

LEGISLATIVE COUNCIL BRIEF

Sewage Services Ordinance
(Cap.463)

SEWAGE SERVICES (SEWAGE CHARGE)(AMENDMENT) REGULATION 2007

SEWAGE SERVICES (TRADE EFFLUENT SURCHARGE)(AMENDMENT) REGULATION 2007

INTRODUCTION

At the meeting of the Executive Council on 13 March 2007, the Council ADVISED and the Chief Executive ORDERED that, under section 12 of the Sewage Services Ordinance, the following regulations should be made to, respectively, set out the Sewage Charge (SC) rates applicable over the coming ten years and extend the period during which a reassessed Trade Effluent Surcharge (TES) rate was effective from one year to two years -

- Annex A (a) Sewage Services (Sewage Charge)(Amendment) Regulation 2007 (Annex A); and
- Annex B (b) Sewage Services (Trade Effluent Surcharge)(Amendment) Regulation 2007 (Annex B).

JUSTIFICATIONS

2. It is generally accepted by the public, as well as the Legislative Council (LegCo), that the polluter-pays principle should be applied to the provision of sewage services to facilitate long-term sustainability of our environment. Last year the Administration completed a review of the sewage services charging scheme in accordance with the foregoing principle. We developed proposals which took into account the need to: (i) enhance the recovery rate of the operating costs attributable to the SC and thus provide further economic incentives to households and the trades to reduce sewage discharges; (ii) recover the anticipated substantial increases in annual operating expenditure when the Harbour Area Treatment Scheme (HATS) Stage 2A and other additional treatment facilities come into place over the coming ten years; and (iii) ensure that the adjustments are modest, gradual and affordable to

the community. On 28 December 2006, the Administration announced that the review has been completed and it was recommended that the following package of proposals be adopted-

- (a) as a long term goal, the operating cost of sewage services be fully recovered from the whole community, including both the public and the trades, in accordance with the polluter-pays principle;
- (b) as an interim target, the Sewage Charge (SC) be increased gradually so as to raise the cost recovery rate from about 54% at present to about 80% in ten years' time; and the fee levels in the coming ten-year period be set out in a single item of legislation;
- (c) regarding the Trade Effluent Surcharge (TES), to encourage pollution reduction measures and to address the concerns of the affected trades, the validity period of reassessments should be extended from one year to two years and the sampling requirement for small TES accounts (with daily pollution less than 50 kg Chemical Oxygen Demand (COD)) be reduced from three days to two days; and
- (d) we should aim to complete surveys of the quality of effluents of all trades subject to the TES within 12 months with a view to adjusting their generic chemical oxygen demand (COD) values and TES rates with effect from 1 April 2008.

PUBLIC CONSULTATION

3. The LegCo EA Panel was consulted on the package of proposals at its meetings on 5 January and 22 January 2007 respectively. At the latter meeting, a total of 11 public deputations offered views on the proposals. The Chairman concluded that the Administration should take into account views expressed by LegCo Members and the deputations when introducing the relevant subsidiary legislation into LegCo before the summer recess.

4. Further, following the announcement of the proposals on 28 December 2006, we conducted briefings for stakeholders including green groups, academics and representatives of the restaurant trade. The Advisory Council on the Environment was consulted on 12 February 2007 and the proposals were supported. The key issues raised by LegCo Members and other members of the public during the consultation and the Administration's response are summarized below -

- (a) **Adhering to the polluter-pays principle**: LegCo Members and members of the public reaffirmed their support to adhering to the polluter-pays principle in the provision of sewage services.

- (b) **Implementing the proposed SC adjustments over a ten-year period:** At the EA Panel meeting of 5 January 2007 some LegCo Members expressed concern about the economic, legal and political implications of approving the proposed SC adjustments over a ten-year period. In response, the Administration further explained the rationale for the ten-year increment scheme i.e. (i) to ensure that the operating cost of major new sewage treatment projects in the pipeline over the coming ten years, which will lead to further improvements in water quality in Victoria Harbour and across the territory, could be covered in future in a sustainable manner, (ii) to demonstrate LegCo's and the community's commitment to support long-term policies to sustain improvement of the water environment of Hong Kong; and (iii) to ensure a smooth progression of modest and gradual increases, avoiding any sharp changes which are unlikely to be welcomed by the community. We also explained that legal advice had been sought confirming that the proposal was constitutional and legally in order. At the EA Panel meeting on 22 January, a number of green groups echoed the view that the proposal was reasonable given the need to implement the polluter-pays principle and the long-term and substantial investment required for new sewage treatment facilities.
- (c) **Timely implementation of HATS Stage 2A:** There was general support for timely implementation of HATS Stage 2A. Engineering professionals, in particular, urged that Stage 2A be implemented without delay to provide treatment of the remaining sewage from the HATS catchment and boost employment for the sector.
- (d) **Commitment to implementing HATS Stage 2B:** Deputations from the engineering sector and some LegCo Members considered the phased approach reasonable as it would allow the flexibility to review the timing for implementation of HATS Stage 2B in view of the actual requirement, and would thus ensure cost-effectiveness in providing sewage services. On the other hand, a number of green groups considered that the Government should show a firm commitment to HATS Stage 2B by declaring a timetable for its construction. The deputations from the engineering sector also urged the Government to undertake the necessary planning and assessment work for HATS Stage 2B. There were also views that HATS Stage 2 should not be implemented by phases and Stages 2A and 2B should be built in one go.

