SCHEDULE 1A - PERMITTED DISCHARGE CHARACTERISTICS

1A.1 Introduction

1A.1.1 The nature and levels of the characteristics of any Trade Waste discharged to QLDC's wastewater network shall comply at all times with the following requirements, except where the nature and levels of such characteristics are varied by QLDC as part of a consent to discharge Trade Waste.

1A.2 Physical Characteristics

1A.2.1 Flow

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
a) The 24-hour flow volume shall be less than 2 m^3. b) The maximum instantaneous flow rate shall be less than 2.0 L/s.	Flows larger than the Guideline values should be Conditional Trade Waste Consent. Conditional Consents will be dependant on the Contaminant concentration/mass load.

1A.2.2 Temperature

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
The temperature shall not exceed 40 °C.	Higher temperatures: • Cause increased damage to sewer structures; • Increase the potential for anaerobic conditions to form in the wastewater; • Promote the release of gases such as H_2S and NH_3 (can adversely affect the safety of operations and maintenance personnel); and • Reflect poor energy efficiency. It should be noted that this temperature has been reduced from 50°C to come into line with the ARMCANZ/ANZECC Guidelines for sewerage systems. A lower maximum temperature may be require for large volume discharges.

1A.2.3 Solids

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
a) Non-faecal gross solids shall have a maximum dimension that shall not exceed 15 mm.	Gross solids can cause sewer blockages. In case of conditional consents fine screening may be appropriate
b) The suspended solids content of any Trade Waste shall have a maximum concentration that shall not exceed 2000 g/m^3. For significant industry this may be reduced to 600 g/m^3.	High suspended solids contents can cause sewer blockages and overload the treatment processes. Where potential for such problems is confirmed, a lower limit appropriate to the risk may be set. A lower limit may be set between 2000 g/m^3 and 600 g/m^3. The ANZECC Guidelines recommend a limit of 600 g/m^3.
c) The settleable solids content of any Trade Waste shall not exceed 50mL/L.	
d) The total dissolved solids concentration in any Trade Waste shall be subject to the approval of QLDC, having regard to the volume of the waste to be discharged, and the suitability of the wastewater network and the Wastewater Treatment Plant to accept such waste.	High total dissolved solids reduce effluent disposal options and may contribute to soil salinity. Where potential for such problems exists, a limit of 10,000 g/m^3 may be used as a guideline.
e) Fibrous, woven, or sheet film or any other materials which may adversely interfere with the free flow of wastewater in the wastewater network or Wastewater Treatment Plant shall not be present.	

1A.2.4 Oil and grease

Bylaw Requirements	**Commentary from NZS 9201: Part 23: 2004**
a) There shall be no free or floating layer.	Oils and greases can cause sewer blockages, may adversely affect the treatment process, and may impair the aesthetics of the receiving water. Where the Wastewater Treatment Plant discharges to a sensitive receiving water, lower values should be considered.
b) Fat, oil or grease shall not exceed 100 g/m^3	If the WWA only has screening and/or primary treatment prior to discharge, it is recommended that oil and grease be reduced to 100 g/m^3. If quick break detergents are being used, it should be ensured that proper separation systems are being used by the Consent Holder. If not, oil will reappear in drainage systems as a free layer.

1A.2.5 Solvents and other organic liquids

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
There shall be no free layer (whether floating or settled) of solvents or organic liquids.	Some organic liquids are denser than water and will settle in sewers and traps.

1A.2.6 Emulsions of paint, latex, adhesive, rubber, plastic

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
a) Where such emulsions are not treatable these may be discharged into the wastewater network subject to the total suspended solids not exceeding 1000 g/m^3 or the concentration agreed with QLDC.	'Treatable' in relation to emulsion wastewater, means the Total Organic Carbon content of the waste decreases by 90% or more when the wastewater is subjected to a simulated wastewater treatment process that matches the WWA treatment system.
b) QLDC may determine that the need exists for pre-treatment of such emulsions if they consider that Trade Waste containing emulsions unreasonably interferes with the operation of QLDC's Wastewater Treatment Plant, e.g. reduces % UVT (ultra violet transmission).	Emulsions vary considerably in their properties and local treatment works may need additional restrictions depending on the experience of the specific treatment plant and the quantity of emulsion to be treated.
c) Such emulsions of both treatable and non-treatable types, shall be discharged to the wastewater network only at a concentration and pH range that prevents coagulation and blockage at the mixing zone in the public wastewater network.	Emulsion may colour the WWA treatment plant influent such that % UVT is unacceptably reduced. Emulsions will coagulate when unstable and can sometimes cause sewer blockage. Emulsions are stable when dilute or in the correct pH range.

