

TW-02 Pre-treatment guideline

1. Purpose:

This guideline aims to provide clear direction to businesses, contractors, hydraulic designers and other regulators when servicing, designing, building or assessing trade waste pre-treatment systems within the City of Gold Coast environs.

Installation of a pre-treatment device is often a specified condition of a Trade Waste Approval. The following device descriptions are a **minimum requirement** for business activities that generate substances of known risk to the network (*refer to City of Gold Coast's Sewer Admission Standards (SAS)*):

2. Physical treatment systems

These are acceptable treatment methods for low to medium risk trade waste and require little or no operator input, apart from scheduled maintenance. Technologies include filtration, sedimentation or floatation with provision for either active or passive removal of problem or prohibited substances.

a) Grease Arrestor – (grease trap, grease interceptor trap, G.I.T.)

A minimum 1000 litre/hour capacity grease arrestor is installed where the business activity includes processes related to food preparation, cooking or any wash-water resulting from those processes. An exemption may be given if the answer is 'no' to all of the following criteria;

- Is food cooked (*other than toasting or microwave reheating*) on the premises?
- Are the combined capacities of all fixtures* (*other than glass or dishwashers*) greater than 250 litres/hour?
- Does the business use a commercial dishwasher?
- Does the amount of process-water used for the business exceed 500 litres/day?

b) Oily Water Separator – (similar technologies include coalescing plate or vertical gravity separator, petrol/oil triple or vortex interceptor)

A minimum 1000 litre holding tank servicing a 1000 litre/hour capacity separator (or equivalent) is installed where the business activity includes processes related to maintenance (includes cleaning), repair, assembly or manufacture of automotive machinery or parts in contact with mineral hydrocarbon lubricants. An exemption may be given if the answer is 'no' to all of the following criteria;

- Is water from machinery or parts maintenance directed to sewer (includes engine steam cleaning and under-body vehicle washing)?
- Are the combined fixture* capacities greater than 250 litres/hour?

Please note that discharge of solvents, fuel or other flammable substances to sewer is prohibited (*refer to SAS*).

*Fixture loadings referred to are outlined in the *National Guideline for Managing Food, Fats, Oil and Grease from food premises (FFOG Guideline)*, published by the *Water Services Association of Australia (WSAA)*.

c) Silt Arrestor/Balance Tank/Cooling Pit

A minimum 1000 litre/hour trap is installed where the business activity includes water generated from cooling, defrosting, dilution or washing prior to trade waste discharge. An exemption may be given if the answer is 'no' to all of the following criteria;

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- Is the temperature of contact, recirculated or process water greater than 38°C?
 - Are chemical substances (including detergents) present in the trade waste?
 - Is the generated trade waste volume greater than 500 litres/day?

d) Existing businesses – discharging less than 5000 litres/day are required to:

- Meet the minimum *Physical Treatment System* requirements outlined above.
- Demonstrate compliance with pre-treatment device maintenance schedules as specified in the Trade Waste Approval document
- Demonstrate compliance with the Sewer Admission Standards (SAS)
- Implement effective ‘housekeeping’ systems to exclude prohibited wastes from trade waste e.g. strainers or bucket traps for floor wastes, diversion of concentrated waste streams
- Implement cleaner production initiatives such as diversion of putrescible wastes for beneficial re-use
- Collaborate with the Source Control Section to regularly review performance and condition of pre-treatment systems and enter into a Trade Waste Improvement Programme as directed

3. Advanced Chemical or Biological treatment systems

Businesses producing trade waste with high volume or contaminant levels (high load) represent a higher risk to the City’s sewerage network. A pre-treatment system for these trade wastes usually requires specialised design, sometimes taking into account the configuration and control of waste streams from multiple processes. A professional consultancy service should be considered for specification of an optimal treatment system. Training staff to be proficient in operating the treatment system is usually needed.

a) Equalisation Tank

The first step in most advanced treatment systems is a reservoir designed to contain, mix and balance the accumulation of production effluent streams. There are specific design formulae available to calculate the size and retention time requirements of these vessels. The efficiency of the equalisation step is critical to the performance of downstream treatment processes.

b) Chemical dosing for pH control

Feedback control instrumentation is recommended for applying metered doses of acid/alkali to control pH. Chemical dosing can occur at the equalisation step or at the final treatment stage, depending on other process requirements. Certain treatment steps require a specific pH range for effective treatment to occur (e.g. oxidation/reduction, precipitation of metals). Adequate mixing and retention time for each treatment step is essential for optimising the final effluent.

c) Treatment System Design and specific requirements

Businesses with processes discharging greater than 5000 litres/day will be expected to implement continuous effluent treatment process technology in accordance with industry best practice (or BEARPIT*) principles.