In response, the Administration reiterated its intention to pursue biological treatment under HATS Stage 2. There were however different views in the community on the timing for implementation of Stage 2B. While some would aspire to immediate implementation of Stage 2B, there are also views that we should take into account the substantial

treatment cost relating to HATS Stage 2B (and the subsequent consequences for the SC and TES), and the actual environmental need, in considering the timing issue. We reiterated the need to move forward with Stage 2A while at the same time monitoring the population and sewage flow build-up, and the water quality trends, in preparation for a review of the timing of the implementation of Stage 2B in 2010/11. Meanwhile, we would also take steps to ensure that land would be available for the construction and operation of HATS Stage 2B.

- (e) **Environmental Impact of the Advance Disinfection Facilities**: LegCo recommended, in the Public Accounts Committee Report No.42 released in June 2004, that the commissioning of the disinfection facilities of HATS Stage 2A should be advanced. At the EA Panel meeting on 5 January 2007, there was a request for an assurance that the Tsuen Wan beaches which had to be closed following the full commissioning of HATS Stage 1, would be reopened as early as possible. While a number of green groups reiterated their concern about the possible environmental impact of the use of chlorination/dechlorination for disinfection, the deputations from the engineering sector considered that, subject to the results of the environmental impact assessment (EIA) study, the technology could be adopted as an interim measure. It was also suggested that it should only be applied when necessary e.g. during the swimming season to minimize possible impact on the environment.

In response, the Administration made clear that we have taken account of these concerns and have, in July 2005, commissioned the EIA study for the provision of disinfection facilities at the Stonecutters Island Sewage Treatment Works (SCISTW), which is expected to be completed by the second quarter of 2007. We also affirmed that we would not use chlorination/dechlorination if the EIA ultimately concludes that this technology would lead to unacceptable environmental consequences under the local conditions. The alternative of UV-irradiation for disinfection would then be considered but this would mean some delay in water quality improvements as a supplementary EIA study and a longer construction time might be required.

- (f) **Concerns of the restaurant trade**: Deputations from the restaurant trade urged early implementation of a revised TES rate for the trade. They opined that the impact of the proposed SC increment scheme, though modest in itself, would add to the burden of the trade. They also suggested that in the coming review for TES rates, the 100% target recovery rate should not be implemented immediately as there was no reason why the trades should not enjoy the same degree of subsidy as domestic users of sewage services.

In response, the Administration reaffirmed our goal of carrying out the effluent surveys for all the 30 TES trades within a year and then making the required adjustments to the generic COD values. We explained that since over 80% of the restaurants were currently paying less than \$500 per month for SC, the impact of the SC proposal (an increase of less than \$50 per month in the first year and total increase of \$700 per month over a ten-year period for these restaurants) should be modest and affordable to the trade. We would continue to encourage restaurants to adopt measures to reduce sewage discharge and save water so that pollution and cost could be reduced at the same time.

5. Given the generally positive reception by the community to the proposed package for the SC and TES review, we concluded we should introduce the relevant subsidiary legislation and amendments to the relevant Technical Memorandum (TM) into LegCo and, subject to acceptance of the package, seek funding from LegCo Public Works Sub-committee and the Finance Committee for the next HATS Stage 2A-related project before the summer break.

THE AMENDMENT REGULATIONS

Sewage Services (Sewage Charge)(Amendment) Regulation 2007

6. The main provisions of the Sewage Services (Sewage Charge)(Amendment) Regulation are clauses 2(1) and 4, which add a new schedule to set out the SC rates applicable in different periods. The prescribed rate applicable to a billing period is the rate prevailing on the commencement date of that billing period. The Regulation and the first SC increment will come into operation on 1 July 2007. From then and over the next 10 years, there would be an annual increase in the SC rate on 1 July each year.

7. Clause 3 repeals an obsolete transitional provision. Clauses 2(2) and 5 provide for the consequential amendments.

Sewage Services (Trade Effluent Surcharge)(Amendment) Regulation 2007

8. The main provisions of the Sewage Services (Trade Effluent Surcharge)(Amendment) Regulation 2007 are contained in clause 2, which extends the period during which a re-assessed TES rate is effective from one year to two years. Clause 3 repeals an obsolete transitional provision and replaces it with a new one. Under the new arrangement, for the prevailing cases to which a reassessed TES rate is still applicable on the date of commencement of the amendment regulation (i.e. 1 July 2007), the validity period for the reassessed TES rates shall be similarly extended from one year to two years from the beginning of the billing period.

9. The above is to ensure fair treatment to existing cases as well as all applications received and handled in the few months before the commencement of

the amendment regulation, such that all successful cases will have a validity period of at least two years irrespective of whether they are approved before or after the date of commencement. This also aims to mitigate the resources implications caused by the anticipated surge in caseload shortly after the proposed revision of the TES reassessment mechanism. It is consistent with our policy intention of reducing the cost of reassessment and will not undermine the integrity of the system.

