For discussion on
14 March 2024

DWSAC Paper No. 2/2024

DRINKING WATER SAFETY ADVISORY COMMITTEE

Review of Hong Kong Drinking Water Standards

PURPOSE

This paper aims to seek views from the Drinking Water Safety Advisory Committee ("Committee") on the recommended updates to the Hong Kong Drinking Water Standards ("HKDWS"), Surveillance List ("SL"), Watch List ("WL") and Aesthetic Guidelines ("AG"), and the associated monitoring programme.

BACKGROUND

2. In light of the fact that updates on drinking water standards and guidelines have been made by the World Health Organization ("WHO"), the Mainland China and a number of overseas jurisdictions over the past few years, we commissioned a study in August 2022 to review HKDWS, SL, WL and AG (hereinafter referred to as "HKDWS Study") and the associated monitoring programme.

3. The scope of the HKDWS Study covered the following tasks:

(a) reviewing the updates made by WHO on its Guidelines for Drinking-water Quality: fourth edition[1] ("WHO 2022");

(b) reviewing all parameters in the national "Standards for Drinking Water Quality", viz. GB 5749-2022[2];

(c) reviewing the updates on drinking water standards/guidelines made by eight overseas jurisdictions, namely Australia ("AU"), Canada ("CA"), England and Wales in the United Kingdom ("UK"), the European Union ("EU"), Japan ("JP"), New Zealand ("NZ"), Singapore ("SG") and the United States of America ("USA") (hereinafter referred to as "Overseas Jurisdictions") since January 2019;

[1] Incorporated with the first and second addenda in 2022.

[2] With GB 5749-2022 just recently issued in 2022, we considered it opportune to include the review of all of its parameters as part of the HKDWS Study.

(d) reviewing the local water quality data obtained from the Enhanced Water Quality Monitoring Programme ("EP")[3]; and

(e) providing recommendations on how HKDWS, SL, WL and AG as well as the corresponding monitoring programme should be updated.

RECOMMENDED UPDATES

4. The parameters reviewed in the HKDWS Study and the recommendations on the updates to be made are summarised in the following Annexes and the ensuing paragraphs:

(a) **Annex 1(A)** – Review of 87 parameters based on the updates made in/by WHO 2022 and the Overseas Jurisdictions;

(b) **Annex 1(B)** – Review of 152 parameters in GB 5749-2022;

(c) **Annex 2** and paragraphs 5 to 9 – Recommended updates to HKDWS, SL, WL and AL;

(d) **Annex 3** and paragraph 6 – Recommended updates to the assumptions in deriving HKDWS standard value ("SV");

(e) **Annex 4** and paragraphs 10 to 12 – Recommended monitoring programme for the proposed new/revised parameters; and

(f) Paragraph 13 – Review of and recommended updates to the metal parameters under EP.

[3] EP monitors residual chlorine, *Escherichia coli* and six metals, viz. antimony, cadmium, chromium, copper, lead and nickel, in drinking water at consumers' taps of randomly selected premises. The HKDWS values for the six metals are to be reviewed upon collection of sufficient local data.

HKDWS

5. The number of parameters in HKDWS is recommended to be increased from 60 to 61 with (i) the inclusion of three new parameters; (ii) the exclusion of two existing parameters; and (iii) the extension of the coverage of one existing parameter, as tabulated below:

Parameter	**Recommended updates**	**Standard Value ("SV")[4]**	**Remarks**
Manganese ("Mn")	New parameter to be added to HKDWS	80µg/L	To align with WHO 2022 which introduced a health-based PGV for Mn. (Note: Mn will remain in AG.)
Cylindrospermopsins ("CYNs")	New parameters to be upgraded from WL	0.7µg/L	Although these toxins are not currently detected in drinking water locally, their inclusion in HKDWS is recommended to align with WHO 2022 and to better protect public health from the climate change perspective[5].
Saxitoxins ("STXs")		3µg/L	
Microcystins ("MCs")	Existing parameter "microcystin-LR" to be renamed as MCs with their coverage extended	1µg/L (unchanged)	
Tetrachloroethene	Existing parameters to be downgraded to SL	-	These contaminants have not been detected at levels of concern in drinking water locally but their contamination risk cannot be completely excluded.
Uranium			

6. The assumptions in deriving SV of the parameters in HKDWS as laid down in DWSAC Paper No. 10/2018 have been reviewed in the HKDWS Study with the recommended updates given in **Annex 3**. Similar to the approach adopted by WHO, the recommended updates to the assumptions for deriving the SVs are only applicable to the new or revised parameters.