1A.2.7 Radioactivity

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
Radioactivity levels shall not exceed National Radiation Laboratory Guidelines.	Refer National Radiation Laboratory *Code of safe practice for the use of unsealed radioactive materials* NRL C1.

1A.2.8 Colour

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
No waste shall have colour or colouring substance that causes the discharge to be coloured to the extent that it impairs wastewater treatment processes or compromises the treated wastewater discharge Consent.	Colour may cause aesthetic impairment of receiving waters, and adverse affects on lagoon treatment processes and ultra-violet disinfection. Where potential for such problems exists, a level of colour that is rendered not noticeable after 100 dilutions may be used as a Guideline. Where UV disinfection is used special conditions may apply.

1A.3 Chemical Characteristics

1A.3.1 pH value

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
The pH shall be between 6.0 and 10.0 at all times.	Extremes in pH: • Can adversely affect biological treatment processes; • Can adversely affect the safety of operations and/or maintenance personnel; • Cause corrosion of sewer structures; and • Increase the potential for the release of toxic gases such as H_2S and HCN. Relaxation of these limits to 5.5 and 11.0 is acceptable for low pressure premises which discharge into a large flow. Significant industries may need to be restricted to limits between 6.0 and 9.0.

1A.3.2 Organic Strength

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
Where there is no council treatment system for organic removal the BOD_5 shall not exceed 1000 g/m³. For significant Industry this may be reduced to 600 g/m³	The loading on a treatment plant is affected by Biochemical Oxygen Demand BOD_5 rather than Chemical Oxygen Demand (COD). For any particular waste type there is a fixed ratio between COD and BOD_5. For domestic wastewater it is about 2.5:1 (COD: BOD_5), but can range from 1:1 to 100:1 for Trade Waste. Therefore BOD_5 is important for the treatment process and charging, but because of the time taken for testing, it is often preferable to use COD for monitoring. However, the use of COD testing shall be balanced by the possible environmental effects of undertaking such tests due to the production of chromium and mercury wastes. Where a consistent relationship between BOD_5 and COD can be established the discharge may be monitored using the COD test. If the treatment plant BOD_5 capacity is not limited, and sulphides are unlikely to cause problems, there may be no need to limit BOD_5 High COD may increase the potential for the generation of sulphides in the wastewater. A BOD_5 limit which is too stringent may require

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
	the installation of Pre-treatment systems by some Consent Holders, imposing unnecessary costs because the most cost effective treatment method may be the WWA treatment plant. The concentration and mass loads of BOD_5 may be set to reflect WWA treatment plant capacity: e.g. ARMCANZ/ANZECC Guidelines for sewerage systems use a concentration of 600 g/m^3.

1A.3.3 Maximum concentrations

Bylaw Requirements	Commentary from NZS 9201: Part 23: 2004
The maximum concentrations permissible for the chemical characteristics of an acceptable discharge are set out in the following tables: Table 1 - General Chemical Characteristics Table 2 - Heavy Metals Table 3 - Organic Compounds and Pesticides	Where appropriate, maximum daily limits (kg/day) for mass limit Permitted Discharges may also be given.

Table 1 — General Chemical Characteristics

(Mass limits may be imposed, refer to clause 4.2 of this Bylaw)