Typical installation for start-up or expanding businesses discharging greater than 5000 litres/day:

- A minimum two stage pre-treatment system that includes,
- An equalisation tank, designed to balance and control flow rate to the optimal capacity of the subsequent treatment stage(s) (e.g. grease arrestor, Dissolved Air Flotation (DAF), digester)
- A feedback instrumentation and dosing system for pH correction (if needed)
- An approved method of measuring trade waste volume discharged to sewer

Early consultation with the Source Control Section of City of Gold Coast, Water and Waste is recommended prior to submitting a design for assessment.

* *Best Available & Reasonable Pre-treatment Infrastructure Technology (BEARPIT)*

d) Metal finishing, Chemical manufacturing & Waste processing industries – specific requirements

Businesses with metal/chemical/waste processes discharging less than 5000 litres/day are to install a batch treatment and discharge system comprising three stages:

- An equalisation/treatment stage, with sufficient capacity to contain half of the daily (4 hours minimum) effluent production. Effective mixing, dosing and control systems are to be employed.
- A settling stage, with sufficient capacity to process the full daily (or shift, 8 hours minimum) effluent production. Provision for effective sludge removal must be included in any design.
- A final effluent ‘polishing’ stage with sufficient capacity to contain the treated effluent for supervised testing and pH correction as directed. This step may be replaced with a filtration step where appropriate.

e) Food & Beverage Processing Industries – specific requirements

Businesses with food/beverage manufacturing processes discharging less than 5000 litres/day – as for **d)** above, *however the final polishing and testing stage may not be required* for food and beverage wastewater, depending on the performance of the first two stages.

Note:

- Businesses engaged in batch or continuous production of bulk quantities of food or beverage products typically generate trade waste of variable quality and quantity during a production cycle.
- Basic physical treatment systems (grease arrestors) aren’t designed for large fluctuations of load, often failing to perform during peak production or cleaning cycles of a manufacturing process.

4. Pre-treatment exemption or ‘deemed compliance’ for low-risk trade waste

Any business or property owner may apply, with supporting information, for consideration of exemption from the device requirements. The criteria outlined above provide a guide to circumstances where trade waste discharged with suitable controls (e.g. strainers, traps) may be considered low-risk (*deemed compliant*).

Where alternative production techniques or cleaner production initiatives are in place, businesses may apply (with supporting information) to be given consideration for a lower risk trade waste category (*‘Industry Group’ load score*) for monitoring and charging purposes.

5. Monitoring

A standard sewer maintenance hole (1050 millimetres diameter), or an alternative access chamber of approved design, must be installed on-lot at the property connection point to the sewer for all commercial and industrial premises having the ability to discharge trade waste to sewer. The maintenance hole will be used for quality and volume monitoring.

Source Control may waive the 1050 mm maintenance hole requirement with sufficient evidence of circumstances where:

- Existing site constraints make the installation of the maintenance hole impractical.
- The works are part of a retro-fit to existing approved plumbing and drainage.
- A Council sewer maintenance hole dedicated to servicing the premise is already accessible.

Waiver is given in each case on the condition that a suitable alternative to allow monitoring is provided, such as a watermark approved maintenance shaft or an inspection shaft (min. 150mm) extending vertically upward from a square junction.

6. Grease Arrestor specification (sizing), installation and maintenance

The following guideline is supported by the *Queensland Plumbing and Wastewater Code 2019 – Part C2*. Fixture loadings referred to are outlined in the *National Guideline for Managing Food, Fats, Oil and Grease from food premises (FFOG Guideline)*, published by the *Water Services Association of Australia (WSAA)*.

a) Size and Design

Requirements for grease arrestor size and design are:

- Capacity from 1000 to 5000 litres per hour.
- Use of active, passive or combination of both types of arrestors may be authorised.
- Design must eliminate the potential for short circuiting during peak use i.e. baffles, surge control.
- Design must maximise detention time for effective substance separation and adequate heat dispersal.
- All pre-cast concrete grease or silt arrestors are to be protected by an internal acid resistant protective coating, installed during manufacture and prior to the delivery and installation of the arrestor.

Sizing considerations should be made with reference to the calculation method contained in *Section 3, WSAA FFOG Guideline* and using fixture flow rate estimates published within that document. *For example:*

Table 1 – Calculation, trade waste load/storage: Typical kitchen fixtures discharging to a grease arrestor

Fixture	Peak flow litre/hour	No. units	Storage Factor *	Arrestor capacity litres/hour
Sink – per bowl	75	1	2	150
Dishwasher	120	1	2	240
Cleaners sink (and floor wastes per 50m ²)	50	1	2	100
Hand basin	50	1	2	100
Total	295		2	590

*A storage factor risk ranking of 2 applies to all fixtures

Note:

- Calculation from fixtures should be predominantly used. Estimated capacities for specialty fixtures are available on request.
- Calculation from water consumption will be considered at the discretion of the City's Source Control section. Other methods such as calculation from meal, cover or seat numbers will not be accepted.
- The nominated arrestor size shouldn't be more than double the arrestor capacity calculated.