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[4] SVs of the parameters concerned have been derived according to the derivation methodology laid down in DWSAC Paper No. 10/2018 and the assumptions given in **Annex 3**. All derived SVs are the same as their corresponding guideline values ("GVs")/provisional guideline values ("PGVs") in WHO 2022.

[5] Cyanobacteria are commonly found in surface water bodies and some of these species can produce cyanotoxins, which can impact public health. There has been increasing concern on climate change which will give rise to potential growth of cyanobacteria in water bodies due to rising temperatures, changing precipitation patterns and nutrient availability. To address this, WHO has recommended new guidelines for monitoring CYNs and STXs.

SL

7. The number of parameters in SL is recommended to be increased from 41 to 42 with (i) the inclusion of three new parameters; and (ii) the exclusion of two parameters, as tabulated below:

Parameters	**Recommended updates**	**Remarks**
Tetrachloroethene	New parameter to be downgraded from HKDWS	The contamination risk of these parameters cannot be completely excluded despite the fact that their detected levels in local drinking water do not give rise to any health concern. For HAA_5, three of the five haloacetates were HKDWS parameters with detectable levels in the past, and hence it is recommended that closer track of the levels of this group of chemicals be kept.
Uranium		
Sum of five haloacetates ("HAA_5")	New parameter to be upgraded from WL	
Formaldehyde	Existing parameters to be downgraded to WL	They occur in local drinking water at concentrations well below the levels of health concerns.
Trichloroacetonitrile		

WL

8. The number of parameters in WL is recommended to be increased from 687 to 708, as tabulated below:

Parameter	**Recommended updates**	**Remarks**
Acrolein	New parameters to be added to WL	These 22 parameters are included in the drinking water standards/ guidelines of some of the Overseas Jurisdictions or GB 5749-2022. Current evidence either (i) does not support their chance of occurring at levels that would cause adverse health risk through consumption of local drinking water, or (ii) does not show that their potential adverse health risks via the drinking water route have been established scientifically. They are included as they could be of public concerns.
Acrylic acid		
Anisole		
Beryllium		
Butyl xanthic acid		
Di(2-ethylhexyl) adipate		
1,1-dichloroethene		
Dichlorvos		
Dimethyl disulfide		
Dimethyl trisulfide		
Diquat		
Hexafluoropropylene oxide dimer acid and its ammonium salt (GenX chemicals)		
Iodoacetic acid		
Molybdenum		
Naphthenic acid		
2-naphthol		
Nitrobenzene		
Pentachloropropane		
Radium-226		
Sulphide		
1,1,1-trichloroethane		
Tritium		
Formaldehyde	Existing parameters to be downgraded from SL	See corresponding remark in the table under paragraph 7.
Trichloroacetonitrile		
CYNs	Existing parameters to be upgraded to HKDWS	See corresponding remark in the table under paragraph 5.
STXs		
HAA_5	Existing parameter to be upgraded to SL	See corresponding remark in the table under paragraph 7.
Anatoxins ("ATXs")	Existing parameter "Anatoxin-a" to be renamed as ATXs	Coverage to be extended.
Glyphosate and aminomethylphosphonic acid ("AMPA")	Existing parameter "Glyphosate" to be renamed as AMPA	

AG

9. The number of parameters in AG is recommended to be increased from 10 to 12 to enhance the control of aesthetic quality of the drinking water, as tabulated below:

Parameter	**Recommended updates**	**Aesthetic Guideline Value("AGV")**	**Remarks**
Geosmin	New parameters to be added	40ng/L	The proposed AGV is based on historical level in raw water with no complaints received from the public and is practically achievable in the local context.
Visible substance		No visible substance	Any visible substance, if exists in drinking water, may arouse public concern on drinking water quality.
2-Methyl-isoborneol	Existing parameter with AGV to be revised	From 50ng/L to 40ng/L	The proposed AGV is based on historical level in drinking water with no complaints received from the public and is practically achievable in the local context.