Characteristic	**Maximum concentration** (g/m^3)	**Mass Limits** (kg/day)	**Reason for limit**
MBAS (Methylene blue active substances)	500	1.5	MBAS is a measure of anionic surfactants. High MBAS can: • Adversely affect the efficiency of activated wastewater sludge plants; and • Impair the aesthetics of receiving waters. For Wastewater Treatment Plants that suffer from the effects of surfactants the maximum concentration could be reduced significantly, e.g. Sydney Water utilise a level of 100 g/m^3.
Ammonia (measured as N)			High ammonia: • May adversely affect the safety of operations and maintenance personnel; and • May significantly contribute to the nutrient load to the receiving environment.
— free ammonia	50	0.25	
— ammonium salts	200	1.0	
Kjeldahl nitrogen	150	1.0	High Kjeldahl nitrogen may significantly contribute to the nutrient load of the receiving environment. A value of 50 g/m^3 should be used as a guideline for sensitive receiving waters.
Total phosphorus (as P)	50	0.75	High phosphorus nitrogen may significantly contribute to the nutrient load of the receiving environment. A value of 10 g/m^3 should be used as a guideline for sensitive receiving waters.
Sulphate (measured as SO_4)	500 1500 (with good mixing)	2.5	Sulphate: • May adversely affect the wastewater network; and • May increase the potential for the generation of sulphides in the wastewater if the wastewater network is prone to becoming anaerobic.
Sulphite (measured as SO_2)	15	0.075	Sulphite has potential to release SO_2 gas and thus adversely affect the safety of operations and maintenance personnel. It is a strong reducing agent and removes dissolved oxygen thereby increasing the potential for anaerobic conditions to form in the wastewater.
Sulphide — as H_2S on acidification	5	0.025	Sulphides in wastewater may: • Cause corrosion of the wastewater network, particularly the top non-wetted part of a sewer; • Generate odours in sewers which could cause public nuisance; and • Release the toxic H_2S gas that could adversely affect the safety of operations and maintenance personnel. Under some of the conditions above sulphide should be <2.0 g/m^3

Characteristic	**Maximum concentration** (g/m^3)	**Mass Limits** (kg/day)	**Reason for limit**
Chlorine (measured as Cl_2) Free chlorine Hypochlorite	 3 30	 0.015 0.15	Chlorine: • Can adversely affect the safety of operations and maintenance personnel; and • Can cause corrosion of the wastewater network. ARMCANZ/ANZECC Guidelines for sewerage systems utilize a figure of 10 g/m^3.
Dissolved aluminium	100	1.5	Aluminium compounds, particularly in the presence of calcium salts, have the potential to precipitate on a scale that may cause a sewer blockage.
Dissolved iron	100	1.5	Iron salts may precipitate and cause a sewer blockage. High concentrations of ferric iron may also present colour problems depending on local conditions.
Boron (as B)	25	0.125	Boron is not removed by conventional treatment. High concentration in wastewater may restrict irrigation applications. Final wastewater use and limits should be taken into account.
Bromine (as Br_2)	5	0.025	High concentrations of bromine may adversely affect the safety of operations and maintenance personnel.
Fluoride (as F)	30	0.15	Fluoride is not removed by conventional wastewater treatment, however pre-treatment can easily and economically reduce concentrations to below 20 g/m^3.
Cyanide — weak acid dissociable (as CN)	5	0.005	Cyanide may produce toxic atmosphere in the sewer and adversely affect the safety of operations and maintenance personnel.

Table 2 — Heavy Metals

(Mass limits may be imposed, refer to clause 4.2 of this Bylaw)

Metal	**Maximum Concentration**[1] (g/m^3)	**Mass Limit**[2] (kg/day)	**Metal**	**Maximum Concentration** (g/m^3)	**Mass Limit** (kg/day)
Antimony	10.0	0.025	Manganese	10.0	0.025
Arsenic	5.0	0.025	Mercury	0.05	0.0001
Barium	10.0	0.025	Molybdenum	10.0	0.025
Beryllium	0.005	0.0001	Nickel	10.0	0.050
Cadmium	0.5	0.001	Selenium	10.0	0.025
Chromium	5.0	0.050	Silver	2.0	0.010
Cobalt	10.0	0.025	Thallium	10.0	0.025
Copper	10.0	0.050	Tin	10.0	0.025
Lead	10.0	0.025	Zinc	10.0	0.050

Note:

Heavy metals have the potential to:

a) Impair the treatment process;
b) Impact on the receiving environment; and
c) Limit the reuse of wastewater sludge and effluent.

Where any of these factors are critical it is important that local acceptance limits should be developed.

The concentration of chromium includes all valent forms of the element. Chromium (VI) is considered to be more toxic than chromium (III), and for a discharge where chromium (III) makes up a large proportion of the characteristic, higher concentration limits may be acceptable. Specialist advice should be sought.

Metals will be tested as total, not dissolved. If sludge is used as a biosolid then metal concentration/mass are important such that the Biosolids Guidelines are met.

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[1] It is intended that these maximum concentrations refer to the total metal fraction

[2] It is intended that these mass limits refer to the total metal fraction.

