

Annex 6A

**Water Quality Objectives and
Technical Memorandum for
Effluents Discharged into
Drainage and Sewerage
Systems, Inland and Coastal
Waters for the Victoria
Harbour Phase II and Tolo
Harbour and Channel Water
Control Zones**

Table 6A-1 Water Quality Objectives for Victoria Harbour Phase Water Control Zone

Water Quality Objective	Part or parts of Zone
A. AESTHETIC APPEARANCE	
(a) There should be no objectionable odours or discolouration of the water.	Whole zone
(b) Tarry residues, floating wood, articles made of glass, plastic, rubber or of any other substances should be absent.	Whole zone
(c) Mineral oil should not be visible on the surface. Surfactants should not give rise to a lasting foam.	Whole zone
(d) There should be no recognisable sewage-derived debris.	Whole zone
(e) Floating, submerged and semi-submerged objects of a size likely to interfere with the free movement of vessels, should be absent.	Whole zone
(f) The water should not contain substances which settle to form objectionable deposits.	Whole zone
B. BACTERIA	
The level of <i>Escherichia coli</i> should not exceed 1000 per 100 mL, calculated as the geometric mean of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days.	Inland waters
C. COLOUR	
Human activity should not cause the colour of water to exceed 50 Hazen units.	Inland waters
D. DISSOLVED OXYGEN	
(a) The level of dissolved oxygen should not fall below 4 mg per litre for 90% of the sampling occasions during the whole year, values should be calculated as the annual water column average (see Note). In addition, the concentration of dissolved oxygen should not be less than 2 mg per litre within 2 m of the seabed for 90% of the sampling occasions during the whole year.	Marine waters
(b) The level of dissolved oxygen should not be less than 4 mg per litre.	Inland waters
E. pH	
(a) The pH of the water should be within the range of 6.5-8.5 units. In addition, human activity should not cause the natural pH range to be extended by more than 0.2 unit.	Marine waters
(b) Human activity should not cause the pH of the water to exceed the range of 6.0-9.0 units	Inland waters
F. TEMPERATURE	
Human activity should not cause the daily temperature range to change by more than 2.0°C.	Whole zone

Water Quality Objective	Part or parts of Zone
<p>G. SALINITY</p> <p>Human activity should not cause the salinity level to change by more than 10%.</p>	Whole zone
<p>H. SUSPENDED SOLIDS</p> <p>(a) Human activity should neither cause the suspended solids concentration to be raised more than 30% nor give rise to accumulation of suspended solids which may adversely affect aquatic communities.</p> <p>(b) Human activity should not cause the annual median of suspended solids to exceed 25 mg per litre.</p>	<p>Marine waters</p> <p>Inland waters</p>
<p>I. AMMONIA</p> <p>The un-ionized ammoniacal nitrogen level should not be more than 0.021 mg per litre, calculated as the annual average (arithmetic mean).</p>	Whole zone
<p>J. NUTRIENTS</p> <p>(a) Nutrients should not be present in quantities sufficient to cause excessive or nuisance growth of algae or other aquatic plants.</p> <p>(b) Without limiting the generality of objective (a) above, the level of inorganic nitrogen should not exceed 0.4 mg per litre, expressed as annual water column average (see Note).</p>	<p>Marine waters</p> <p>Marine waters</p>
<p>K. 5-DAY BIOCHEMICAL OXYGEN DEMAND</p> <p>The 5-day biochemical oxygen demand should not exceed 5 mg per litre.</p>	Inland waters
<p>L. CHEMICAL OXYGEN DEMAND</p> <p>The chemical oxygen demand should not exceed 30 mg per litre.</p>	Inland waters
<p>M. TOXIC SUBSTANCES</p> <p>(a) Toxic substances in the water should not attain such levels as to produce significant toxic, carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chains and to interactions of toxic substances with each other.</p> <p>(b) Human activity should not cause a risk to any beneficial use of the aquatic environment.</p>	<p>Whole zone</p> <p>Whole zone</p>
<p>Note: Expressed normally as the arithmetic mean of at least 3 measurements at 1 m below surface, mid depth and 1 m above the seabed. However in water of a depth of 5 m or less, the mean shall be that of 2 measurements (1 m below surface and 1 m above seabed), and in water of less than 3 m the 1 m below surface sample only shall apply.</p>	

Table 6A-2 Water Quality Objectives for Tolo Harbour and Channel Water Control Zone