RECOMMENDED MONTIORING PROGRAMME

10. Upon review, the HKDWS Study noted that there has been no particular change in the guiding principles in the monitoring programme of other jurisdictions. Therefore, the rationale currently adopted in our drinking water quality monitoring programme remains in order and has been used for formulating the monitoring programme for the new/revised parameters as mentioned in paragraphs 5 to 9 above. The recommended monitoring programme for these new/revised parameters are summarised in **Annex 4**.

11. On a related issue, we took the opportunity to review the monitoring of taste and odour at random publicly accessible consumers' taps ("PACTs")[6] in the HKDWS

[6] PACTs are consumers' taps used for drinking and food preparation purposes in non-domestic premises such as shopping centres, community facilities, clinics, management offices, government offices, etc. that are accessible for sampling by the Water Supplies Department ("WSD").

Study to address the concern raised by WSD staff on the potential health risks associated with tasting water collected from randomly selected consumers' taps which appeared not in a hygienic condition. Upon review, it is recommended that tests for taste and odour would not be conducted at such PACTs. In case this leads to a shortfall in the number of taste and odour samples from PACTs within a District Council District ("DCD"), it is recommended that the shortfall should be made up by water samples collected from the fixed sampling points of the distribution network or fresh water service reservoirs, within the same DCD.

12. In addition to the above, the HKDWS Study also recommends relaxation of the monitoring frequency of two disinfection by-products ("DBPs") i.e. chlorite and perchlorate from weekly to monthly at water treatment works ("WTW") adopting sodium hypochlorite solution for disinfection. However, we consider it more prudent to maintain the monitoring at a weekly interval for the time being as committed to the Committee in association with the operation and maintenance plan for on-site chlorine generation ("OSCG") plants where sodium hypochlorite solution is temporarily used as an interim measure. WSD would keep in view the monitoring data of these DBPs upon full operation of all OSCG plants to see it is appropriate to adopt the recommendation, before putting it forward to the Committee for consideration.

REVIEW ON METAL PARAMETERS UNDER EP

13. As six metals, viz. antimony, cadmium, chromium, copper, lead and nickel, could be present in internal plumbing systems, EP has been implemented in the territory since December 2017 to monitor their content, if any, in drinking water collected from randomly selected consumers' taps as well as to collect data for reviewing the HKDWS SVs of these metals, which have formed the basis for assessing compliance in EP under a two-tier sampling protocol[7]. Upon reviewing the data collected as well as the details of EP, the following recommendations are made:

[7] Tier 1 – Random Day Time sampling: the purpose is to monitor the drinking water quality in respect of the six metals in Hong Kong. A 1-litre unflushed sample will be randomly collected during daytime.

Tier 2 – 30-minute stagnation sampling: the purpose is to verify the metal exposure of consumers in the premises concerned. It will only be tested if exceedance is found in the Tier 1 sample. The water tap will first be flushed for 5 minutes and then stagnated for 30 minutes. After stagnation, a 1-litre unflushed sample will be collected at the water tap.

