

For discussion
on 28 January 2002

Legislative Council Panel on Environmental Affairs

Water Pollution Control Ordinance, Chapter 358

Proposed Amendments to the Technical Memorandum on Effluent Standards

Purpose

This paper seeks Members' advice on the proposed amendments to improve and streamline the Technical Memorandum on Effluent Standards (TM) promulgated under section 21 of the Water Pollution Control Ordinance, Cap 358 (WPCO).

Background

2. Under the WPCO, effluent discharges into the drainage system, the sewerage system or environmental waters¹ of Hong Kong are regulated by means of a licensing system administered by the Director of Environmental Protection (the Authority). A TM issued under the WPCO sets out the standards for effluent that are acceptable for discharge to different receiving systems, namely foul sewers, inland and coastal waters. In issuing or renewing a discharge licence, the Authority makes reference to the TM for the purpose of fixing the licence conditions.

3. The existing TM was issued by the then Secretary for Planning, Environment and Lands in 1991. It sets out the effluent standards in 12 tables for discharges to different receiving systems. Each table has up to 34 determinands and up to 13 discharge flow bands. Contaminant limits vary with the rate of effluent being discharged. Under the WPCO, amendments to the TM proposed by the Secretary for the Environment and Food (who was delegated with the relevant authority upon the establishment of the Environment and Food Bureau in January 2000) must first be published in the Gazette and then laid on the table of the Legislative Council (LegCo)

¹ This refers to waters in the natural environment, including sea water, rivers, streams, lakes and water gathering grounds.

for “negative vetting” before they can be formally adopted. Under the “negative vetting” procedure, the Council has a period of 28 days² within which to propose amendments to the Government’s proposals. The amended TM would come into operation at the end of the negative vetting period unless before then LegCo has passed a resolution proposing amendments to the Government’s proposals.

The Review

4. Since the promulgation of the current TM in 1991 and its progressive implementation, Hong Kong’s economic structure has changed. There were also requests from some trades (e.g. the electronics and catering trades) in the past few years for the Government to review the TM standards in the light of experience gained in implementing the TM. Taking into account these factors, the Environmental Protection Department (EPD) initiated a review of the TM with the aim of simplifying it and ensuring that the effluent standards specified remain relevant to current conditions and environmental requirements.

5. The review³ was completed in March 2000. In brief, the review recommended that the standards for more than 95% of the discharges should remain unchanged or relaxed, while the remaining discharges, in particular direct discharges to the more sensitive environmental waters (e.g. bathing beaches and semi-enclosed bays like Tai Tam Bay and Mirs Bay), should be subject to tighter standards in certain aspects so as to offer better protection to the environment.

Proposed Amendments

6. The outcome of the review was distributed to 35 external stakeholder groups, including green groups, academics and relevant trade associations for consultation. A list of the parties we consulted is at **Annex I**.

² If the end of the 28-day period falls on a date after the end of a LegCo session or a dissolution but on or before the day of the second sitting of the next LegCo session, the period shall be deemed to extend to and expire on the day after that second sitting of the LegCo. LegCo may also by resolution extend the end of the “negative vetting period” to the next meeting.

³ In conducting the review, the EPD has taken into account various factors including the existing groupings of different receiving systems, requirements of those systems from the point of view of protection of the environment, the nature and volume of existing discharges, currently available wastewater treatment techniques, latest enforcement experience and international standards.

7. All the original proposals were generally well received by consultees, with the exception of proposals (a), (b) and (c) below. Taking into consideration these views, we have produced a set of proposed amendments to the TM which are set out briefly below -

Streamlining of flow bands

- (a) We **propose** to set the standards for any flow above 1,000 m³/day on a case-by-case basis. A few main trade groups initially expressed reservations as they were worried that they might be faced with onerous new requirements upon licence renewal, without time to adjust to them. However, all these trade groups, with the exception of the bleaching and dyeing (B&D) trade, have subsequently accepted EPD's commitment that for existing discharges above the 1,000m³/day flow band, the standard for the first renewed licence after the new TM comes into operation would in general not be more stringent than the current one. The B&D trade requested that the standards should be prescribed at least for flows up to 2,000 m³/day. We consider that with EPD's commitment above, the lead-time of at least five years should be sufficient for the licensees to adjust their treatment facilities, if necessary, to meet any new standards that may be required for the higher flow bands. Hence, we propose to retain the original proposal.
- (b) At present, some tables in the TM include effluent standards for as many as 13 flow bands. We **propose** to merge some of these flow bands such that the number of flow bands for discharges to inland/coastal waters and foul sewer will be respectively reduced to two and three. This will result in the tightening of some standards for small discharges (i.e. ≤ 10 m³/day) to inshore coastal waters. The petroleum trade objects to this proposed amendment as it considers that there is no practical and feasible way for about 30 affected petrol filling stations to comply with such standards. However, the proposed standards for discharge into inshore waters are in fact the same as those that are currently being applied to existing petrol filling stations that discharge into inland waters. We consider that the 30 odd stations which discharge into inshore waters should have no difficulties in meeting these new standards through improvement in their mode of operation and proper segregation of discharge streams, particularly as their discharge is only of a small quantity. If upgrading a treatment facility is found to be necessary for some petrol filling

stations, we will allow these stations ample time for the work. In view of the above, we propose to retain the original proposal. To match the streamlined simplified flow bands, we also **propose** to amend slightly the standards for some conventional parameters such as BOD₅⁴, COD⁵, and TSS⁶. With the exception of the aforesaid views raised by the petroleum trade, the consultees had raised no objection to these amendments.

Relaxation of standards for discharges to sewer

- (c) Having considered the conditions of the local catering industry and the standards applied in other places with cooking styles similar to Hong Kong, we initially proposed to set the sewer discharge standard for oil and grease (O&G) at 100 mg/L across the board for flows up to 1,000 m³/day. During the consultation, the catering trade asked for further relaxation of the proposed standard for restaurants that discharge less than 100 m³ of effluent per day. As this counter-proposal would not adversely affect water quality and having taken into account views of other consultees such as academics and wastewater treatment professionals, we **propose** to adopt the standards suggested by the trade. Over 8,000 catering operations will be subject to this new relaxed standards.
- (d) Upon review of relevant overseas practices, we **propose** to repeal the prohibition for discharge of petroleum hydrocarbon to sewers and to set a standard at 100 mg/L. EPD considers the proposed standard adequate for the protection of downstream wastewater treatment facilities and receiving waters. Over 133 petrol filling stations are expected to benefit from this proposed relaxation.

Rationalising the water body groupings

- (e) To streamline the administrative work in issuing licences under WPCO, give a clearer picture to the public on inland water groupings and avoid disputes in classification of inland waters, we **propose** to reduce the number of inland

⁴ BOD₅ means 5-day biochemical oxygen demand. It is a measure of the amount of oxygen used up by microbial in decomposing organic matter in a water sample over a period of 5 days.

⁵ COD means chemical oxygen demand. It is a measure of the amount of oxygen used up when a water sample is oxidized by a strong oxidant.

⁶ TSS means total suspended solids. It is a measure of the solid particles contained in a water sample.

water groups from four to two by merging the “irrigation”, “pond fish culture” and “general amenity and secondary contact recreation” groups into one group.

- (f) Taking into account the hydrodynamic condition and assimilative capacity of different water bodies, we **propose** to reduce the existing coastal water groups from six to three, namely “semi-enclosed water bodies”, “inshore waters” and “marine waters” so as to streamline the classification of coastal water groups.