THE TECHNICAL MEMORANDUM

10. Separately, as regards the proposal to reduce the number of specified sampling days for small establishments from three to two, this will be put into effect through amendments to the Technical Memorandum on the Procedures and Methods for Sampling and Analysis of Trade Effluents for the Trade Effluent Surcharge Scheme (the TM) issued by the Secretary for the Environment, Transport and Works (SETW) under section 13 of the Sewage Services Ordinance. Accordingly, SETW has approved the amendments to the above TM to put into effect the necessary changes, with the understanding that the proposed amendments to the TM are part and parcel of the overall SC and TES review package to be considered by LegCo for approval. Under the amended TM (section 3.6.2), for formal applications for reassessments received by the Drainage Authority i.e. the Director of Drainage Services or his authorized representatives, on or after 1 July 2007, the sampling requirement for those establishments with daily discharge of less than 50 kg COD will be reduced from three days to two days. The proposal will reduce the cost relating to reassessments for small establishments and hence encourage them to adopt pollution reduction measures. Pursuant to section 13 of the Ordinance, the revised TM will be gazetted on 23 March 2007 and tabled at the LegCo sitting on 28 March 2007. A copy of the TM as amended is at Annex C.

Annex C

LEGISLATIVE TIMETABLE

11. The legislative timetable is as follows –

Publication in the Gazette	23 March 2007
Tabling in the LegCo	28 March 2007
Commencement of amendment regulations	1 July 2007

IMPLICATIONS OF THE PROPOSALS

12. The proposals have economic, financial, environmental, sustainability and civil service implications as set out at Annex D. The proposals are in conformity with the Basic Law, including the provisions concerning human rights.

Annex D

They do not affect the current binding effect of the existing provisions of the Sewage Services Ordinance and its subsidiary legislation. They have no productivity implications.

PUBLICITY

13. A press release will be issued and a new series of APIs will be launched.

BACKGROUND

14. The sewage services charges (i.e. SC and TES) were introduced in Hong Kong on 1 April 1995 backed by the Sewage Services Ordinance, Cap. 463 enacted in 1994, the Sewage Services (Sewage Charge) Regulations (Cap. 463 Sub. Leg A) in 1995 and the Sewage Services (Trade Effluent Surcharges) Regulations (Cap. 463 Sub. Leg. B) in 1995.

15. The SC aims to recover the cost of the collection and treatment of the wastewater at or below a typical pollution strength equivalent to domestic sewage. The SC is collected from all users whose premises are connected to a government sewer. The TES is an additional charge on top of the SC, applying to 30 trades, for the additional cost incurred in treating effluents of strength higher than domestic sewage. Members of the same trades are subject to trade-specific generic TES rates, which are based on the respective generic COD value for each trade. Individual members of a trade are entitled to a lower TES rate if they can, through the reassessment process, prove that the effluent they discharge is weaker than that suggested by the relevant generic COD value.

ENQUIRIES

16. For any enquiries, please contact Mr CHOW Wing-hang, Senior Administrative Officer (Water Policy Division), at 2594 6227.

Environmental Protection Department
21 March 2007

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(Cap.463)

SEWAGE SERVICES (SEWAGE CHARGE)(AMENDMENT) REGULATION 2007

SEWAGE SERVICES (TRADE EFFLUENT SURCHARGE)(AMENDMENT) REGULATION 2007

ANNEXES

- Annex A Sewage Services (Sewage Charge)(Amendment) Regulation 2007
- Annex B Sewage Services (Trade Effluent Surcharge)(Amendment) Regulation 2007
- Annex C Trade Effluent Surcharge Scheme Technical Memorandum on Procedures and Methods for Sampling and Analysis of Trade Effluents
- Annex D Implications of the Proposals

**SEWAGE SERVICES (SEWAGE CHARGE) (AMENDMENT)
REGULATION 2007**

(Made by the Chief Executive in Council under section 12 of the
Sewage Services Ordinance (Cap. 463))

1. Commencement

This Regulation shall come into operation on 1 July 2007.

2. Sewage charges

(1) Section 2(1) of the Sewage Services (Sewage Charge) Regulation (Cap. 463 sub. leg. A) is amended by repealing everything after “the prescribed rate” and substituting –

“for each cubic metre of water (other than water supplied specifically for flushing purposes) supplied during a billing period –

(a) that commences in a period specified in column 2 of Part 1 of Schedule 1 shall be the rate specified in column 3 of Part 1 of Schedule 1 opposite to that period;

(b) that commences on or after 1 July 2017 shall be the rate specified in Part 2 of Schedule 1.”.

(2) Section 2(2) is amended by repealing “the Schedule” and substituting “Schedule 2”.

3. Transitional

Section 4 is repealed.

4. Schedule 1 added

The following is added –

“SCHEDULE 1 [s. 2(1)]
PRESCRIBED RATE OF SEWAGE
CHARGE
PART 1

Item	Periods	Prescribed rate \$ per cubic metre of water supplied
1.	1 April 1995 – 30 June 2007	1.20
2.	1 July 2007 – 30 June 2008	1.31
3.	1 July 2008 – 30 June 2009	1.43
4.	1 July 2009 – 30 June 2010	1.57
5.	1 July 2010 – 30 June 2011	1.71
6.	1 July 2011 – 30 June 2012	1.87
7.	1 July 2012 – 30 June 2013	2.05
8.	1 July 2013 – 30 June 2014	2.24
9.	1 July 2014 – 30 June 2015	2.44
10.	1 July 2015 – 30 June 2016	2.67
11.	1 July 2016 – 30 June 2017	2.92

PART 2

\$2.92 per cubic metre of water supplied”.