Aspects of EP	Recommendations	Remarks
HKDWS SVs for the six metal parameters	No change	Aligned with GVs/PGVs in WHO 2022.
	To review in the future the actions to be taken by the Overseas Jurisdictions in respect of achieving a tightened standard for lead; and to implement measures as enablers for progressive build-up of Hong Kong's readiness on this front.	Tightening SV for lead is notably an overseas trend.
Monitoring of the six metal parameters	To remove antimony from EP but continue its monitoring under WSD's routine monitoring programme	Since the launch of EP, the antimony level in all Random Day Time samples have been below the reporting limit of 1μg/L.
Two-tier sampling protocol	No change	Continual adoption of the protocol has been reaffirmed as it aligns with the principle of the technical brief of WHO[8] and practices adopted by other jurisdictions.

WAY FORWARD

14. Subject to the views of the Committee, we will consult relevant stakeholders, and seek endorsement of the proposed updates to HKDWS by the Secretary for Development ("SDEV"). Subject to SDEV's endorsement, the monitoring of the new/revised parameters will commence by stages[9].

ADVICE SOUGHT

15. Members are invited to offer views on the recommended updates to the HKDWS, SL, WL, AG and the associated monitoring programme mentioned above.

Development Bureau
Water Supplies Department
February 2024

[8] Lead in drinking-water: Health risks, monitoring and corrective actions. https://iris.who.int/bitstream/handle/10665/361821/9789240020863-eng.pdf

[9] The monitoring of CYNs, STXs and MCs would commence in the third quarter of 2024 tentatively after acquisition of necessary equipment and reagents for testing of these cyanotoxins by WSD.

(A) Updates in/by WHO 2022 and the Overseas Jurisdictions reviewed in HKDWS Study

(Parametric values with strikethrough line and marked red were the previous parametric values before they were revised by the jurisdiction)

	Parameter	Category	Updates on drinking water standards/guidelines since January 2019 (unit in µg/L unless otherwise stated)									Currently adopted in HK		Recommendations of Review
			WHO	EU	UK	USA	CA	AU	JP	NZ	SG	Unit in µg/L unless otherwise stated	List	
1.	Colour (TCU)	A	-	-	-	-	-	-	-	~~10~~ ≤15	-	≤ 15	AG	No change [Note a]
2.	Iron	A	-	-	-	-	-	-	-	~~200~~ ≤ 300	-	≤ 300	AG	No change [Note a]
3.	Taste and Odour	A	-	-	-	-	-	-	-	-	-	Unobjectionable	AG	No change [Note a]; See Para. 11
4.	Temperature	A	-	-	-	-	-	-	-	~~Acceptable to most consumers, preferably cool~~ ≤ 15ºC	-	-	-	No change [Note b]
5.	Turbidity (NTU)	A	-	-	-	-	-	-	-	~~2.5~~ ≤ 5	-	≤ 3	AG	No change [Note a]
6.	Aluminium	C	-	-	-	-	2 900	-	-	1 000	-	≤ 200	AG	No change [Note a]
7.	Anatoxins	C	30 (ST-PRV)	-	-	-	-	-	-	6 [replaced anatoxin-a(s) / homoanatoxin-a]	-	-	Anatoxin-a in WL	**See Annex 2**
8.	Antimony	C (EP)	-	~~5~~ 10	-	-	-	-	-	-	-	≤ 20	HKDWS	No change [Note d]; See Para. 13
9.	Asbestos	C	Reviewed	-	-	-	-	-	-	-	-	-	-	No change [Note c]
10.	Atrazine and its chloro-s-triazine metabolites	C	-	-	-	-		-	-	~~2~~ 100	~~2~~ 100	≤ 100	SL	No change [Note d]
11.	Azinphos methyl	C	-	-	-	-	*	-	-	~~4~~ 100	-	-	WL	No change [Note e]
12.	Barium	C	-	-	-	-	~~1 000~~ 2 000	-	-	~~700~~ 1 500	~~700~~ 1 300	≤ 1 300	HKDWS	No change [Note d]
13.	Bentazone	C	20 000 (acute HBV)	-	-	-		-	-	-	500	-	WL	No change [Note e]
14.	Beta-estradiol	C	-	0.001 (guidance value in Watch List)	-	-	-	-	-	-	-	-	WL	No change [Note e]
15.	Bisphenol A	C	-	2.5	-	-	-	-	-	-	-	-	WL	No change [Note e]
16.	Boron	C	-	~~1 000~~ 1 500 (2 400 for desal)	-	-	-	-	-	~~1 400~~ 2 400	~~500~~ 2 400	≤ 2 400	HKDWS	No change [Note d]
17.	Bromoxynil	C	-	-	-	-	~~5~~ 30	-	-	-	-	-	WL	No change [Note e]
18.	Cadmium	C (EP)	-	-	-	-	~~5~~ 7	-	-	-	-	≤ 3	HKDWS	No change [Note d]; See Para. 13
19.	Carbaryl	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]