Installation of shared devices (e.g. grease arrestors in a new development):

- Calculate as described above with the capacity for each additional property unit (or tenancy) to be 750 litres (min) and where all capacities are unknown; 1000 litres for the first and 750 litres for each additional property unit.

b) Approval of grease arrestors

Source Control's approval for the installation of any arrestor is subject to:

- conformance with relevant design and construction standards **OR**;
- provision of an authorised Performance Solution in accordance with P1, C2.3 of the QPW Code

c) Installation and maintenance

Passive grease arrestors must:

- be installed in an accessible position to enable servicing, preferably outside a building, and as close as practicable to the appliance or fixtures the arrestor serves
- have a gas-tight lid suitable for load likely to be imposed i.e. a heavy-duty lid where the area is subject to vehicle traffic
- be fitted with a 100mm trapped outlet (sample point)
- be vented with 100mm vents (inlet and chamber)
- be within 12 metres of a hose tap, complete with backflow prevention, to assist with cleaning the arrestor during servicing
- be provided with an accessible clean-out point

d) Internal or restricted installations

There are specific requirements for installation of pre-treatment devices proximate to hygiene areas or areas with restricted access, in particular:

- No grease arrestor may be installed in an area licensed for the storage, handling or preparation of food.
- A safe working platform may be required adjacent to the arrestor to enable the gastight covers to be removed from the frame.
- Remote servicing pipes for pre-treatment equipment must be minimum 80 millimetres diameter. The pipe must have provision for connection to flexible hoses (e.g. camlock fitting) *at both ends* to ensure effective cleaning and to prevent leaks or blockages.
- There should be 1 metre (minimum) unobstructed clearance above a grease arrestor located internally or in a restricted location.

All pre-treatment equipment must be installed in a suitable location allowing servicing and maintenance to be carried out in accordance with Workplace Health and Safety guidelines. *Specific consideration must be given to safe access, clearance height and lighting for service areas.* Contact the Source Control section for further information.

All plumbing or drainage work at the premises must be carried out by a QBCC licensed plumber and be verified by a Form 19 - final inspection certificate issued by the City’s Plumbing and Drainage department.

e) Grease arrestor service frequency

The required maintenance service (pump-out & cleaning) schedule for a passive grease arrestor will vary depending on its size, loading and condition. The Trade Waste Approval conditions specify its frequency.

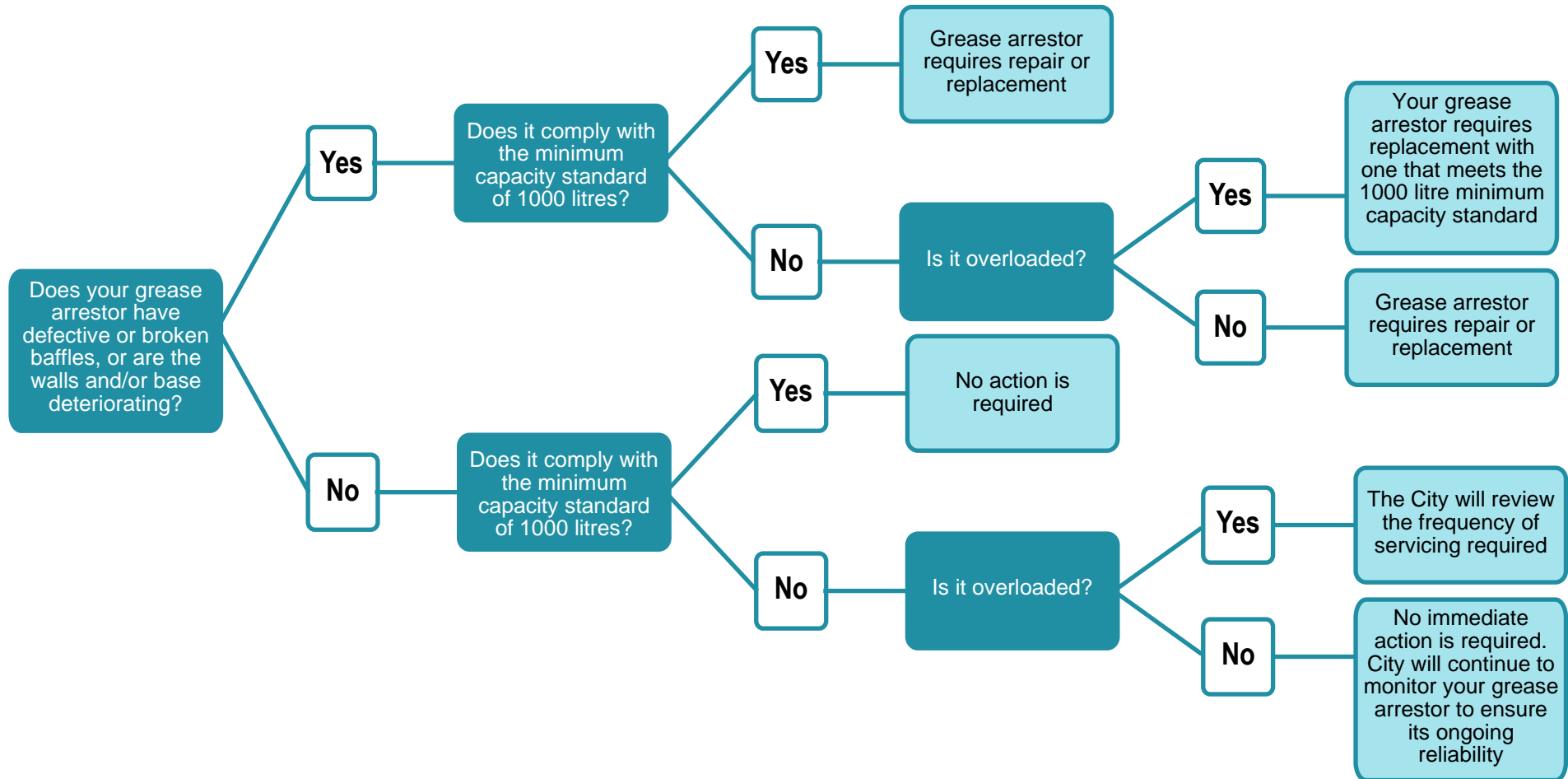
Table 2 – Typical required service frequencies