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Reviewing standards for toxic metals

- (g) Taking into account the significant change in the economic structure of Hong Kong and the impact of such discharges on the environment, we **propose** to relax the standards for discharging toxic metals and toxic substances, which originated mainly from the industrial sector, to sewers and to tighten some of the standards for direct discharges to inland and coastal waters. Since zinc is commonly considered as a toxic metal, we also **propose** to include it in the toxic metal list of the revised TM. Printed-circuit board (PCB) manufacturing and electroplating industries which discharge to sewers are expected to benefit from these proposals.

Enhancing protection of sensitive water bodies

- (h) The re-grouping of coastal waters (proposal (f)) will lead to more sensitive coastal waters such as Junk Bay, parts of Mirs Bay, Discovery Bay, Tai Tam Bay and other southern waters being classified as semi-enclosed waters that will be subject to more stringent control on the discharge of nutrients. We also **propose** that discharges to inland waters leading to these semi-enclosed waters catchments should be subject to the same nutrient standards so as to protect these sensitive receiving water bodies.
- (i) To enhance the protection of beach water quality, we **propose** to tighten the *E. coli* standard for discharges to inland waters leading to within 100 m of the boundary of a gazetted beach, and direct discharges to coastal waters within 100 m of the boundary of a gazetted beach. The current ban on new discharges within 100 m of the boundary of a gazetted beach will be maintained.
- (j) Chlorine, which is commonly used for disinfection of sewage, is toxic to aquatic life. A total residual chlorine (TRC) standard is only laid down in the

existing TM for discharges to coastal waters. To ensure protection of inland waters which generally have a smaller assimilative capacity than coastal waters, we **propose** to add a TRC standard for discharges to inland waters as well.

- (k) Ammonia, particularly in unionized form, is toxic to aquatic life. At present, ammonia standards are specified in the TM for discharges to inland waters but not for discharges to coastal waters. We **propose** a new set of ammonia standards for discharges to various groups of coastal waters.

Miscellaneous proposals

- (l) To align our standards with current practices elsewhere, we also **propose** to drop the standards for some parameters such as settleable solids and conductivity. In view of the fact that comprehensive control over radioactive substances, including radioactive wastes, is exercised through the Radiation Ordinance, we also **propose** to delete references to radioactive substances from the TM.

8. The proposed new standards are shown in Table A1 of **Annex II**. They have already incorporated stakeholders' views. Tables A2 – A7 of Annex II compare the proposed standards with the existing standards. Detailed information on the proposed amendments is at **Annex III**.

Environmental implications

9. Since mid-1993, the amount of metals discharged into Victoria Harbour has dropped from over 7,000 kg/day to about 600 kg/day due to major changes in the economic structure and nature of industries in Hong Kong, enforcement action under the WPCO and control of chemical wastes under the Waste Disposal Ordinance. With the full commissioning of Stage 1 of the Harbour Area Treatment Scheme, metal loadings in the discharged effluent are anticipated to drop further. Thus, the slight relaxation of the standards for discharges of metals to sewer is not expected to have an impact on water quality.

10. For environmental waters, while the standards for conventional parameters are largely kept at the existing level, the revised TM will offer better environmental protection in the long term because of the tightening of *E. coli*, nutrient and toxic

metal standards, and the introduction of the new TRC and ammonia standards.

Impact on existing dischargers

11. Although a few dischargers may need to upgrade their treatment facilities to meet standards such as the tightened nutrient standards, these standards are achievable with currently available technologies and professional services in the market.

12. We anticipate that the new standards will not result in an increase in capital or operating costs for the vast majority of existing dischargers as over 90% of existing licensed discharges go into sewers. The standards for more than 95% of the discharges would remain unchanged or would be relaxed under the revised TM.

13. For the industrial and commercial sectors, about 90% of the discharges will be unaffected since they enter into sewers. Some trades will benefit from the more relaxed sewer standards e.g. 99% of the PCB manufacturing and electroplating factories (proposal (g)), over 97% of the catering establishments (proposal (c)), and over 60% of the petrol filling stations (proposal (d)). However, about 15% (or 30 odd) of the petrol filling stations (proposal (b)) will be affected by the tightening of standards for discharges to inshore waters.

14. The proposed tightening of nutrient, bacteria, TRC and ammonia standards for discharge to inland and coastal waters (proposals (h) to (k)) will affect less than 600 discharges (equivalent to about 3% of the total) of a domestic nature in remote and unsewered areas. The affected dischargers, mainly low-rise residential complexes, may need to upgrade, retrofit or add new treatment units in order to meet the new standards. Village houses equipped with septic tanks connected to soakaways are in general not affected by our proposals. The Hong Kong Association of Property Management Companies Ltd., whose members are responsible for managing many of the affected residential complexes, was included in the consultation exercise and did not raise any objection to these proposals.

15. The cost and time associated with the works to meet the tightened standards will depend very much on individual situations (e.g. the existing treatment system employed, space constraints etc.). We will allow the affected dischargers ample time to carry out any necessary upgrading works.

Public Consultation

16. As highlighted in paragraph 6, EPD has consulted a wide range of individuals and groups who might have an interest in these proposals. Six consultation meetings, involving 35 groups of external stakeholders (**Annex I**), were held between October and December 2000. Comments of the consultees have been duly considered and adopted as appropriate when we formulated the proposed amendments as set out in paragraph 7.

17. The Advisory Council on the Environment (ACE) discussed the proposed changes to the TM on 30 October 2001 and supported them .

Legislative timetable and commencement

18. We plan to table the revised TM at LegCo for negative vetting in February/March 2002. The new TM is expected to come into operation in the first half of 2002.

Advice sought

19. Members are invited to offer their views on the above proposed amendments to the TM.

Environment and Food Bureau
Environmental Protection Department
January 2002

Water Pollution Control Ordinance, Cap.358
Review of the Technical Memorandum on Effluent Standards (TM)
List of Stakeholder Groups Consulted

Industrial / Commercial Associations

1. Hong Kong General Chamber of Commerce
2. Federation of Hong Kong Industries
3. Chinese Manufacturer's Association of Hong Kong
4. Textile Council of Hong Kong Limited
5. The Hong Kong Association of Textile Bleachers, Dyers, Printers and Finishers Ltd.
6. Hong Kong Electronic Industrial Association
7. Hong Kong Metal Finishing Society
8. Oil Industry Representative Committee
9. Hong Kong Association of Property Management Companies Ltd.
10. Federation of Hong Kong Hotel Owners Ltd.
11. Hong Kong Hotels Association
12. Federation of Hong Kong Restaurant Owners Ltd.
13. Hong Kong Federation of Restaurants and Related Trades (HK Fort)
14. Association of Restaurant Managers Ltd.
15. Lan Kwai Fong Association
16. The Soho Association
17. Association for Hong Kong Catering Service Management
18. The H.K. Restaurant & Eating-House M.G. Association
19. Hong Kong Catering Industry Association

Green Groups

20. The Conservancy Association
21. Friends of the Earth
22. Green Power
23. Green Lantau Association
24. Green Peace
25. The Hong Kong Marine Conservation Society
26. World Wide Fund for Nature Hong Kong

Local Academics / Tertiary Institutions

27. The University of Hong Kong
28. The Hong Kong Polytechnic University
29. The Chinese University of Hong Kong
30. City University of Hong Kong
31. The Hong Kong University of Science and Technology
32. Hong Kong Baptist University
33. The Open University of Hong Kong

Wastewater Treatment Professionals

34. Business Environment Council
35. Hong Kong Productivity Council

**Proposed new TM standards for effluent discharged
into different receiving water bodies**

(Existing standards that are different from the proposed new standards
are shaded for ease of reference)

Table A1 Proposed TM standards for effluent discharged into different receiving water bodies
(All units in mg/L unless otherwise stated, all figures are upper limits unless otherwise indicated)