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			WHO	EU	UK	USA	CA	AU	JP	NZ	SG	Unit in µg/L unless otherwise stated	List	
20.	Carbofuran	C	-	-	-	-	*	-	-	-	-	≤ 7	SL	No change [Note f]
21.	Chloramines	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
22.	Chlorate	C	-	250 700[(1)]	-	-	-	-	-	-	-	≤ 300	HKDWS	No change [Note d]
23.	Chlorine	C	-	-	-	-	-	-	-	~~600-1 000~~ 300-1 000 (aesthetic)	-	≤ 5 000	HKDWS	No change [Note d]
24.	Chlorite	C	-	250 700[(1)]	-	-	-	-	-	-	-	700	HKDWS	No change [Note d]
25.	Chromium	C (EP)	50 (PGV→GV)	50 (25 by 2036)	-	-	-	-	~~50~~ 20 for Cr(VI)	-	-	≤ 50	HKDWS	No change [Note d]; See Para. 13
26.	Copper	C (EP)	-	-	-	-	2 000	-	-	-	-	≤ 2 000	HKDWS	No change [Note d]; See Para. 13
27.	Cyanuric acid	C	-	-	-	-	-	-	-	40 000	40 000	-	-	No change [Note g,h]
28.	Cylindrospermopsins	C	0.7 (PGV) 3 (ST-PGV)	-	-	-	-	-	-	~~1~~ 0.8	-	-	WL	**See Annex 2**
29.	Diazinon	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
30.	Dicamba	C	-	-	-	-	~~120~~ 110	-	-	-	-	-	WL	No change [Note e]
31.	1,2-Dichlorobenzene	C	-	-	-	-	*	-	-	-	-	≤ 1 000	SL	No change [Note f]
32.	2,4-Dichlorophenol	C	-	-	-	-	*	-	-	-	-	-	-	No change [Note f]
33.	Dichlorvos	C	-	-	-	-	-	-	-	-	20	-	-	**See Annex 2**
34.	Diclofop-methyl	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
35.	Dicofol	C	-	-	-	-	-	-	-	-	10	-	-	No change [Note i]
36.	Diquat	C	-	-	-	-	~~10~~ 50	-	-	-	30	-	-	**See Annex 2**
37.	1,4 Dioxane	C	-	-	-	-	50	-	-	-	-	≤ 50	HKDWS	No change [Note d]
38.	Diuron	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
39.	GenX chemicals (Hexafluoropropylene oxide dimer acid and its ammonium salt)	C	-	-	-	0.01 (HA)	-	-	-	-	-	-	-	**See Annex 2**
40.	Glyphosate and AMPA	C	-	-	-	-	-	-	-	-	900	-	Glyphosate in WL	**See Annex 2**
41.	HAA_5	C	-	60	-	-	-	-	-	-	-	-	WL	**See Annex 2**
42.	Hydroxyatrazine	C	-	-	-	-	-	-	-	300	200	≤ 200	SL	No change [Note d]
43.	Iodine	C	Reviewed	-	-	-	-	-	-	-	-	-	-	No change [Note g,h]
44.	Lead	C (EP)	-	10 (5 by 2036)	-	-	~~10~~ 5	-	-	-	-	≤ 10	HKDWS	No change [Note c,d]; See Para. 13
45.	Malathion	C	-	-	-	-	-	-	-	-	900	-	WL	No change [Note e]
46.	Manganese	C	80 (PGV)	-	-	-	120	-	-			≤ 80	AG	**See Annex 2**
47.	MCPA	C	-	-	-	-	350	-	-	~~2~~ 800	~~2~~ 700	-	WL	No change [Note e]
48.	Metalaxyl	C	-	-	-	-		-	-	~~100~~ 300	-	-	WL	No change [Note e]

