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# Trade Waste Charging Model

Most Councils charge for trade waste discharges using unit charges derived based on a particular set of conditions. Unless frequently adjusted, this approach does not consider the variable nature of trade waste entering a Wastewater Treatment Plant (WWTP). As a result, council bears the cost (capital and depreciation) of any spare capacity.

To address these issues BPO have developed a trade waste charging model (TWCM) that equitably charges for the use of the wastewater treatment plant and the associated infrastructure based on the discharger's share of the peak and average loads to the plant.

The charging formula both incentives waste reduction and is fair. The customers pay for their share of the operating and capital cost of the wastewater treatment plant based on a sophisticated breakdown of the waste components and allocation of appropriate cost for the component's treatment. BPO's charging mechanism reduces Council's risk of unexpected withdrawal of any of the contributors from the scheme.

The use of a BPO-TWCM as the charging mechanism is an attractive option where Councils have a significant proportion of industrial or large commercial dischargers and particularly where these are seasonal industries. This is for the following reasons:

- The TWCM provides a positive encouragement for industry to minimise their peak flows and loads. This can delay the need for capacity expansion at the WWTP.
- Costs are apportioned on a true user pays basis.
- Council is not seen to be increasing the unit charges each year.
- The charges fully cover the costs of owning and operating the WWTP.
- Encourages collaborative engagement by industry to minimise load peaking.
- The TWCM can be issued as a "black box" to each industry allowing them to determine the benefit of any spend on waste minimisation. This gives better certainty to the pay back for any works by industry and makes it more likely that these works will be done.

## Background

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Most New Zealand Councils operate a unit charge-based charging mechanism for commercial and industrial customers discharging to the Council's wastewater treatment plant or plants. The unit charges are typically for such parameters as total flow (m<sup>3</sup>), kg BOD<sub>5</sub>, kg TSS, kg TKN and kg TP over a charging period. These are usually derived based on a particular set of conditions (operating cost, load, flow).

Such unit charges work well where there is little change in the flows and loads for both the domestic dischargers, fixed charge small commercial dischargers and the conditional customers, where the flows and loads of each are monitored and used for charge setting.

Where flows and loads change or vary periodically or over time, the Council can be disadvantaged from using the unit charges as the council bears the cost (capital and depreciation) of the plant's "peak" capacity that had to be installed to accommodate the variable loads, while the dischargers pay for their average loads. As a way of example:

- for one particular plant a trade waste discharger reduced the BOD load they discharged by 50 kg BOD<sub>5</sub>/d. At this plant, this resulted in a reduction in charges of \$53/d. However, the reduction in cost to Council was about \$20/d due to reduced aeration demand and a reduced sludge production. The fixed costs (capital, depreciation and fixed operating charges such as wages) do not change and so there is a cost of \$33/d which Council now bears.
- In another town where the treatment plant was about to undergo upgrading, a large discharger installed a DAF as pretreatment for their wastewater. The DAF reduced the BOD load by about 90%, TSS load by 95% and the TKN load about 60%. This reduced the dischargers trade waste charges by about \$4,000/d. However, because DAF operation is notoriously fickle the discharger reserved the right to discharge at the full original load. On the days this occurs the discharger pays the extra \$4000/d but every other day council is still paying for the various fixed costs of the larger plant with no payment from the discharger that caused the costs.

If not set adequately, the conventional unit charge system may result in substantial cost to the Council as it subsidises the treatment of trade waste.

## Trade Waste Charging Review Methodology

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BPO's trade waste charge review uses the Trade Waste Charging Model (TWCM) developed for a number of Councils in New Zealand. The model is adjusted to reflect the particular unit operations of the relevant WWTP. The TWCM separates charging for Capex (and depreciation) based on the discharger's share of the peak daily flows and loads to the plant, and operating cost based on the share of the average daily flows and loads. The TWCM also includes the budgeted works for the given year, which will typically not be included in historical unit charges unless the works budget was known at the time the unit charges were set.

The way the share is calculated may differ between the capital charge and the operating charge. For example, the capital cost of an aeration tank or basin is predominately determined by the flow it must handle because the cost of the tank is a high proportion of the overall cost of that unit operation. The operation costs however are predominantly determined by the BOD and TKN loads and so a discharger with high flows but low BOD and TKN loads would pay a larger share of the capital cost and a smaller share of the operation costs of the aeration basin.

The BPO Trade Waste Review process uses discharge monitoring data from each conditional discharger and calculates the annual charge via the conventional unit charges and via the share of load using the TWCM. These are then compared for each discharger. Because the two mechanism use a different basis for allocating costs the two charges are typically not the same but the average charge over the range of dischargers should be at least similar.

The review also considers whether additional parameters should be included in the unit charges based on the range of industries connected to the WWTP. A change in the nature of the plant or the flows and loads may justify introduction of additional or removal of existing parameters.

The following information is required

1. Depreciated replacement value at a sufficient level of detail to assign each asset to a specific unit operation of the WWTP
2. Depreciation allowance for the same assets to the current year or next year
3. Budgeted works for the current or next year
4. Operational costs for the current or next year in sufficient detail to assign them to a specific part of the plant.
5. Historical data for each trade waste discharger
6. Historical data for peak and average flows and loads to the plant.

The number of WWTP “parts” or unit operations used for the TWCM depends on the nature of the plant in question. A simple facultative pond system might have the following parts for the TWCM:

- Sewer network
- Screening
- Facultative pond
- Aerators (if installed)
- Maturation pond (if installed)
- Allowance for future desludging event (or ongoing sludge removal and disposal if present)
- Wetlands (if installed)
- Discharge (outfall, irrigation, rapid infiltration etc)
- General (e.g. fencing, roading, automation and telemetry, mowing etc)

For more information on the Trade Waste Charging Review or the Trade Waste Charging Model, please contact Dr Chris Hearn or Geoff Young at BPO Ltd.



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