Determinand	Proposed New TM Standards												
	Foul Sewer			Group I Inland Waters ⁽¹⁾		Group II Inland Waters ⁽²⁾		Group A Coastal Waters ⁽³⁾		Group B Coastal Waters ⁽⁴⁾		Group C Coastal Waters ⁽⁵⁾	
Flow (m ³ /day)	≤10	>10 and ≤100	>100 and ≤1000	≤100	>100 and ≤1000	≤100	>100 and ≤1000	≤100	>100 and ≤1000	≤100	>100 and ≤1000	≤100	>100 and ≤1000
pH (pH units)	6-10	6-10	6-10	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-9	6-10	6-10
Temperature (°C)	43	43	43	30	30	30	30	40	40	40	40	45	45
Color (Lovibond units) (25mm cell length)	-- ⁽⁶⁾	--	--	1	1	1	1	1	1	1	1	1	1
Dissolved Oxygen	--	--	--	≥4	≥4	--	--	--	--	--	--	--	--
BOD ₅	1200	1000	800	10	5	20	20	20	20	20	20	500	300
COD	3000	2500	2000	50	20	80	80	80	80	80	80	1000	600
Total suspended solids	1200	1000	800	10	5	30	30	30	30	30	30	500	300
Oil & Grease	200	150	100	1	1	10	10	20	20	20	20	50	20
Surfactants	200	150	50	Prohibit	Prohibit	5	5	15	15	15	15	30	15
Hydrogen sulphide	--	--	--	0.05	0.05	--	--	--	--	--	--	--	--
Total sulphide	10	10	5	0.2	0.1	0.2	0.2	5	5	5	5	5	5
Fluoride	--	--	--	1	1	--	--	--	--	--	--	--	--
Sulphate	--	--	--	600	400	800	600	--	--	--	--	--	--
Chloride	--	--	--	500	200	1000	800	--	--	--	--	--	--
Nitrogen (Ammonia)	--	--	--	1	1	10	5	10	5	10	5	20	20
Total nitrogen	200	200	200	15	10	50	30	20	15	100	80	100	80
Total phosphorous	50	50	50	1	1	10	8	8	5	10	8	10	8
<i>E.coli</i> (cfu/100ml)	--	--	--	< 1	< 1	1000/ 100 ⁽⁷⁾	1000/ 100 ⁽⁷⁾	1000/ 100 ⁽⁸⁾	1000/ 100 ⁽⁸⁾	1000/ 100 ⁽⁸⁾	1000/ 100 ⁽⁸⁾	4000	4000
Total residual chlorine	--	--	--	0.2	0.2	0.2	0.2	1	1	1	1	1	1
Phenols	1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.2
Cyanide	2	2	2	0.05	0.05	0.05	0.05	0.1	0.05	0.10	0.05	0.5	0.2
Boron	--	--	--	2	0.5	--	--	--	--	--	--	--	--
Barium	--	--	--	2	0.5	--	--	--	--	--	--	--	--
Iron	--	--	--	2	0.5	10	5	10	5	15	5	15	5
Manganese	--	--	--	0.5	0.5	--	--	--	--	--	--	--	--
Arsenic	3	2	2	0.05	0.05	--	--	--	--	--	--	--	--
Cadmium	0.5	0.5	0.5	0.001	0.001	0.02	0.01	0.02	0.01	0.02	0.01	0.10	0.05
Chromium	3	2	2	0.05	0.05	0.2	0.1	1.0	0.5	1.0	0.5	2.0	1.0
Copper	5 (2) ⁽⁹⁾	4 (1.5) ⁽⁹⁾	4 (1.5) ⁽⁹⁾	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.2
Lead	2	1	1	0.1	0.1	0.2	0.1	0.05	0.05	0.05	0.05	0.10	0.05
Mercury	0.2	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Nickel	4	3	3	--	--	0.5	0.2	0.1	0.1	0.1	0.1	0.5	0.2
Selenium	3	2	2	0.01	0.01	--	--	--	--	--	--	--	--
Sliver	4	3	3	--	--	--	--	--	--	--	--	--	--
Zinc	5	4	4	1	1	1	1	1	1	1	1	1	1
Other toxic metals individually	--	--	--	0.1	0.1	--	--	--	--	--	--	--	--
Total toxic metals	10	10	8	1	1	2	1	2	1	2	1	3	1
Hydrocarbon	100	100	100	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit

Note:

- (1) Group I Inland Waters refer to inland waters for abstraction for potable water supply.
- (2) Group II Inland Waters refer to inland waters for irrigation, pond fish culture, secondary contact recreation, general amenity and other general uses.
- (3) Group A Coastal Waters refer to semi-enclosed water bodies including Tolo Harbour, Port Shelter, Deep Bay, Tai Tam Bay and Junk Bay as shown in Figure 1.
- (4) Group B Coastal Waters refer to inshore waters of all Water Control Zones except those falling within semi-enclosed water bodies (i.e. Group A above).
- (5) Group C Coastal Waters refer to marine waters of all Water Control Zones except those falling within semi-enclosed water bodies (i.e. Group A above).
- (6) "--" means no standard is proposed for this parameter.
- (7) 100 cfu/100mL *E.coli* standard is applicable for discharges to inland waters leading to 100m of the boundaries of a gazetted beach in any direction.
- (8) 100 cfu/100mL *E.coli* standard is applicable for discharges within 100m of the boundaries of a gazetted beach in any direction.
- (9) Standard in parenthesis is applicable for discharges into foul sewer leading to Government sewage treatment plants with microbial treatment.