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49.	Metolachlor	C	-	-	-	-	*	-	-	-	-	≤ 10	HKDWS	No change [Note f]
50.	Microcystins	C	1 (PGV) 12 (ST-PGV)	1		-	-	-	-	1 Microcystins/ nodularins as microcystin-LR toxicity equivalents [replaced microcystin-LR / Nodularin]	-	≤ 1 for MC-LR	HKDWS; Nodularins in WL	**See Annex 2**
51.	Microplastics	C	-	To adopt a testing method by 2024	-	-	-	-	-	-	-	-	WL	No change [Note c]
52.	Molybdenum	C	-	-	-	-	-	-	-	*	-	-	-	**See Annex 2**
53.	Monochlorobenzene	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
54.	NDMA	C	-	-	-	-	-	-	-	0.1	0.1	≤ 0.1	HKDWS	No change [Note d]
55.	Nickel	C (EP)	70 (review and status quo)	-	-	-	-	-	-	-	-	≤ 70	HKDWS	No change [Note d]; See Para. 13
56.	Nitrate and nitrite	C	-	-	-	-	-	-	-	~~200 for nitrite (long-term)~~ sum ratio against their short-term MAVs (ST) ≤1	-	-	-	No change. (Nitrate and nitrite are individually included in HKDWS [Note d]. Sum ratio is not relevant in HK's context, since nitrite is not a concern when HK's drinking water is not chloraminated and the water sources are not impacted by high nitrite sources.)
57.	Nonylphenol	C	-	0.3 (guidance value in Watch List)	-	-	-	-	-	-	-	-	WL	No change [Note e]
58.	Organotins	C	1.5 (HBV)	-	-	-	-	-	-	-	-	-	-	No change [Note g]
59.	Paraquat	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
60.	Perchlorate	C	-	-	-	-	-	-	-	80	70	≤ 70	HKDWS	No change [Note d]
61.	Pesticide 1080 (ST)	C	-	-	-	-	-	-	-	35	-	-	-	No change [Note i]
62.	PFAS total	C	-	0.5	-	-	-	-	-	-	-	-	WL	No change [Note c]
63.	$PFAS_{20}$	C	-	0.1	-	-	-	-	-	-	-	-	WL	No change [Note c]
64.	PFBS	C	-	-	-	2 (HA)	-	-	-	-	-	-	WL	No change [Note c]
65.	PFHxS and PFOS	C	-	-	-		-	-	-	0.07	-	-	WL	No change [Note c]
66.	PFOA	C	-	-	-	0.000004 (Interim HA)	0.2	-	-	0.56	-	-	WL	No change [Note c]
67.	PFOS	C	-	-	-	0.00002 (Interim HA)	0.6	-	-	-	-	-	WL	No change [Note c]