Table 3 — Organic compounds and pesticides

(Mass limits may be imposed, refer to 4.2)

Compound	**Maximum concentration**[3] (g/m^3)	**Mass Limits**[4] (kg/day)	**Reason for limit**
Formaldehyde (as HCHO)	50	0.25	Formaldehyde in the sewer atmosphere can adversely affect the safety of operations and maintenance personnel.
Phenolic compounds (as phenols) Excluding chlorinated phenols	50	0.25	Phenols may adversely affect biological treatment processes. They may not be completely removed by conventional treatment and subsequently impact on the environment.
Chlorinated phenols	0.02	0.001	Chlorinated phenols can adversely affect biological treatment process and impair the quality of the receiving environment.
Petroleum hydrocarbons	30	0.15	Petroleum hydrocarbons may adversely affect the safety of operations and maintenance personnel.
Halogenated aliphatic compounds[5]	1	0.001	Because of their stability and chemical properties these compounds may: • Adversely affect the treatment process; • Impair the quality of the receiving environment; and • Adversely affect the safety of operations and maintenance personnel.
Monocyclic aromatic hydrocarbons	5	0.025	These compounds (also known as benzene series) are relatively insoluble in water, and are normally not a problem in Trade Waste. They may be carcinogenic and may adversely affect the safety of operations maintenance personnel.
Polycyclic (or polynuclear) aromatic hydrocarbons (PAHs) Including specifically: dibenzo [a,h] anthracene benzo [a] anthracene benzo[a] pyrene benzo [b] fluoranthene benzo [k] fluoranthene chrysene indeno [a,2,3-cd] pyrene	0.05	0.001	Many of these substances have been demonstrated to have an adverse effect on the health of animals. Some are also persistent and are not degraded by conventional treatment processes.

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[3] Where several compounds are grouped into a generic type, the sum of individual concentrations is not to exceed the maximum listed

[4] Where several compounds are group into a generic type, the sum of individual mass quantities is not to exceed the maximum listed

[5] These compounds shall be accepted up to the given maximum concentration only when specifically approved

Compound	**Maximum concentration**[3] (g/m^3)	**Mass Limits**[4] (kg/day)	**Reason for limit**
Halogenated aromatic hydrocarbons (HAHs)	0.002	0.0001	Because of their stability, persistence and ability to bioaccumulate in animal tissue these compounds have been severely restricted by health and environmental regulators
Polychlorinated biphenyls (PCBs) Polybrominated biphenyls (PBBs) Including specifically the following congeners using the IUPAC nomenclature: PCB-28 PCB-52 PCB-77 PCB-81 PCB-101 PCB-105 PCB-114 PCB-118 PCB-123 PCB-126 PCB-138 PCB-153 PCB-156 PCB-157 PCB-167 PCB-169 PCB-180 PCB-189	0.002	0.0001	Because of their stability, persistence and ability to bioaccumulate in animal tissue these compounds have been severely restricted by health and environmental regulators
Pesticides (general) (includes insecticides, herbicides, fungicides and excludes organophosphate, organochlorine and any pesticides not registered for use in New Zealand)	0.002 each 0.2 in total	0.0001	Pesticides: • May adversely affect the treatment processes; • May impair the quality of the receiving environment; and • May adversely affect the safety of operations and maintenance personnel.
Organophosphate pesticides [6] [7] - excludes pesticides not registered for use in New Zealand - These compounds shall be accepted up to the given maximum concentration only when specifically approved.	0.1	0.0001	

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[6] These compounds shall be accepted up to the given maximum concentration only when specifically approved

[7] Excludes pesticides not registered for use in New Zealand.

1A.3.4 Inhibitor Chemicals

No waste being diluted at a ratio of 100 to 1 of wastewater shall inhibit the performance of the wastewater treatment process, such that QLDC is significantly at risk, or prevented from achieving its environmental statutory requirements.

After dilution with de-chlorinated water, at a ratio of 15 to1 of wastewater, a discharge which has an acute result when subjected to the Whole Effluent Toxicity Testing, will be deemed to have inhibitory chemicals. Whole Effluent Toxicity Testing will be undertaken using organisms selected by the QLDC.

SCHEDULE 1B - PROHIBITED CHARACTERISTICS

1B.1 Introduction

1B.1.1 Schedule 1B defines Prohibited Trade Wastes.