Table A2 Standards for effluents discharged into foul sewers leading into Government sewage treatment plants
(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Flow rate (m ³ /day) Determinand	Proposed TM sewer standards			Existing TM sewer standards												
	≤10	>10 and ≤100	> 100 and ≤1000	≤10	>10 and ≤100	>100 and ≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000	>3000 and ≤4000	>4000 and ≤5000	>5000 and ≤6000
pH (pH units)	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10
Temperature (°C)	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Total suspended solids	1200	1000	800	1200	1000	900	800	800	800	800	800	800	800	800	800	800
Settleable solids	-- ⁽¹⁾	--	--	100	100	100	100	100	100	100	100	100	100	100	100	100
BOD ₅	1200	1000	800	1200	1000	900	800	800	800	800	800	800	800	800	800	800
COD	3000	2500	2000	3000	2500	2200	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Oil & Grease	200	150	100	100	100	50	50	50	40	30	20	20	20	20	20	20
Total sulphide	10	10	5	10	10	10	10	5	5	4	2	2	2	1	1	1
Sulphate	--	--	--	1000	1000	1000	1000	1000	1000	1000	900	800	600	600	600	600
Total nitrogen	200	200	200	200	200	200	200	200	200	200	100	100	100	100	100	100
Total phosphorus	50	50	50	50	50	50	50	50	50	50	25	25	25	25	25	25
Surfactants	200	150	50	200	150	50	40	30	25	25	25	25	25	25	25	25
Iron	--	--	--	30	25	25	25	15	12.5	10	7.5	5	3.5	2.5	2	1.5
Boron	--	--	--	8	7	6	5	4	3	2.4	1.6	1.2	0.8	0.6	0.5	0.4
Barium	--	--	--	8	7	6	5	4	3	2.4	1.6	1.2	0.8	0.6	0.5	0.4
Mercury	0.2	0.1	0.1	0.2	0.15	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium	0.5	0.5	0.5	0.2	0.15	0.1	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Copper	5 (2.0) ⁽²⁾	4 (1.5)	4 (1.5)	4 (1.5)	4 (1)	4 (1)	3 (1)	1.5 (0.8)	1.5 (0.6)	1 (0.5)	1 (0.4)	1 (0.3)	1 (0.2)	1 (0.15)	1 (0.1)	1 (0.05)
Nickel	4	3	3	4	3	3	2	1.5	1	1	0.8	0.7	0.7	0.6	0.6	0.6
Chromium	3	2	2	2	2	2	2	1	0.7	0.6	0.4	0.3	0.2	0.1	0.1	0.1
Zinc	5	4	4	5	5	4	3	1.5	1.5	1	0.8	0.7	0.7	0.6	0.6	0.6
Silver	4	3	3	4	3	3	2	1.5	1.5	1	0.8	0.7	0.7	0.6	0.6	0.6
Arsenic	3	2	2	2.5	2.2	2	1.5	1	0.7	0.6	0.4	0.3	0.2	0.15	0.12	0.1
Lead	2	1	1	2.5	2.2	2	1.5	1	0.7	0.6	0.4	0.3	0.2	0.15	0.12	0.1
Selenium	3	2	2	2.5	2.2	2	1.5	1	0.7	0.6	0.4	0.3	0.2	0.15	0.12	0.1
Total toxic metals	10 ⁽³⁾	10 ⁽³⁾	8 ⁽³⁾	10 ⁽⁴⁾	10 ⁽⁴⁾	8 ⁽⁴⁾	7 ⁽⁴⁾	3 ⁽⁴⁾	2 ⁽⁴⁾	2 ⁽⁴⁾	1.6 ⁽⁴⁾	1.4 ⁽⁴⁾	1.2 ⁽⁴⁾	1.2 ⁽⁴⁾	1.2 ⁽⁴⁾	1 ⁽⁴⁾
Cyanide	2	2	2	2	2	2	1	0.7	0.5	0.4	0.27	0.2	0.13	0.1	0.08	0.06
Phenols	1	1	1	1	1	1	1	0.7	0.5	0.4	0.27	0.2	0.13	0.1	0.1	0.1
Hydrocarbon	100	100	100	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit

Note:

- (1) "--" means no standard is proposed for this parameter.
- (2) Standard in parenthesis is applicable for discharges to foul sewer leading to Government sewage treatment plants with microbial treatment.
- (3) The new "Total Toxic Metals" limit applies to sum of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium and zinc.
- (4) The existing "Total Toxic Metals" limit applies to sum of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium and vanadium.

Table A3 Standards for effluents discharged into Group I inland waters.

(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Determinand	Proposed New TM Standards		Existing TM Standards					
	Flow rate (m ³ /day)	≤100	>100 and ≤1000	≤10	>10 and ≤100	>100 and ≤500	>500 and ≤1000	>1000 and ≤2000
pH (pH units)		6-9	6-9	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
Temperature (°C)		30	30	35	35	30	30	30
Color (Lovibond units) (25mm cell length)		1	1	1	1	1	1	1
Conductivity (µs/cm at 20°C)		-- ⁽¹⁾	--	1000	1000	1000	1000	1000
Dissolved Oxygen		≥4	≥4	≥4	≥4	≥4	≥4	≥4
BOD ₅		10	5	10	10	5	5	5
COD		50	20	50	50	20	20	10
Total suspended solids		10	5	10	10	5	5	5
Oil & Grease		1	1	1	1	1	1	1
Surfactants		Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit	Prohibit
Hydrogen sulphide		0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total sulphide		0.2	0.1	0.2	0.2	0.1	0.1	0.1
Fluoride		1	1	1	1	1	1	0.5
Sulphate		600	400	800	600	500	400	200
Chloride		500	200	800	500	500	200	200
Nitrogen (Ammonia)		1	1	1	1	1	1	0.5
Nitrate + Nitrite		--	--	15	15	15	10	10
Total nitrogen		15	10	--	--	--	--	--
Total reactive phosphorus		--	--	1	0.7	0.7	0.5	0.5
Total phosphorus		1	1	--	--	--	--	--
<i>E.coli</i> (cfu/100ml)		<1	<1	<1	<1	<1	<1	<1
Total residual chlorine		0.2	0.2	--	--	--	--	--
Phenols		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cyanide		0.05	0.05	0.05	0.05	0.05	0.05	0.02
Boron		2	0.5	2	2	1	0.5	0.5
Barium		2	0.5	2	2	1	0.5	0.5
Iron		2	0.5	2	2	1	0.5	0.5
Manganese		0.5	0.5	0.5	0.5	0.5	0.5	0.5
Arsenic		0.05	0.05	0.05	0.05	0.05	0.05	0.05
Cadmium		0.001	0.001	0.001	0.001	0.001	0.001	0.001
Chromium		0.05	0.05	0.05	0.05	0.05	0.05	0.05
Copper		0.2	0.2	0.2	0.2	0.2	0.2	0.1
Lead		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mercury		0.001	0.001	0.001	0.001	0.001	0.001	0.001
Selenium		0.01	0.01	0.01	0.01	0.01	0.01	0.01
Zinc		1	1	1	1	1	1	1
Other toxic metals individually		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total toxic metals		1	1	0.3	0.3	0.2	0.2	0.15

Note :

(1) "--" means no standard is proposed for this parameter

Table A4 Standards for effluents discharged into Group II inland waters.
(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Determinand	Proposed New TM Standards		Existing TM Standards									
	≤100	>100 and ≤1000	≤100	>100 and ≤200	>200 and ≤400	>400 and ≤500	>500 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000
pH (pH units)	6-9	6-9	6-8.5 ⁽¹⁾ 6-9 ⁽²⁾ 6-10 ⁽³⁾	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 6-9 6-10	6-8.5 -- 6-10
Temperature (°C)	30	30	35 30 30	35 30 30	30 30 30	30 30 30	30 30 30	30 30 30	30 30 30	30 30 30	30 30 30	30 30 30
Color (Lovibond units) (25mm cell length)	1	1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 -- 1
BOD ₅	20	20	20 20 20	20 15 20	20 15 20	20 15 20	20 15 20	20 10 20	20 10 20	20 10 20	20 5 20	20 5 20
COD	80	80	80 80 80	80 60 80	80 60 80	80 60 80	80 60 80	80 40 80	80 40 80	80 40 80	80 20 80	80 20 80
Total suspended solids	30	30	30 20 30	30 10 30	30 10 30	30 10 30	30 10 30	30 10 30	30 10 30	30 10 30	30 5 30	30 5 30
Oil & Grease	10	10	10 1 10	10 1 10	10 1 10	10 1 10	10 1 10	10 1 10	10 1 10	10 1 10	10 1 10	10 -- 10
Surfactants	5	5	5 2 15	5 2 15	5 2 15	5 2 15	5 2 15	5 2 15	5 2 15	5 2 15	5 1 15	5 1 15
Total sulphide	0.2	0.2	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.2 1	0.2 0.1 1	0.2 -- 1
Fluoride	-- ⁽⁴⁾	--	10 10 10	10 7 10	10 7 8	8 7 8	8 5 8	8 5 8	8 5 5	5 4 5	5 4 3	3 -- 3
Sulphate	800	600	800 800 800	800 600 800	800 600 600	600 600 600	600 400 600	600 400 600	600 400 600	400 200 400	400 200 400	400 -- 400
Chloride	1000	800	1000 1000 1000	1000 1000 1000	1000 1000 800	800 1000 800	800 1000 800	800 1000 800	800 1000 600	600 1000 600	600 1000 400	400 -- 400
Nitrogen (Ammonia)	10	5	5 2 20	5 2 20	5 2 20	5 2 20	5 2 20	5 2 20	5 2 20	5 1 20	5 1 20	5 -- 10
Nitrate + Nitrite	--	--	30 30 50	30 30 50	30 30 50	30 30 50	30 20 50	20 20 30	20 20 30	20 20 30	20 20 30	10 20 20
Total nitrogen	50	30	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --
Total Phosphorus	10	8	10 10 10	10 10 10	10 10 10	10 10 10	10 8 10	8 8 8	8 8 8	8 8 8	8 8 5	5 -- 5
<i>E.coli</i> (cfu/100ml)	1000/ 100 ⁽⁵⁾	1000/ 100 ⁽⁵⁾	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 1000 1000	100 -- 1000
Total residual chlorine	0.2	0.2	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --
Phenols	0.1	0.1	0.1 0.1 0.4	0.1 0.1 0.4	0.1 0.1 0.3	0.1 0.1 0.2	0.1 0.1 0.2	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	0.1 -- 0.1
Cyanide	0.05	0.05	0.1 0.05 0.4	0.1 0.05 0.4	0.1 0.05 0.4	0.1 0.05 0.3	0.1 0.05 0.3	0.1 0.05 0.3	0.08 0.05 0.2	0.08 0.05 0.2	0.05 0.01 0.1	0.05 -- 0.05