5. Trade, business or manufacture

The Schedule is amended by repealing “SCHEDULE” and substituting “SCHEDULE 2”.

Clerk to the Executive Council

COUNCIL CHAMBER

13 March 2007

Explanatory Note

This Regulation amends the Sewage Services (Sewage Charge) Regulation (Cap. 463 sub. leg. A) (“the principal Regulation”) to increase the rate of sewage charge in phases.

2. Section 4 adds a new Schedule to the principal Regulation to set out the rates of sewage charge applicable in different periods. The prescribed rate applicable to a billing period is the rate prevailing on the commencement date of that billing period.

3. Section 3 repeals section 4 of the principal Regulation to delete an obsolete transitional provision.

4. Sections 2(2) and 5 provide for the consequential amendments.

**SEWAGE SERVICES (TRADE EFFLUENT SURCHARGE)
(AMENDMENT) REGULATION 2007**

(Made by the Chief Executive in Council under section 12 of the
Sewage Services Ordinance (Cap. 463))

1. Commencement

This Regulation shall come into operation on 1 July 2007.

2. Variation of trade effluent surcharge rate

(1) Section 4(3) of the Sewage Services (Trade Effluent Surcharge) Regulation (Cap. 463 sub. leg. B) is amended by repealing “1 year at which time the rate established under” and substituting “2 years. Upon the expiry of those 2 years the rate provided for in”.

(2) Section 4(4) is amended by repealing “1 year” and substituting “2 years”.

3. Section substituted

Section 8 is repealed and the following substituted –

“8. Transitional

Where a new trade effluent surcharge rate –

- (a) was determined under section 4(2) before 1 July 2007 during a billing period; and
- (b) is applicable to the relevant consumer or agent on 1 July 2007,

the new rate shall be in effect for 2 years from the beginning of the billing period. Upon the expiry of those 2 years the rate provided for in section 3 shall apply subject to the consumer or agent having further tests done under section 4(1) and the Drainage Authority making another determination under section 4.”.

Clerk to the Executive Council

COUNCIL CHAMBER

13 March 2007

Explanatory Note

This Regulation amends the Sewage Services (Trade Effluent Surcharge) Regulation (Cap. 463 sub. leg. B) (“the principal Regulation”).

2. Section 2 extends the period during which the re-assessed trade effluent surcharge rate has effect.
3. Section 3 repeals section 8 of the principal Regulation to delete an obsolete transitional provision and replaces it with a new transitional provision.

**TRADE EFFLUENT SURCHARGE SCHEME
TECHNICAL MEMORANDUM ON PROCEDURES AND METHODS
FOR SAMPLING AND ANALYSIS OF TRADE EFFLUENTS**

1. PRELIMINARY

1.1 *Citation and commencement*

This technical memorandum is issued under Section 13 of the Sewage Services Ordinance. It may be cited as the Technical Memorandum on the Procedures and Methods for Sampling and Analysis of Trade Effluents for the Trade Effluent Surcharge Scheme.

This technical memorandum supersedes the one issued by the then Secretary for Works on 27 February 1995 under Section 13 of the Sewage Services Ordinance.

1.2 *Application and scope*

1.2.1 The Sewage Services Ordinance sets out mechanisms for the collection of charges for the provision of sewage services to consumers and separately for the reception of trade effluent produced in the course of any trade, business or manufacture. The charges relating to the latter are based on an assessment of the quality and quantity of the materials discharged, and the Ordinance allows for the provision of a Technical Memorandum to set out the procedures and methods to be adopted for sampling, analysis, approval of laboratories, presentation of results, and any other matters relating to the establishment of specific effluent characteristics. These apply in the following circumstances :—

1. formal application by a consumer for acceptance of a specific effluent characteristics;
2. sampling and analysis undertaken by the Drainage Authority for the purposes of assigning or auditing specific effluent characteristics for an individual consumer.

1.2.2 The Drainage Authority will only consider an application for reassessment of effluent characteristics if the application is accompanied by details of proposed sampling schedules etc. as specified in this memorandum. Only following acceptance of these proposals by the Drainage Authority, may sampling and analysis commence. Once satisfactory sampling and analysis have been completed a certificate will be required from the laboratory confirming that the

samples have been obtained, and that the sample preparation and the analyses have been undertaken in the manner described in this Technical Memorandum.

2. INTERPRETATION

2.1 This memorandum uses standard scientific terms. Where the Ordinance or the Regulations made thereunder defines a term, that definition applies.

2.2 In this memorandum, the following definitions also apply.

“Laboratory” — a laboratory accredited within the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the analyses described in this memorandum.

“Homogenisation” refers to the process of ensuring that the sample is uniform so that identical portions may be taken. Various techniques are used (e.g. blenders or ultrasonic mixers) in the laboratory to achieve this, dependent upon the nature of the sample.

“Methodology” is a scientific term used to describe the procedures adopted.