1B.2 Prohibited Characteristics

1B.2.1 Characteristics

Any discharge has prohibited characteristics if it has any solid, liquid or gaseous matters, or any combination or mixture of such matters, which by themselves or in combination with any other matters, will immediately or in the course of time:

a) Interfere with the free flow of wastewater in the wastewater network;

b) Damage any part of the wastewater network;

c) In any way, directly or indirectly, cause the quality of the treated wastewater or residual biosolids and other solids from any Wastewater Treatment Plant in the catchment to which the waste was discharged to breach the conditions of a consent issued under the RMA, or water right, permit or other governing legislation;

d) Prejudice the occupational health and safety risks faced by wastewater workers;

e) After treatment be toxic to fish, animals or plant life in the receiving waters;

f) Cause malodorous gases or substances to form which are of a nature or sufficient quantity to create a public nuisance; or

g) Have a colour or colouring substance that causes the discharge from any Wastewater Treatment Plant to receiving waters to be coloured.

1B.2.2 Discharge has a prohibited characteristic if it has any amount of:

a) Harmful solids, including dry solid wastes and materials that combine with water to form a cemented mass;

b) Liquid, solid or gas which could be flammable or explosive in the wastes, including oil, fuel, solvents (except as allowed for in Schedule 1A of this Bylaw), calcium carbide, and any other material which is capable of giving rise to fire or explosion hazards either spontaneously or in combination with wastewater;

c) Asbestos;

d) The following organo-metal compounds: Tin (as tributyl and other organotin compounds);

e) Any organochlorine pesticides;

f) Genetic wastes, as follows: All wastes that contain or are likely to contain material from a genetically modified organism that is not in accordance with an approval under the HSNO. The material concerned may be from premises where the genetic modification of any organism is conducted or where a genetically modified organism is processed;

g) Any health care waste prohibited for discharge to a Wastewater Network by NZS 4304 or any pathological or histological wastes; or

h) Radioactivity levels in excess of the National Radiation Laboratory Guidelines.

SCHEDULE 1C - SAMPLING PROCEDURE

1C.1 Sampling equipment

1C.1.1 Sample containers

The laboratory responsible for analysing the samples should be consulted about the type of container that should be used for sample collection and subsequent sample, storage and transportation. Desirable factors to be considered when selecting sample containers are:

a) High resistance to breakage;

b) Good sealing efficiency;

c) Ease of reopening;

d) Good resistance to temperature extremes;

e) Practical size, shape and mass;

f) Good potential for cleaning and re-use;

g) Availability and cost; and

h) Ability to be clearly labelled.

The sample container needs to prevent losses due to adsorption, volatilisation and contamination by foreign substances. Plastic containers are recommended for most characteristics. Some exceptions exist where glass containers only should be used, examples of such analyses include:

a) Oil and grease;

b) Hydrocarbons;

c) Detergents; and

d) Pesticides.

1C.1.2 Apparatus

The sampling procedures set out in this section assume the use of manual sampling equipment. The simplest equipment used for taking effluent samples consists of a bucket, ladle, or wide-mouthed container that may be mounted on a handle of a suitable length. The volume should not be less than 100 ml. Where manual samples are to be used for the preparation of composite samples, the volume of the bucket, ladle or container should be well defined and known to a precision of within ±5 %. Manual samples can also be taken with a Ruttner or Kemmerer sampler, consisting of a 1 litre to 3 litre volume tube with a hinged lid at each end of the tube, or other samplers operating on a similar principle.

Manual sampling equipment should be made of an inert material that does not influence the analyses that will be carried out on the samples later.

Before starting sampling, the equipment should be cleaned with detergent and water, or as directed by the equipment manufacturer, and finally rinsed with water. The sampling equipment may be washed before use in the wastewater stream from which the sample is taken in order to minimise the risk of contamination. Special attention should be paid to rinsing after cleaning, if the analyses under study are detergents. The sampling equipment cannot be washed in the waste stream where this will influence the analysis carried out later (e.g. analysis of oil and grease, and microbiological analysis).

1C.1.3 Sampling Locations

Safety precautions: In all cases when selecting sampling locations, health and safety aspects should be observed.

The sampling location shall be the first manhole or other access point upstream of the point of discharge, unless, because of poor mixing or some other reason, a location giving more representative samples can be found.

The sampling location should be kept clean by removing scale, sludge, bacterial film etc. from the walls.

If turbulent flow conditions do not exist at the sampling location they shall be induced by restricting the flow, for example with a baffle or weir. The restriction should be made in such a way that sedimentation upstream of the restriction does not occur. The sampling intake point should always be located downstream of the restriction. The inlet of the sampling equipment should preferably face the direction of flow, but may face downstream if too many blockages result. If mixing is good just upstream of the obstacle, then the intake can be located there, taking care that sediment is not sampled and ensuring that the intake remains below liquid level.