	Water Quality Objective	Part or parts of Zone
A.	AESTHETIC APPEARANCE	
	(a) There should be no objectionable odours or discolouration of the water	Whole zone
	(b) Tarry residues, floating wood, articles made of glass, plastic, rubber or of any other substances should be absent.	Whole zone
	(c) Mineral oil should not be visible on the surface.	Whole zone
	(d) There should be no recognisable sewage-derived debris.	Whole zone
	(e) Floating, submerged and semi-submerged objects of a size likely to interfere with the free movement of vessels, or cause damage to vessels, should be absent.	Whole zone
	(f) The water should not contain substances which settle to form objectionable deposits.	Whole zone
B.	BACTERIA	
	The level of <i>Escherichia coli</i> should be less than 1 per 100 mL, calculated as the geometric mean of the most recent 5 consecutive samples taken at intervals of between 7 and 21 days.	Whole zone
C.	COLOUR	
	Human activity should not cause the colour of water to exceed 30 Hazen units.	Whole zone
D.	DISSOLVED OXYGEN	
	The level of dissolved oxygen should not be less than 4 mg per litre.	Whole zone
E.	pH	
	Human activity should not cause the pH of the water to exceed the range of 6.5-8.5 units.	Whole zone
F.	TEMPERATURE	
	Human activity should not cause the natural daily temperature range to change by more than 2.0°C.	Whole zone
G.	SALINITY	
	Human activity should not cause the natural ambient salinity level to change by more than 10%.	Whole zone
H.	SUSPENDED SOLIDS	
	(b) Human activity should not cause the annual median of suspended solids to exceed 20 mg per litre.	Whole zone
I.	AMMONIA	
	The un-ionized ammoniacal nitrogen level should not be more than 0.021 mg per litre, calculated as the annual average (arithmetic mean).	Whole zone
J.	5-DAY BIOCHEMICAL OXYGEN DEMAND	

Water Quality Objective	Part or parts of Zone
The 5-day biochemical oxygen demand should not exceed 3 mg per litre	Whole zone
K. CHEMICAL OXYGEN DEMAND	
The chemical oxygen demand should not exceed 15 mg per litre.	Whole zone
L. TOXIC SUBSTANCES	
(a) Toxic substances in the water should not attain such levels as to produce significant toxic, carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chains and to interactions of toxic substances with each other.	Whole zone
(b) Human activity should not cause a risk to any beneficial use of the aquatic environment.	Whole zone

Table 6A-3 Standards for Effluents Discharged into the Marine Waters of Victoria Harbour Phase II Water Control Zone

Flow rate (m ³ /day)	≤10		>10 & ≤200		>200 & ≤400		>400 & ≤600		>600 & ≤800		>800 & ≤1000		>1000 & ≤1500		>1500 & ≤2000		>2000 & ≤3000		>3000 & ≤4000		>4000 & ≤5000		>5000 & ≤6000			
	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	6-10	6-10	6-10	
Determinant																										
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	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
Colour	4	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
Suspended solids	700	600	600	600	500	500	375	375	300	300	300	600	600	400	400	300	300	200	200	200	100	100	100	100	100	100
BOD	700	600	600	600	500	500	375	375	300	300	300	600	600	400	400	300	300	200	200	200	100	100	100	100	100	100
COD	1500	1200	1200	1200	1000	1000	700	700	600	600	600	1200	1200	800	800	600	600	400	400	400	200	200	200	200	200	200
Oil & Grease	50	50	50	50	30	30	25	25	20	20	20	50	50	30	30	20	20	20	20	20	20	20	20	20	20	20
Iron	20	15	13	13	10	10	7.5	7.5	6	6	6	15	15	10	10	10	10	10	10	10	10	10	10	10	10	10
Boron	6	5	4	4	3.5	3.5	2.5	2.5	2	2	2	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4
Barium	6	5	4	4	3.5	3.5	2.5	2.5	2	2	2	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4
Mercury	0.1	0.1	0.05	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	0.001	0.001
Cadmium	0.1	0.1	0.05	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	0.001	0.001
Other toxic metals	2	1.5	1	1	0.8	0.8	0.6	0.6	0.5	0.5	0.5	1.5	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1
Total toxic metals	4	3	2	2	1.6	1.6	1.2	1.2	1	1	1	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
Cyanide	1	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Phenols	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Sulphide	5	5	5	5	5	5	5	5	5	5	5	10	10	5	5	5	5	5	5	5	5	5	5	5	5	5
Total residual	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
Total nitrogen	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Total phosphorus	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Surfactants (total)	30	20	20	20	20	20	15	15	15	15	15	30	30	20	20	20	20	20	20	20	20	20	20	20	20	20
<i>E. coli</i> (count/100 ml)	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000

(All units in mg/l¹ unless otherwise stated; all figures are upper limits unless otherwise indicated)