Table A4 Standards for effluents discharged into Group II inland waters. (Cont'd)
 (All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Flow rate (m ³ /day) Determinand	Proposed New TM Standards		Existing TM Standards									
	≤100	>100 and ≤1000	≤100	>100 and ≤200	>200 and ≤400	>400 and ≤500	>500 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000
Boron	--	--	5 10 5	5 5 5	4 5 4	3 5 3.5	3 4 3.5	2.5 4 2.5	2 4 2	1.5 2 1.5	1 2 1	0.5 -- 0.7
Barium	--	--	5 1 5	5 1 5	4 1 4	3 1 3.5	3 1 3.5	2.5 1 2.5	2 1 2	1.5 0.5 1.5	1 0.5 1	0.5 -- 0.7
Iron	10	5	10 0.5 10	10 0.4 10	8 0.4 8	7 0.4 7	7 0.3 7	5 0.3 5	4 0.3 4	3 0.2 2.7	2 0.2 2	1 -- 1.3
Cadmium	0.02	0.01	0.001 0.001 0.1	0.001 0.001 0.1	0.001 0.001 0.05	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 -- 0.001
Chromium	0.2	0.1	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --
Copper	0.2	0.2	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.05 --	-- 0.05 --	-- 0.05 --	-- 0.05 --	-- 0.05 --	-- 0.05 --
Lead	0.2	0.1	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.1 --	-- 0.1 --	-- -- --
Mercury	0.001	0.001	0.001 0.001 0.1	0.001 0.001 0.1	0.001 0.001 0.05	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 0.001 0.001	0.001 -- 0.001
Nickel	0.5	0.2	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.2 --	-- 0.1 --	-- 0.1 --	-- -- --
Selenium	--	--	0.2 0.1 --	0.2 0.1 --	0.2 0.1 --	0.2 0.1 --	0.2 0.05 --	0.2 0.05 --	0.2 0.05 --	0.1 0.05 --	0.1 0.05 --	0.1 -- --
Sliver	--	--	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- 0.1 --	-- -- --
Zinc	1	1	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --	-- -- --
Other toxic metals individually	--	--	0.5 0.5 1	0.5 0.4 1	0.5 0.4 1	0.2 0.4 0.8	0.2 0.3 0.8	0.2 0.3 0.8	0.2 0.3 0.5	0.1 0.2 0.5	0.1 0.2 0.2	0.1 -- 0.2
Total toxic metals	2	1	2 0.5 2	2 0.4 2	1.5 0.4 2	1 0.4 1.6	1 0.3 1.6	0.5 0.3 1.6	0.5 0.3 1	0.2 0.2 1	0.2 0.2 0.5	0.2 -- 0.4

- Note:
- (1) Existing TM standards for discharge to Group B inland waters.
 - (2) Existing TM standards for discharge to Group C inland waters.
 - (3) Existing TM standards for discharge to Group D inland waters.
 - (4) "--" means no standard is proposed for this parameter.
 - (5) 100 cfu/100mL *E.coli* standard is applicable for discharges to inland water leading to 100m of the boundaries of a gazetted beach.

Table A5 Standards for effluents discharged into Group A coastal waters

(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Determinand	Proposed TM Standards		Existing TM Standards												
	Flow rate (m ³ /day) ≤100	>100 and ≤1000	≤10	>10 and ≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000	>3000 and ≤4000	>4000 and ≤5000	>5000 and ≤6000	
pH (pH units)	6-9	6-9	6-9 ⁽¹⁾ 6-9 ⁽²⁾	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	
Temperature (°C)	40	40	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	
Color (Lovibond units) (25mm cell length)	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	
BOD ₅	20	20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	10 10	10 10	10 10	10 10	10 10	
COD	80	80	80 80	80 80	80 80	80 80	80 80	80 80	80 80	50 50	50 50	50 50	50 50	50 50	
Total suspended solids	30	30	30 50	30 50	30 50	30 50	30 50	30 50	30 50	15 25	15 25	15 25	15 25	15 25	
Oil & Grease	20	20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	10 10	10 10	10 10	10 10	10 10	
Surfactants	15	15	15 15	15 15	15 15	15 15	15 15	15 15	15 15	10 10	10 10	10 10	10 10	10 7	
Total sulphide	5	5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	2.5 2.5	2.5 2.5	1.5 1.5	1 1	0.5 0.5	
Nitrogen (Ammonia)	10	5	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	
Total nitrogen	20	15	20 100	20 100	20 100	15 100	15 100	15 100	15 100	15 80	15 80	10 50	10 50	10 50	
Total Phosphorus	8	5	8 10	8 10	5 10	5 10	5 10	5 10	5 10	5 8	5 8	5 5	5 5	5 5	
<i>E. coli</i> (cfu/100ml)	1000/ 100 ⁽³⁾	1000/ 100 ⁽³⁾	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	1000 1000	
Total residual chlorine	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	
Phenols	0.1	0.1	0.5 0.5	0.5 0.5	0.5 0.4	0.25 0.3	0.25 0.25	0.25 0.2	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	
Cyanide	0.1	0.05	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.08	0.05 0.06	0.05 0.04	0.03 0.03	0.02 0.02	0.02 0.01	0.01 0.01	
Boron	-- ⁽⁴⁾	--	5 5	4 4	3 3	2.5 2.5	2 2	1.6 1.6	1.1 1.1	0.8 0.8	0.5 0.5	0.4 0.4	0.3 0.3	0.2 0.2	
Barium	--	--	5 5	4 4	3 3	2.5 2.5	2 2	1.6 1.6	1.1 1.1	0.8 0.8	0.5 0.5	0.4 0.4	0.3 0.3	0.2 0.2	
Iron	10	5	10 10	10 10	10 10	7 7	5 5	4 4	2.7 3	2 2	1.3 1	1 1	0.8 1	0.6 1	
Cadmium	0.02	0.01	0.1 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	
Chromium	1.0	0.5	1 1	1 0.5	0.8 0.5	0.5 0.5	0.5 0.4	0.4 0.4	0.1 0.25	0.1 0.2	0.1 0.15	0.1 0.1	0.1 0.1	0.1 0.1	
Copper	0.2	0.2	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	
Lead	0.05	0.05	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	
Mercury	0.001	0.001	0.1 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	
Nickel	0.1	0.1	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	
Zinc	1	1	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	
Other toxic metals individually	--	--	1 1	1 0.5	0.8 0.5	0.5 0.5	0.5 0.4	0.4 0.4	0.1 0.25	0.1 0.2	0.1 0.15	0.1 0.1	0.1 0.1	0.1 0.1	
Total toxic metals	2	1	2 2	2 1	1.6 1	1 1	1 0.8	0.8 0.8	0.2 0.5	0.2 0.4	0.2 0.3	0.2 0.2	0.14 0.14	0.1 0.1	

Note :

(1) Existing TM standard for discharge to coastal waters of Tolo and Port Shelter Water Control Zone.