As a general rule, the sampling point should be one-third of the wastewater depth below the surface.

It may be necessary to sample the surface by skimming, in order that qualitative information about emulsified and floating material can be obtained. Guidance on the choice of suitable containers for this sampling technique should be sought from the receiving laboratory.

1C.1.4 Choice of sampling methods

Types of sample

It is common to distinguish between two sample types:

1. Spot (or grab) samples; and
2. Composite samples.

Spot sample

A spot sample is defined as a discrete sample taken randomly (with regard to time and/or location) from the Trade Waste.

In a spot sample, the whole sample volume is taken at one time. Spot samples are useful for determining the wastewater composition at a certain time. In cases with small variations in the volume and composition of the waste stream, a spot sample can be representative of the composition during a longer period.

For certain determinations, spot samples only can be used. For example, oil and grease, dissolved oxygen, chlorine and sulphide. Here the result will differ if the analyses are not carried out (or started) immediately after collection of the sample, and if the whole sample volume is not used at a time.

Composite sample

A composite sample is defined as two or more samples or sub-samples, mixed together in appropriate known proportions (either discretely or continuously), from which the average result of a desired characteristic may be obtained. The proportions are usually based on time or flow measurements.

Composite samples are prepared by mixing a number of spot samples or by collection of a continuous fraction of the waste stream.

In sampling, each of the spot samples should be greater than 50 ml in volume. Often it is advisable that spot samples are 200 ml to 300 ml in volume, to ensure the collection of representative samples.

Instantaneous composite sample

An instantaneous sample is a composite sample taken using the following method:

- Three spot samples of the discharge shall be taken at intervals of not less than 1 minute nor more than 5 minutes.

- The 3 spot samples must be combined using equal volumes of all 3 samples to obtain the instantaneous sample.

An instantaneous sample shall be used for all routine compliance monitoring unless otherwise specified.

Four-hour average composite sample

A 4-hour average sample is a composite sample taken using the following method:

- No less than 12 spot samples shall be taken from the discharge at reasonably even intervals over the whole period.
- The intervals between the samples must not be less than 5 minutes nor more than 30 minutes.
- The samples shall be mixed using equal volumes of all samples to obtain the 4-hour average sample.

The 4-hour flow period used when taking a 4-hour average sample shall be a continuous period of 4 hours during which the discharge is occurring and:

1. Shall as far as practical be representative of the discharge occurring on a typical working day, and
2. Shall exclude periods of decreased discharge prior to or after the day's operations.

Twenty-four hour flow proportionate sample

A 24-hour flow proportionate sample is obtained using the following method:

- Spot samples shall be taken from the discharge over a continuous 24-hour period.
- The samples shall be taken at reasonably even intervals over the whole period.
- The intervals between the samples must not be less than 15 minutes nor more than 60 minutes.
- Whenever more than one sample is taken within a 60 minute period the samples must be of equal quantity and maybe stored with other samples taken during that 60 minute period in a common container.

If the discharge usually flows for a period less than 24 hours then no less than 18 spot samples shall be taken as described in paragraph a) above, to represent the nominated 24-hour period.

The 24-hour flow proportionate sample is then obtained by taking a part of the contents of each container and mixing all such samples together. The size of the part of each container sample that is used shall be in direct proportion to the volume of discharge that occurred from the time a sample was first placed in the particular container to the time a sample was first placed in the next container.

Automatic Sampling

Automatic sampling machines facilitate recovery of time proportional samples during the entire working day. Typically a sampler machine is able to collect at least 24 samples. The sample period is determined by consideration of the daily duration of the

Trade Waste discharge and the number of samples able to be collected by the sampler machine. The volume of each sample is sized such that the total volume collected during the sampling period is 5 litres or more.

Flow proportional samples are obtained by taking samples each time a pre-set wastewater volume is measured as passing through the sample point. The pre-set wastewater volume is usually determined by dividing the expected total daily discharge by the number of samples to be taken (minimum typically 24). The volume of each sample is sized such that the total volume collected during the sampling period is 5 litres or more.