“COD” refers to the Chemical Oxygen Demand.

“Adsorption” is the accumulation of materials on a surface.

“Composite” has the same meaning as combine.

“Particulate Fraction” is the solid part of the sample, which will settle out of the sample on standing.

“Immiscible Fraction” is the component of the sample which does not mix with water and will separate out on standing.

“Recovery” refers to the accuracy of the COD test, comparing the value of the COD measured experimentally for a standard solution to the theoretical value for its oxidation. The amount determined experimentally (recovered) indicates the effectiveness of the laboratory analysis.

“Aliquot” is a representative portion of a sample used for analysis.

3. SAMPLING PROCEDURES

3.1 *Introduction*

3.1.1 The techniques used for the collection of samples are critical to the determination of the characteristics of the effluent discharged, especially where the nature of the waste is variable, both during the course of the working day and during the week. Dischargers should develop a sampling procedure which specifies the organisations to be employed and the methods to be adopted to ensure that representative sampling has been undertaken.

3.1.2 Detailed guidance on sampling methodology is available in various published methods, [Ref 1] & [Ref 2]. These include information for the satisfactory design of appropriate sampling programmes, such as the principles of sampling, the relevant statistical analysis and the range of techniques available to ensure that a representative sample is obtained from both homogenous and non-homogenous systems. Reference to these should enable adequate sampling arrangements to be proposed by the trader or his representative.

3.2 *Sampling arrangements – authorization*

The proposed sample collection arrangements must be approved in advance by the Drainage Authority to ensure that the sampling is valid before programme commencement. In addition, whilst the sampling programme is under way the Drainage Authority may inspect the site at any time to confirm that the agreed sampling protocol is being complied with. Following completion of sampling the discharger must confirm to the Drainage Authority that the agreed methodology has been used throughout. If the sampling is found not to conform to the approved arrangements all previous samples and results from the survey will be considered to be void.

3.3 *Sample collection*

3.3.1 Discrete individual samples must be taken throughout the working hours of the establishment, in order to establish the average concentration of COD discharged in the effluent during that period. A minimum of 96 samples per 24 hour period would be necessary to ensure a representative composite sample can be produced. Where the effluent flow is constant, these individual samples may be taken at 15 minute intervals and then equal portions combined (see Section 5.1). However where the flow varies it will be necessary to take individual samples at discrete flow intervals indicated by a suitable meter so that at least 96 samples are taken in a 24 hour period (i.e. if the daily flow is $X \text{ m}^3$, then a sample must be taken for every $X/96 \text{ m}^3$ of effluent flow)—with variable flow rates the

Ref 1 General Principles of Sampling and Accuracy of Results 1980—DoE Standing Committee of Analysts (Methods for the Examination of Waters and Associated Materials 1980), HMSO London ISBN 011 751491 8]

Ref 2 Sampling of Oils, Fats, Waxes and Tars in Aqueous and Solid Systems 1983—DoE SCA, HMSO London ISBN 011 7519 561]

time interval may become substantially lower or greater than the 15 minute intervals specified for constant flows.

3.3.2 Where a batch process is employed the time interval may be so short as to render collection of 96 samples impossible. In these circumstances, special arrangements (e.g. sampling the bulk tank prior to discharge) must be agreed with the Drainage Authority.

3.3.3 As an alternative to manual sampling, an automatic sampler triggered by pulses from a flow meter could be used for this purpose. This has the advantage that it automatically provides a flow weighted composite sample over the relevant periods. However, auto sampling is unsuitable for certain effluents such as : —

- effluents with a high solids and/or grease content;
- discharges from industries which could cause ragging or blockages of the equipment (e.g. textiles).

For these effluents, manual samples must be taken.

3.3.4 Individual samples must be collected in glass bottles to ensure an adequate sample of the particulate fraction is obtained, adsorption minimised and that when equal portions of these samples are composited, the portions used are representative. If the samples appear to be inhomogeneous these must be homogenised (blended) prior to compositing. All samples taken must be composited and analyzed within 24 hours of sampling (see sample preparation in Section 5).

3.3.5 At least 500 mL of each discrete sample must be taken to ensure that a representative sample has been obtained, and to allow for the subsequent combining of samples.

3.3.6 In addition care must be taken to avoid contamination of the sample and to ensure that a sample representative of the effluent characteristics is taken. Specific points that require consideration include : —

- Cleanliness of sampling equipment to avoid contamination;
- Use of wide mouth glass sampling bottles, which should be thoroughly cleaned prior to use by rinsing with sulphuric acid to remove any organics;
- Except where high concentrations of grease and solids are present, the bottle should be rinsed two or three times in the discharge stream, prior to collection of the sample;
- The need to exercise care during sampling to avoid incorporation of solids that may be attached to the effluent channel or pipe.

3.4 *Sampling location*

3.4.1 It is crucial that the sampling location and equipment be selected to ensure a representative sample is obtained. It is important that the sample location is selected in such a way as to ensure that all fractions are collected, including the dissolved, particulate and immiscible fractions, as the COD that is to be measured by the subsequent analysis may be associated with any/all of these fractions.