(2) Existing TM standard for discharge to coastal waters of Deep Bay Water Control Zone.

(3) 100cfu/100mL *E. coli* standard is applicable to discharges within 100m of the boundaries of a gazetted beach in any direction.

(4) "--" means no standard is proposed for this parameter.

Table A6 Standards for effluents discharged into Group B coastal waters
(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Determinand	Proposed TM Standards		Existing TM Standards											
	Flow rate (m ³ /day) ≤100	Flow rate (m ³ /day) >100 and ≤1000	≤10	>10 and ≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000	>3000 and ≤4000	>4000 and ≤5000	>5000 and ≤6000
pH (pH units)	6-9	6-9	6-9 ⁽¹⁾ 6-9 ⁽²⁾	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9	6-9 6-9
Temperature (°C)	40	40	40 40	40 40	40 40	40 40	40 40	40 40	40 40	40 40	40 40	40 40	40 40	40 40
Color(Lovibond units) (25mm cell length)	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
BOD ₅	20	20	50 50	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20
COD	80	80	100 100	80 80	80 80	80 80	80 80	80 80	80 80	80 80	80 80	80 80	80 80	80 80
Total suspended solids	30	30	50 50	30 30	30 30	30 30	30 30	30 30	30 30	30 30	30 30	30 30	30 30	30 30
Oil & Grease	20	20	30 30	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 20	20 10
Surfactants	15	15	20 20	15 15	15 15	15 15	15 15	15 15	10 10	10 10	10 10	10 10	10 10	10 10
Total sulphide	5	5	5 5	5 5	5 5	5 5	5 5	5 5	2.5 2.5	2.5 2.5	1.5 1.5	1 1	1 1	0.5 0.5
Nitrogen (Ammonia)	10	5	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Total nitrogen	100	80	100 100	100 100	100 80	100 80	100 80	100 80	80 50	80 50	50 50	50 50	50 50	50 30
Total Phosphorus	10	8	10 10	10 10	10 8	10 8	10 8	10 8	8 5	8 5	5 5	5 5	5 5	5 5
<i>E.coli</i> (cfu/100ml)	1000/ 100 ⁽³⁾	1000/ 100 ⁽³⁾	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000	5000 1000
Total residual chlorine	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
Phenols	0.1	0.1	0.5 0.5	0.5 0.5	0.5 0.5	0.3 0.3	0.25 0.25	0.2 0.2	0.13 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1
Cyanide	0.10	0.05	0.2 0.2	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.05 0.05	0.05 0.05	0.03 0.03	0.02 0.02	0.02 0.02	0.01 0.01
Boron	-- ⁽⁴⁾	--	5 5	4 4	3 3	2.7 2	2 2	1.6 1.5	1.1 1.1	0.8 0.8	0.5 0.5	0.4 0.4	0.3 0.3	0.2 0.2
Barium	--	--	5 5	4 4	3 3	2.7 2	2 2	1.6 1.5	1.1 1.1	0.8 0.8	0.5 0.5	0.4 0.4	0.3 0.3	0.2 0.2
Iron	15	5	15 15	10 10	10 10	7 7	5 5	4 4	2.7 3	2 2	1.3 1	1 1	0.8 0.8	0.6 0.6
Cadmium	0.02	0.01	0.1 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001
Chromium	1.0	0.5	1 1	1 1	0.8 0.8	0.7 0.7	0.5 0.5	0.4 0.4	0.25 0.3	0.2 0.2	0.15 0.15	0.1 0.1	0.1 0.1	0.1 0.1
Copper	0.2	0.2	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Lead	0.05	0.05	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Mercury	0.001	0.001	0.1 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001
Nickel	0.1	0.1	-- --	-- --	-- --	-- --	-- --	-- --	0.25 0.3	0.2 0.2	0.15 0.15	0.1 0.1	0.1 0.1	0.1 0.1
Zinc	1	1	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Other toxic metals individually	--	--	1 1	1 1	0.8 0.8	0.7 0.7	0.5 0.5	0.4 0.4	0.25 0.3	0.2 0.2	0.15 0.15	0.1 0.1	0.1 0.1	0.1 0.1
Total toxic metals	2	1	2 2	2 2	1.6 1.6	1.4 1.4	1 1	0.8 0.8	0.5 0.6	0.4 0.4	0.3 0.3	0.2 0.2	0.14 0.1	0.1 0.1

Note:

- (1) Existing TM standard for discharge to inshore waters of Victoria Harbour Water Control Zone..
- (2) Existing TM standard for discharge to inshore waters of Southern, Mirs Bay, Junk Bay, North Western, Eastern Buffer and Western Buffer Water Control Zone.
- (3) 100cfu/100mL *E.coli* standard is applicable to discharges within 100m of the boundaries of a gazetted beach in any direction.
- (4) "--" means no standard is proposed for this parameter.

Table A7 Standards for effluents discharged into Group C coastal waters.

(All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Determinand	Proposed TM Standards		Existing TM Standards											
	≤100	>100 and ≤1000	≤10	>10 and ≤200	>200 and ≤400	>400 and ≤600	>600 and ≤800	>800 and ≤1000	>1000 and ≤1500	>1500 and ≤2000	>2000 and ≤3000	>3000 and ≤4000	>4000 and ≤5000	>5000 and ≤6000
Flow rate (m ³ /day)	6-10	6-10	6-10 ⁽¹⁾ 6-10 ⁽²⁾	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10
pH (pH units)	6-10	6-10	6-10 ⁽¹⁾ 6-10 ⁽²⁾	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10	6-10 6-10
Temperature (°C)	45	45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45	45 45
Color (Lovibond units) (25mm cell length)	1	1	4 4	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
BOD ₅	500	300	700 500	600 500	600 500	500 300	375 200	300 200	200 100	150 100	100 50	75 50	60 40	40 30
COD	1000	600	1500 1000	1200 1000	1200 1000	1000 700	700 500	600 400	400 300	300 200	200 150	100 100	100 80	85 80
Total suspended solids	500	300	700 500	600 500	600 500	500 300	375 200	300 200	200 100	150 100	100 50	75 50	60 40	40 30
Oil & Grease	50	20	50 50	50 50	50 50	30 30	25 25	20 20	20 20	20 20	20 20	20 20	20 20	20 20
Surfactants	30	15	30 30	20 20	20 20	20 20	15 15	15 15	15 15	15 15	15 15	15 15	15 15	15 15
Total sulphide	5	5	5 5	5 5	5 5	5 5	5 5	5 5	2.5 2.5	2.5 2.5	1.5 1.5	1 1	1 1	0.5 0.5
Nitrogen (Ammonia)	20	20	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Total nitrogen	100	80	100 100	100 100	100 80	100 80	100 80	100 80	100 50	100 50	100 50	100 50	100 50	50 50
Total Phosphorus	10	8	10 10	10 10	10 8	10 8	10 8	10 8	10 5	10 5	10 5	10 5	10 5	5 5
<i>E.coli</i> (cfu/100ml)	4000	4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000	5000 4000
Total residual chlorine	1	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
Phenols	0.5	0.2	0.5 0.5	0.5 0.5	0.5 0.5	0.3 0.3	0.3 0.25	0.2 0.2	0.1 0.13	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1	0.1 0.1
Cyanide	0.5	0.2	1 1	0.5 0.5	0.5 0.5	0.5 0.5	0.4 0.4	0.3 0.3	0.2 0.2	0.1 0.15	0.1 0.1	0.08 0.08	0.06 0.06	0.04 0.04
Boron	-- ⁽³⁾	--	6 6	5 5	4 4	3.5 3.5	2.5 2.5	2 2	1.5 1.5	1 1	0.7 0.7	0.5 0.5	0.4 0.4	0.3 0.3
Barium	--	--	6 6	5 5	4 4	3.5 3.5	2.5 2.5	2 2	1.5 1.5	1 1	0.7 0.7	0.5 0.5	0.4 0.4	0.3 0.3
Iron	15	5	20 20	15 15	13 13	10 10	7.5 7	6 6	4 4	3 3	2 2	1.5 1.5	1.2 1.2	1 1
Cadmium	0.10	0.05	0.1 0.1	0.1 0.1	0.05 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001
Chromium	2.0	1.0	2 2	1.5 1.5	1 1.2	0.8 0.8	0.6 0.6	0.5 0.5	0.32 0.32	0.24 0.24	0.16 0.16	0.12 0.12	0.1 0.1	0.1 0.1
Copper	0.5	0.2	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Lead	0.10	0.05	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Mercury	0.001	0.001	0.1 0.1	0.1 0.1	0.05 0.1	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001	0.001 0.001
Nickel	0.5	0.2	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Zinc	1	1	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --
Other toxic metals individually	--	--	2 2	1.5 1.5	1 1.2	0.8 0.8	0.6 0.6	0.5 0.5	0.32 0.32	0.24 0.24	0.16 0.16	0.12 0.12	0.1 0.1	0.1 0.1
Total toxic metals	3	1	4 4	3 3	2 2.4	1.6 1.6	1.2 1.2	1 1	0.64 0.64	0.48 0.48	0.32 0.32	0.24 0.24	0.2 0.2	0.14 0.14