Grease arrestor type/size	Load/Connections	Service frequency
Standard 1000-5000L	Single tenant	12 weeks
	Multiple tenants/supermarket	8 weeks
	Overloaded (capacity)	6 weeks
	Overloaded (grease/solids)	4 weeks
IMPORTANT: The service frequency for an arrestor that is not standard, or for arrestors <1000L or >5000L, shall be determined after assessment and due consideration by the Source Control section.		

7. Defective/undersized grease arrestors

If your grease arrestor is found to be defective, overloaded or not meet the minimum 1000 litre capacity, the Source Control section will use the following condition assessment chart to determine the appropriate course of action.

Chart 1 – Arrestor condition assessment



8. Appliances producing high-strength liquid wastes

Businesses producing liquid wastes should be aware that approval for disposal of liquefied substances to sewer remains subject to the City's Sewer Admission Standards and is only granted under strict conditions of treatment and maintenance. Similar to the increased service specified for undersized or overloaded devices, operation of the following appliances will carry specific requirements:

a) Food waste disposal systems & digesters

Discharge of large quantities of food waste to sewer increases both the likelihood of blockages and the sewage treatment cost. For this reason the City does not permit commercial or industrial business to connect food waste disposal units to trade waste or sanitary drainage systems.

Effluent from digesters that actively liquefy food waste is likely to exceed SAS limits for solids and other substances and as such will require additional pre-treatment capacity in the form of advanced treatment systems (i.e. equalisation tank with pH correction prior to grease arrestor or DAF).

b) Oil scavenging units/active arrestors

Oil scavenging units may be considered as an acceptable temporary or alternate solution in situations where installation of a passive grease arrestor is impractical or cost prohibitive (e.g. the retrofit of an existing kitchen with limited drainage access). They may also be used to enhance the performance of an approved pre-treatment system. The Source Control section can advise you of specific conditions for the approval, installation and maintenance of these devices.

c) Cooking utensil soakage tanks

Cooking utensil soakage tanks are generally used for cleaning cooking equipment by premises that serve, produce or manufacture food. The storage tanks retain a build-up of the fat, grease, carbon and oil removed during the cleaning process. Advanced treatment in the form of neutralisation will usually be required prior to discharge to sewer, whether a grease arrestor is connected or not.

d) Macerator units

Macerator units are used to dispose of single-use hospital items such as bed pans made from cellulose materials. As for the food waste digester example above, the effluent produced is likely to exceed SAS limits for solids and as such will require advanced treatment or additional capacity (i.e. storage).

9. Risk categorisation and Load Factor assessment

High strength effluent from the appliances described here, defective/undersized/overloaded arrestors, or any other systems that are operated without adequate treatment or maintenance will no longer be categorised as low-risk. The result to the business will be an increased 'load score' assessment and subsequent additional utility charges (one load score = 5% load factor increase) for the increased demand placed upon the sewerage system. *Refer to the City's Trade Waste Guidelines for details of risk categorisation, load factor assessment and sewage charges.*