3.4.2 If a pump is used to deliver the sample or an automatic sampler is used, these should be selected such that flow rates within sampling lines are sufficiently high to prevent deposition of suspended materials, and the collection device for the sampler or pump must be pointed upstream to minimise any effects from the flow in the channel. Samples must be taken from a location which maintains fully turbulent conditions it may be necessary to construct a weir to achieve this. Detailed information on selection of sampling location and key considerations is provided in Refs 1 & 2.

3.4.3 To avoid the possibility of unrepresentative samples leading to anomalous results, it is essential that the conditions of sampling are clearly defined by the establishment concerned. In addition water distribution and drainage layouts must be reviewed to determine the most representative sampling locations.

3.4.4 If the establishment has more than one discharge point, the sample location should be established so that all such discharges which contain trade effluent are captured, samples being collected sufficiently far downstream of the last inflow to ensure a well mixed sample. Alternatively separate samples of each discharge must be taken and aggregated into a flow weighted composite sample for the whole establishment prior to analysis.

3.4.5 The depth and volume of flow must be recorded during sampling, together with the depth at which the sampler is positioned, to demonstrate that the sample taken is representative of the flow as a whole. This is particularly important for establishments with multiple discharge points.

3.5 *Sampling documentation*

In order to confirm the suitability of the proposals the Drainage Authority must be provided with details of the proposed sample collection arrangements. The following information must be included :—

- Number of discharge points from the establishment;
- Diagram showing discharge points and sample collection points;
- Flow rate information;
- Type of sample collection device;
- Depth of flow at time of sampling and sampling collection depth;
- Statement confirming the competence of the sampler to verify that sample *will be* representative of effluent flow;

- Description of any unusual circumstances pertinent to the sample collection;
- Description of any unusual circumstances pertinent to the process or discharge.

3.6 *Sampling Frequency*

3.6.1 The number of days of sampling required for the formal review to establish the effluent characteristics inevitably depends upon the nature of the effluent concerned. Where water usage and effluent characteristics of the establishment are highly variable both on a weekly and monthly basis, the establishment must propose a representative sampling schedule to the Drainage Authority.

3.6.2 Where there is relatively little variation in both daily water usage and daily composite effluent quality on working days (no more than 25%) the number of days of sampling required is given in the tables below. For formal applications received by the Drainage Authority before 1 July 2007, the sampling frequency in Table 1 shall apply. For formal applications received by the Drainage Authority on or after 1 July 2007, the sampling frequency in Table 2 shall apply.

Table 1

Sampling Frequency

Range of Discharged COD (kg/day)	Number of Days of Sampling
0 – 100	3
101 – 300	4
301 – 600	5
>601	6

Table 2

Sampling Frequency

Range of Discharged COD (kg/day)	Number of Days of Sampling
0 – 50	2
51 – 100	3
101 – 300	4
301 - 600	5
> 601	6

3.6.3 The sampling frequency should be determined by using the current trade effluent surcharge estimate of COD load discharged (i.e. using water meter readings

for the latest billing period; discharge factor, if any; and COD concentrations from generic characteristics).

3.6.4 Relevant data for the latest year and associated details of any batch processes employed by the establishment that may affect effluent quality must be supplied to the Drainage Authority with the sampling proposal.

3.6.5 The COD of the flow weighted sample for each day of sampling is determined as in Section 5 and 6, and the flow weighted average COD values required for determination of the TES charge are calculated from these in accordance with the equation given in Section 6.5.

4. SAMPLE TRANSPORT AND STORAGE

Samples should be transported to the laboratory for analysis as soon as possible following collection, and must be refrigerated (at 4°C) or iced from the time of collection. To minimise the possibility of either changes in concentration or adsorption of material onto container walls affecting the results, the samples must be analyzed within 24 hours of collection. Retention of samples for periods of longer than 24 hours prior to analysis will only be permitted if stability of the sample over a longer period can be demonstrated to the satisfaction of the Drainage Authority by the laboratory concerned. Samples with a high grease/oil content may rapidly change in nature and must be analyzed as soon as possible.

5. SAMPLE PREPARATION

5.1 *Preparation of composites*

5.1.1 Samples must be homogenised and combined immediately on arrival at the nominated laboratory, or on site by the sampler, if this has been agreed with the Drainage Authority. The nature of the homogenisation technique selected by the laboratory will be dependent upon the nature of the sample however the method adopted must be agreed in advance with the Drainage Authority.

5.1.2 Equal portions of each sample taken are then combined to produce the composite 24 hour sample to be used for subsequent analysis. At least two 1L composite samples must be prepared, using the same method, for each 24 hour period sampled. One to provide sufficient volume for subsequent analysis and the other to be made available to the Drainage Authority for analysis, if the Authority consider this necessary to verify original results. This must be preserved for seven working days.

5.1.3 The sample for analysis must be split to provide the two separate portions necessary for the TES scheme (settled COD and total COD). Before this is

undertaken, the sample must be adjusted to a temperature of 25°C and pH 7 using the method specified in [Ref 3], the sample should be homogenised if necessary and then two separate sub samples of 500 mL taken.

5.2 Preparation of Sample for total COD measurement

One 500 mL sub sample is homogenised and a suitable aliquot taken (refer to Section 6) to enable the total COD of the original sample to be determined.