1C.1.5 Frequency, number and timing for samples

Frequency and number of samples

Analyses shall be based on sampling discharge periods that are representative of peak discharge. Such analyses shall be undertaken at a frequency of at least once per year unless otherwise specified in the Trade Waste Discharge Consent. The samples should be composite samples, unless the determinations to be carried out prohibit the use of a composite sample. The choice of the necessary number of samples taken during each year should be decided on the basis of when the peak discharge occurs and the size of the discharge in relation to the total discharge from all industry in the Hamilton City area served.

Sampling programme

The objective of a sampling programme often dictates when and how a sample is collected.

When sampling Trade Waste, allowance should be made for the following sources of variation in quality:

- Diurnal variations (i.e. within-day variability);
- Variations between days of the week; and
- Variations between seasons (if applicable).

If the identification of the nature and magnitude of peak load are important, sampling should be restricted to those periods when peak loads are known to occur.

The most appropriate type of sampling method (grab or composite) may be dependent on the magnitude of the variation in quality.

Relating the times of sampling to the particular process being monitored may be very important when considering discharges that are either seasonal or operated on a batch basis. In either case, the discharge will not be continuous and the sampling programme will need to take this fact into account.

If taking more than one sample, the samples should normally be taken at fixed intervals during the whole control period. The control period shall normally be one month.

Sampling period

The overall sampling period may vary from a few hours, where tracing studies on volatile organics are being monitored, to several days, where stable inorganic species are being monitored.

This subclause deals with the selection of the period over which a composite sample has to be taken. When selecting the period, the following two factors should be considered:

- The objective of the sampling. For example, it may be necessary to assess the average organic load in a flow over several 24-hour periods, in which case diurnal flow proportional composite samples will be adequate.
- The stability of the sample. In the example given in (a), it would not necessarily be practical to extend the sampling period to longer than 24 hours, since the organic component in the sample under study may deteriorate.
- The stability of the sample may often limit the duration of the sampling period. In such cases, reference should be made to the specific analytical techniques to be employed and the receiving laboratory should be consulted, so correct preservative measures can be used.

Sample preservation and storage

The most common way of preserving wastewater samples is to cool to a temperature between 0 °C and 4 °C. When cooled to this temperature and stored in the dark, most samples are normally stable for up to 24 hours. For some determinants, long-term stability may be obtained by deep freezing (below 18 °C).

When collecting composite samples during extended periods, preservation should be an integral part of the sampling operation.

It may be necessary to use more than one sampling device, to allow both preserved and unpreserved samples to be taken.

The laboratory responsible for analysing the samples should always be consulted with regard to the selection of the preservation method and subsequent transport and storage.

Transportation of samples

a) Samples may include infectious substances;

b) Segregation of packages of dangerous goods for road transport is necessary;

c) Wastewater is classified in the Land Transport Rule Dangerous Goods 1999 Rule 45001 as Class 6.2 — Infectious Substance and may be carried by road and air transport as a Diagnostic Specimen in limited amounts;

d) By road the maximum volume of liquid in any one package should not be greater than 5 litres. By air the limit per package is 4 litres;

e) Containers shall be sufficiently robust to remain intact and continue to contain goods safely and without leaking for normal conditions of handling and loading;

f) Three layers of packaging shall be used;

g) Primary containers and one other layer of packaging shall be leak proof;

h) Ensure that you have filled out the appropriate documentation; and

i) Check with the laboratory that you are using, that they supply containers that meet the required standards.

Sample identification and records

A printed form for the sampling report should as a minimum include at least the following information:

- Name of the trade premises;
- Trade Waste Consent number;
- Sampling point;
- Date, start and stop of sampling;
- Time, start and stop of sampling;
- Duration of the sampling period;
- Details of the sampling method;
- Preservation method;
- Details of any field tests;
- Name of the person who carried out the sampling; and
- Information required for a complete chain of custody.

There are many publications that may assist in the development of a sampling programme. These include:

AS/NZS 5667:…	Water quality — Sampling
• Part 1:1998	Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples
• Part 10:1998	Guidance on sampling of waste waters
BS 6068:…	Water quality
• Part 6:…	Sampling
• Section 6.10:1993	Guidance on sampling of waste waters
BS EN 25667-1: 1994	Water quality. Sampling. Guidance on the design of

BS 6068-6.1:1981	sampling programmes
BS EN 25667-2: 1993 BS 6068-6.2:1981	Water quality. Sampling. Guidance on sampling techniques
BS EN 5667-3: 2003 BS 6068-6.3:2003	Water quality. Sampling. Guidance on the preservation and handling of water samples

New Zealand Municipal Wastewater Monitoring Guideline