Note:

- (1) Existing TM standard for discharge to marine waters of Victoria Harbour Water Control Zone..
- (2) Existing TM standard for discharge to marine waters of Southern, Mirs Bay, Junk Bay, North Western, Eastern Buffer and Western Buffer Water Control Zone.
- (3) "--" means no standard is proposed for this parameter.

Details of Major Proposed Amendments to the TM

(a) Setting the standards for any flow above 1,000 m³/day on a case-by-case basis

Under the existing TM, standards for flows above 6,000 m³/day are set on a case-by-case basis. As a flow of 1,000 m³/day is already equivalent to the volume of wastewater discharged from 3,000 people and this scale of flow has the potential to make a relatively significant impact on the receiving system, we **propose** to extend this case-by-case arrangement to flows between 1,000 m³/day and 6,000 m³/day as well, to ensure better protection for the receiving systems. According to the Environmental Protection Department (EPD)'s licensing record, about 99% of the discharges are below 1,000 m³/day, which means that for the vast majority of discharges the standards will still be prescribed by the TM.

2. Several trade groups consulted (electroplating, bleaching & dyeing, petroleum, and Hong Kong General Chamber of Commerce) at first expressed reservations about this proposal as they were concerned that the Government may impose more stringent standards in the future for flows above 1,000 m³/day. EPD subsequently has reviewed their discharge conditions (e.g. flow rate, discharge location, and wastewater characteristics) and concluded that for these existing discharges, the standards for their first renewed licences after the new TM comes into operation will in general not be more stringent than the standards they are now subject to, provided the principal discharge characteristics remain unchanged. This will allow appropriate lead-time for the licensees to adjust wastewater treatment methods, if necessary.

3. With the exception of the B&D trade, all stakeholders were content with EPD's commitment and no longer objected to this proposal. The B&D trade, on the other hand, maintained that it needed a clear picture of the future standards and requested that the standards should be prescribed, at least for flows up to 2,000 m³/day.

4. Among the B&D discharges (less than 150), more than 90% are less than 1,000 m³/day and hence will remain subject to the standards prescribed in the TM. However, even if the coverage of the new proposals were to be extended to flows up to 2,000 m³/day, some 3% of the B&D discharges would still be subject to the case-by-case assessment.

5. While it is possible to add another flow band for flows between 1,000 to 2,000 m³/day or even bands for higher flow rates, this will defeat the purpose of the streamlining. We consider that with the commitment not to impose more stringent standards for the first renewed licences, there will be sufficient lead-time for the licensees to adjust their wastewater treatment facilities, if necessary, to meet any new standards that may be required for the higher flow bands. Hence, we propose

to maintain the original proposal.

(b) Streamlining of flow bands

6. At present, some tables in the TM have effluent standards for as many as 13 flow bands (three to seven flow bands for flows below 1,000 m³/day and one to six flow bands for flows between 1,000 and 6,000 m³/day). To make these tables less complicated, we **propose** to reduce the number of flow bands to two for inland waters and coastal waters, i.e. <100 m³/day, and 100 to 1000 m³/day. There will no longer be any flow band for flows exceeding 1,000 m³/day as EPD will set the standards for such flows on a case-by-case basis (paragraph 1 above).

7. As experience has shown that the majority of discharges to foul sewer are very small (over 60% are less than 10 m³/day) with many of the treatment facilities housed in multi-storey buildings, there can be practical difficulties in treating wastewaters from these establishments to a very high standard. Thus, we **propose** three flow bands should be used for discharges to foul sewers, with generally more relaxed standards for flows below 10 m³/day. The new flow bands for which standards will be prescribed are as follows -

Receiving system	Flow bands
Foul sewer	≤10, >10 to ≤100, >100 to ≤1000 m ³ /day
Inland waters	≤100, >100 to ≤1000 m ³ /day
Coastal waters	≤100, >100 to ≤1000 m ³ /day

8. Nevertheless, to reduce the flow bands from the existing 13 to two or three, some of the standards will have to be adjusted in order to fit into the new system.

9. As a result of the streamlining of flow bands, the TSS, COD and surfactants standards for discharges less than 10 m³/day to inshore waters will have to be changed from the existing 50/100/20 mg/L respectively to 30/80/15 mg/L. The petroleum trade has objected to this amendment as about 30 out of 200 or so petrol filling stations will be subject to the new standards and they argue that there is no practical and feasible way to comply with the standards. The petroleum trade is the only stakeholder who expressed reservations about this proposal during the consultation exercise.

10. However, we do not consider the objection well justified. The new standards are in fact the same as those that need to be met by existing petrol filling stations which discharge into inland waters. They also follow the spirit of the TM that any discharge made to a receiving water body with limited assimilative capacity (e.g. inshore coastal waters and inland waters) should be subject to relatively more stringent standards. We anticipate that with improvement in their mode of operation and proper segregation of discharge streams, the affected petrol filling

stations should be able to meet the new standards as the wastewater quantity concerned is only 10 m³/day or less. If upgrading of a treatment facility is found to be necessary for some petrol filling stations, we will allow ample time for the work. Having considered the above, we propose to maintain the original proposal.

11. To match the streamlined flow bands, we also **propose** to amend slightly the standards for some conventional parameters such as BOD₅, COD, and TSS.

(c) Revision of oil and grease (O&G) standards for discharge to sewer

12. At present, the TM specifies O&G standards ranging from 20 mg/L to 100 mg/L for discharge to foul sewer. The higher the flow rate, the more stringent the standards will be. Having considered the conditions of the local catering industry and the standards applied in other places with cooking styles similar to Hong Kong (such as Singapore, Malaysia and the Mainland), we initially proposed to set the O&G standard at 100 mg/L across the board for flows up to 1,000 m³/day.