5.3 Preparation of Sample for settled COD measurement

5.3.1 The remaining sub-sample is left to settle for one hour at a temperature of 25°C, during which time the settleable solids will move to the bottom and the fats, oils and greases will rise to the top. The sample for analysis must be drawn from the middle section, whilst ensuring that the settled layers are not disturbed. The detailed procedure to be adopted is that given as [Ref 3].

5.3.2 At least 500 mL of sample should be used for separation by the above technique and at least 250 mL removed for analysis of settleable COD. A smaller aliquot may be required for the actual analysis, consistent with the requirements of the methodology.

6. METHOD OF ANALYSIS

6.1 Introduction

6.1.1 The TES scheme makes use of the Chemical Oxygen Demand (COD) test to provide a measure of the organic matter of a sample that is susceptible to oxidation by a strong chemical oxidant. In order to provide the two parameters adopted within the Sewage Services (Trade Effluent Surcharge) Regulation, namely COD settled and COD total, two samples are prepared as described previously and they are both analyzed by a specified standard method.

6.1.2 Analysis undertaken for the above purpose must be carried out in a laboratory with HOKLAS registration for COD analysis; this will ensure a consistent quality of test for all applications for establishment of specific effluent characteristics. Laboratory reports in connection with this must include the certification information for the laboratory conducting the analysis, along with the quality control results (specified in Section 6.4), to allow the Drainage Authority to evaluate the quality of the data provided in support of the application.

6.2 Test Method

Ref 3 Suspended Matter, Settleable and Dissolved solids in Waters and Effluents 1980—DoE SCA method—HMSO London ISBN 011 751957 X]

6.2.1 The open reflux COD method (APHA 5220 B) [Ref 4] should be used to determine the COD concentrations of the samples. This method has the advantage of using a large enough sample to ensure a representative result, but will not include the contribution of any volatile organics, which will be lost in sampling or during the reflux conditions.

6.2.2 If other COD methods are considered suitable by the analyzing laboratory, details regarding these, including comparative performance characteristics for the samples to be analyzed, should be provided to the Drainage Authority, who will determine the acceptability of the alternative proposed.

6.3 *Possible Causes of Interference*

6.3.1 The analytical method specified for COD may be subject to various interferences, the most notable in Hong Kong being due to the possible salinity of the effluent. For effluents containing high concentrations of salt, precautions are mentioned in the method where the salinity (measured as chloride) is less than 2000 mg/L. For samples with higher chloride concentrations, the procedure for measuring COD in saline waters should be used, [Ref 5]. The options for measuring COD in saline water should be assessed by the laboratory for the samples concerned to ensure that the method selected does not affect the accuracy of the result reported—the analyst should be aware that using these technique may lead to results with a high bias. As an alternative, the sample can be diluted to reduce the chloride level to less than 2000 mg/L provided that it can be demonstrated to the satisfaction to the Drainage Authority that this does not affect the accuracy of the result. COD values must *then* be multiplied by the appropriate dilution factor.

6.3.2 In addition other potential interferences, such as those from reduced inorganic substances are described in the referenced method.

6.3.3 All of these interferences will yield COD measurements with a high bias. It is the responsibility of the laboratory conducting the analysis to demonstrate to the satisfaction of the Drainage Authority that results are biased high due to one of these interferences; otherwise results will be considered to be a true representation of the COD.

6.4 *Quality Control*

Ref 4 Standard Methods for the Examination of Water and Wastewater, 18th edition: American Public Health Association, (1992)—ISBN 0 87553 207 1

Ref 5 Procedures for overcoming Cl interference are given in :-
Correction for chloride interference in the chemical oxygen demand test: Burns, E.R. & C. Marshall, 1965, J. Water Pollut. Control Fed. 37:1716.
Dichromate reflux chemical oxygen demand: A proposed method for chloride correction in highly saline water: Baumann, F.I. 1974, Anal Chem. 46:1336.

Quality control procedures are described in the referenced test method [Ref 4], and must be used to verify the accuracy of the analysis. The standard solution (of known strength) involved must be analyzed daily and the results compared to a control chart held as part of the analytical quality control procedures of the laboratory concerned. Results of the analysis of this standard must be within the range of the control chart used by the accredited laboratory the relative standard deviation obtained must be within the performance characteristics of the method adopted. *Recovery must be reported along with the sample results*, and the latter will only be accepted if recovery meets these limits.

6.5 Reporting Results

6.5.1 When reporting analytical results for this programme, the information described below must be provided. Some of this would be transmitted directly from the sampler (which may or may not be the laboratory) to the laboratory, while other data would be generated in the laboratory itself.

6.5.2 Additional requirements for reporting both proposed sample collection arrangements and their satisfactory completion are described in Section 3.5.

6.5.3 The information required will include :—

- Identification and accreditation of the laboratory performing the analysis.
- Date, time and volume collected, date received by laboratory, and date analyzed.
- Verification by the laboratory that the sample was received in the laboratory in a cold, intact condition.
- Homogenisation technique and volume of sample analyzed.
- All analytical results in mg/L.
- Results for the associated quality control standard in percent recovery.
- Sample location in relation to flow streams and drainage/sewerage layout.
- Type of sample collection (flow weighted proportional sampler, manually composited samples, etc.)
- General observations of sample conditions.
- Flow estimates and method (e.g. water meter readings, depth/velocity monitoring etc.)

