the potential exposure of wastes during operation. However this would be minimised by implementation of the proposed erosion and sedimentation controls and operational mitigation measures.

It is envisaged that the proposed works, with the adoption of the recommended mitigation measures, would not have a significant impact on local surface water flows or quality.