13. During the consultation meetings, the catering trade asked for further relaxation of the proposed standard for those restaurants that discharge less than 100 m³/day as follows -

Flow	O&G standard	
	Original proposal put forward for public consultation	Trade's proposal
≤ 10 m ³ /day	100 mg/L	200 mg/L
> 10 m ³ /day, but ≤ 100 m ³ /day	100 mg/L	150 mg/L
>100 m ³ /day, but ≤1000 m ³ /day	100 mg/L	100 mg/L

14. Academics and wastewater treatment professionals attending the consultation meetings generally supported the standards proposed by the catering trade and considered that such a relaxation would not undermine the primary purpose of setting the O&G standard, i.e. to protect the downstream sewerage network and treatment facilities. We agree with this assessment and therefore **propose** to adopt the standards as suggested by the trade.

(d) Repeal of the prohibition of petroleum hydrocarbon for discharges to sewer

15. The existing TM prohibits any discharge of petroleum hydrocarbon to foul sewers or directly to the environment. Upon review of practices elsewhere such as

Australia, the USA, Germany and the Mainland, we find this restriction overly stringent for discharges to sewers. Thus, we **propose** to repeal the prohibition for discharge to sewers and set a standard at 100 mg/L. The standard is in line with overseas standards (e.g. the USA and Germany). Given the relatively small proportion of petroleum-contaminated wastewater (which account for less than 1% of the wastewater discharged to sewers), EPD considers the proposed standard adequate for the protection of downstream treatment facilities and receiving waters. Nonetheless, owing to the relatively small assimilative capacity of the inland and coastal waters in relation to the nature of the substance, direct discharge of the substance to these water bodies will remain prohibited in the revised TM.

(e) New grouping of inland waters

16. At present, inland waters are divided into four groups. But EPD’s review concluded that this is no longer necessary bearing in mind the existing water quality objectives for inland waters, and the general use patterns. We thus **propose** to reduce the number of inland water groups from four to two, namely one for abstraction for potable supply (which would be those waters within gazetted Water Gathering Grounds), and one for the remainder. This will streamline the administrative work in licensing under WPCO, give a clearer picture to the public on inland water groupings, and avoid disputes in classification of inland waters. The existing and the proposed inland water groups are shown below -

Existing Grouping		Proposed Grouping	
A	Abstraction for potable water supply	I	Abstraction for potable water supply
B	Irrigation	II	Irrigation, pond fish culture, secondary contact recreation, general amenity and other general uses
C	Pond fish culture		
D	General amenity and secondary contact recreation		

(f) New grouping of coastal waters

17. Taking into account the hydrodynamic condition and assimilative capacity of different water bodies, we **propose** to reduce the existing coastal water groups from six to three. The existing and proposed coastal water groups are shown below -

Existing Grouping		New Grouping	
I.	Coastal waters of Tolo Harbour and Port Shelter Water Control Zones (WCZs)	A.	Semi-enclosed water bodies. These include Tolo Harbour, Port Shelter, Deep Bay, Tai Tam Bay and Junk Bay, etc. (Their locations are shown in Figure 1)

Existing Grouping	New Grouping
II. Coastal waters of Deep Bay WCZ	
IIIa. Inshore waters of Victoria Harbour WCZ	B. Inshore waters of all WCZs except those falling within semi-enclosed water bodies (i.e. Group A above)
IIIb. Inshore waters of other WCZs	
IVa. Marine waters of Victoria Harbour WCZ	C. Marine waters of all WCZs except those falling within semi-enclosed water bodies (i.e. Group A above)
IVb. Marine waters of other WCZs	

(g) Revision of effluent standards for toxic metals and toxic substances

18. Since zinc is commonly considered as a toxic metal, we **propose** to include it in the toxic metal list of the revised TM. With the addition of zinc, the number of toxic metals covered in the TM will increase from 13¹ to 14.

19. As a result of the significant change in the economic and industrial structure of Hong Kong, EPD has reviewed the effluent standards for toxic metals and toxic substances such as cyanide and phenols, which originate mainly from the industrial sector. In doing so, EPD has adopted the general international approach of considering the standards needed to protect downstream treatment facilities and receiving water bodies, the possible dilution effect due to mixing with domestic sewage in the collection system, the level of treatment received before discharge and the initial dilution that can be achieved in the environment. As a result, we have concluded that there is some scope for relaxation of the standards for toxic metals and toxic substances discharged to sewer, but a need to tighten some of the standards for direct discharges to inland and coastal waters.

(h) Tightening of nutrient standards for direct discharges to semi-enclosed waters and discharges to inland waters leading to semi-enclosed waters

20. To protect semi-enclosed water bodies which are more susceptible to eutrophication² (e.g. Tolo Harbour), stringent nutrient standards are set in the existing TM. The re-grouping of coastal waters will lead to more sensitive coastal waters such as Junk Bay and parts of Mirs Bay and Southern Waters, including Discovery Bay and Tai Tam Bay, being classified as semi-enclosed waters. The nutrient standards for direct discharges to these areas have to be revised

¹ The existing 13 toxic metals are antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium and vanadium.

² Eutrophication means an increase of nutrients such as nitrogen in a waterbody which results in an overabundance of plant biomass.

accordingly.

21. Apart from control on direct discharges, we also **propose** that discharges to inland waters leading to these semi-enclosed waters should be subject to the same nutrient standards. The proposal covers most of the inland waters, including those within the Deep Bay, Tolo Harbour, Port Shelter and Mirs Bay catchments. This means a substantial tightening of nutrient standards for discharges to these inland waters. In general, the permissible limits for total nitrogen and total phosphorus are reduced up to 80% and 50% respectively.

(i) Tightening of bacterial standard for discharges to inland waters leading to gazetted beaches and existing discharges entering a gazetted beach directly

22. To enhance the protection of beach water quality, we **propose** to tighten the *E.coli* standard from the existing 1,000 cfu/100mL to 100 cfu/100mL for discharges to inland waters leading to within 100 m of the boundary of a gazetted beach, and direct discharges to coastal waters within 100 m of the boundary of a gazetted beach. The current ban on new discharges within 100 m of the boundary of a gazetted beach will be maintained in the new TM.

(j) New standard for total residual chlorine (TRC) for discharges to inland waters

23. Chlorine is commonly used for disinfection of sewage. It is however toxic to aquatic life. Whilst a TRC standard of 1 mg/L is set down in the existing TM for discharges to coastal waters, no standard has been specified for discharges to inland waters. To ensure protection of inland waters which generally have a smaller assimilative capacity than coastal waters, we **propose** to add a TRC standard of 0.2 mg/L for discharges to inland waters.

(k) New ammonia standard for discharge to coastal waters

24. Ammonia, particularly in unionized form, is toxic to aquatic life. At present, ammonia standards (from 0.5 to 20 mg/L) are specified in the TM for discharges to inland waters but not for discharges to coastal waters. We **propose** a new set of ammonia standards ranging from 5 to 20 mg/L for discharges to various groups of coastal waters.

(l) Other Revisions

25. To align our standards with current practices elsewhere, we also **propose** to drop the standards for some parameters such as settleable solids and conductivity. In view of the fact that comprehensive control over radioactive substances,

including radioactive wastes, is exercised through the Radiation Ordinance, we also intend to delete references to radioactive substances from the TM.

Environmental Protection Department
January 2002



■ Group A Coastal Waters
(i.e. semi-enclosed water bodies)

Figure 1 : Group A Coastal Waters



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