6.5.4 The results of each analysis must be reported to the Drainage Authority within three working days of commencement of analysis.

6.5.5 The laboratory will then calculate the mean flow weighted COD (total) and COD (settled) for the sampling period and provide this information to the Drainage Authority in support of the application for re-assessment. The general formula to be used for this is :—

$$\text{Average COD concentration} = \frac{[\text{COD (day 1)} \times \text{flow (day 1)}] + [\text{COD (day 2)} \times \text{flow (day 2)}] + \text{etc....}}{\text{flow (day 1)} + \text{flow (day 2)} + \text{etc....}}$$

6.5.6 The Drainage Authority may require to verify any of the above (or other relevant) data or procedures with the persons/organisations responsible for provision before acceptance of the results of the survey.

Implications of the Proposals

Economic implications

The economic implications are as follows:

- (a) Consecutive increases in Sewage Charge (SC) will incentivize households and businesses to economize on using water resources.
- (b) This, together with the review of the Trade Effluent Surcharge (TES) reassessment mechanism, would induce more effective pollution control practices by the more polluting trades.
- (c) The 9.3% per year increase in SC rate during 2007/08 is estimated to raise the Composite Consumer Price Index (CCPI) by 0.006 percentage points a year, which is relatively insignificant and should have minimal restraining effect on disposable household income.
- (d) The increase in SC alone will raise operating costs of the restaurant trade by a mere 0.018 percentage points a year. While small establishments in the restaurant trade may face a more difficult operating environment, the increase may be partly offset by the concurrent review of the TES.
- (e) Improvement in water quality in Victoria Harbour would enhance Hong Kong's reputation as an environmentally responsible city and its competitiveness as an international business and financial centre.

Financial implications

2. The financial implications of the proposal are as follows:

- (a) Our proposal to increase the SC by ten consecutive increments of 9.3% is estimated to increase SC revenue by around \$900 million by 2016/17.
- (b) By 2016/17 we expect to be recovering about 80% of the sewage treatment expenditure attributed to the SC. The subsidy by the Government is estimated to be around \$390 million, which is slightly less than the existing level of subsidy.
- (c) The proposed revisions in the TES reassessment mechanism will provide more financial incentives and may attract more TES establishments to seek reassessment. However, it is difficult to estimate the amount of revenue loss arising from the proposed revisions as it is difficult to

ascertain how many more TES establishments will be attracted to seek reassessment by the proposed revisions. As a rough indication, assuming only the top 20% of the restaurants that discharge less than 50 kg Chemical Oxygen Demand (COD) daily and consume enough water such that they can potentially break even or realize savings apply for reassessment and become entitled to lower TES rates, the estimated revenue loss from the revisions in reassessment mechanism is around \$25 million per annum¹.

- (d) If LegCo agrees to the proposed increase in the SC and the revisions of the TES reassessment mechanism, we will seek the Finance Committee's funding approval for the implementation of the advance disinfection facilities under the Harbour Area Treatment Scheme (HATS) Stage 2A and the planning and design of upgrading of various sewerage works at a total capital cost of around \$179 million. We will seek funding approval from the Finance Committee in the second half of 2008 for the Sludge Treatment Facility and in the first half of 2009 for the actual construction of the remaining works under HATS Stage 2A. The total capital cost is estimated to be around \$10,619 million. The total recurrent operating costs for the HATS Stage 2A facilities and Sludge Treatment Facility upon full commissioning are estimated to be \$566 million per annum.

Sustainability implications

3. The proposed gradual increments in the SC will progressively reduce taxpayers' subsidy and improve the financial sustainability of the sewage treatment systems in Hong Kong. Since the SC increases in dollar terms are modest, the proposals will not impose significant economic pressure on the public and the trades. The move to a more rigorous application of the polluter-pays principle should encourage more rational behaviour and thus help reduce the overall cost of wastewater treatment to society. In general, the proposal is in line with the sustainability principles of minimizing our ecological footprint through improving consumption efficiency and seeking opportunities to enhance environmental quality.

Environmental implications

4. We expect that both the increase in SC and revisions to the TES reassessment mechanism would bring a certain degree of environmental benefit. With increments in the SC, the public and the trades will have more incentive to reduce water consumption and (for trades) the amount of pollution discharged. With a simplified reassessment mechanism, more TES establishments will find it economically rewarding to invest in pollution reduction measures.

¹ In the extremely unlikely case that all such restaurants apply for reassessment and succeed, the estimated revenue loss is around \$65 million p.a.

5. The HATS Stage 2A project is a Designated Project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance. An environmental permit under the Ordinance is required for its construction and operation. The EIA study for the project is being carried in accordance with the Ordinance. The public and the Advisory Council on the Environment will have the opportunity to comment on the EIA report before the report is approved.

Civil service implications

6. The proposed increase in SC has no civil service implications. Although more TES establishments will opt for reassessment, each successful case will have a longer validity period. We expect that the caseload per year would remain more or less the same. Any need for a temporary increase in manpower to handle a sudden surge in caseload shortly after the proposed revisions to the TES reassessment mechanism comes into effect would be met by redeployment of the existing resources of the Drainage Services Department.