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			WHO	EU	UK	USA	CA	AU	JP	NZ	SG	Unit in µg/L unless otherwise stated	List	
68.	PFOS and PFOA	C	-	-	-	-	-	-	0.05 (P)	-	-	-	WL	No change [Note c]
69.	Phorate	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
70.	Picloram	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
71.	Saxitoxins	C	3 (acute GV)	-	-	-	-	-	-	-	-	-	WL	**See Annex 2**
72.	Selenium	C	-	~~10~~ 20 30[(2)]	-	-	-	-	-	~~10~~ 40	~~10~~ 40	≤ 40	HKDWS	No change [Note d]
73.	Silver	C	100 (PRV)	-	-	-	-	-	-			-	-	No change [Note g,h]
74.	Simazine	C	-	-	-	-	*	-	-	-	-	≤ 2	HKDWS	No change [Note f]
75.	Strontium	C	-	-	-	-	7 000	-	-			-	WL	No change [Note e]
76.	Terbufos	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
77.	Tetrachloroethene	C	~~40~~ 100 (GV)	-	-	-	-	-	-	-	-	≤ 40	HKDWS	**See Annex 2**
78.	2,3,4,6-Tetrachlorophenol	C	-	-	-	-	*	-	-	-	-	-	WL	No change [Note f]
79.	Trichloroacetonitrile	C	-	-	-	-	-	-	-	-	-	-	SL	**See Annex 2**
80.	Trichloroethene	C	~~20~~ 8 (GV)	-	-	-	-	-	-	~~20~~ 30	-	≤ 8	SL	No change [Note d]
81.	Trifluralin	C	-	-	-	-	*	-	-	-	-	≤ 20	HKDWS	No change [Note f]
82.	Uranium	C	-	30	-	-	-	~~17~~ 20	-	~~20~~ 30	~~15~~ 30	≤ 30	HKDWS	**See Annex 2**
83.	*Legionella* (cfu/L)	M	-	≤ 1 000	-	-	-	-	-	-	-	-	-	No change [Note c]
84.	Total alpha activity (Bq/L)	R	-	-	-	-	-	-	-	~~0.1~~ 0.5 excluding radon	-	≤ 0.5 for gross alpha activity	HKDWS	No change [Note j]
85.	Total beta activity (Bq/L)	R	-	-	-	-	-	-	-	~~0.5~~ 1 excluding potassium-40	-	≤ 1 for gross beta activity	HKDWS	No change [Note j]
86.	Total indicative dose (mSv/yr)	R	-	*[(3)] 0.1	-	-	-	~~0.5~~ 0.3 (OG)	-	-	-	-	-	No change [Note j]
87.	Tritium (Bq/L)	R	-	*[(3)] 100 as trigger level for stepped-up monitoring	-	-	-	-	-	-	-	-	-	**See Annex 2**

(B) Summary on the review of parameters in national Standards for Drinking Water Quality (GB 5749-2022)

Index No.^	Parameter	Category	Index Limit in CN's GB 5749-2022	Currently adopted in HK		Recommendation of Review
			Unit in µg/L unless otherwise stated	Unit in µg/L unless otherwise stated	List	
-	Thermotolerant coliform (cfu/100mL or MPN/100mL) (Subgroup of total coliforms)	M	*	0 cfu/100mL	SL (total coliforms)	No change [Note f]
1.	Total coliform (cfu/100mL or MPN/100mL)	M	Not detected	0 cfu/100mL	SL	No change [Note l]
2.	*E. coli* (cfu/100mL or MPN/100mL)	M	Not detected	0 cfu/100mL	HKDWS	No change
3.	Total plate count (cfu/mL or MPN/mL)	M	100	(5)	SL	No change [Note l]
4.	Arsenic	C	10	≤ 10	HKDWS	No change
5.	Cadmium	C	5	≤ 5	HKDWS	No change [Note d]; See Para. 13
6.	Chromium (VI)	C	50	≤ 50	HKDWS	No change [Note d]; See Para. 13
7.	Lead	C	10	≤ 10	HKDWS	No change [Note d]; See Para. 13
8.	Mercury	C	1	≤ 6	HKDWS	No change [Note d]
9.	Cyanide	C	50	-	WL	No change [Note e]
10.	Fluoride	C	1 000	≤ 1 500	HKDWS	No change [Note d]
11.	Nitrate-N	C	~~10 000 (30 000 ground water)~~ 10 000 as N	≤ 50 000 as NO_3^- (equivalent to ≤ 11 000 as N)	HKDWS	No change [Note d]
12.	Chloroform	C	60	≤ 300	HKDWS	No change [Note d]
13.	Dibromochloromethane	C	100	≤ 100	HKDWS	No change
14.	Bromodichloromethane	C	60	≤ 60	HKDWS	No change
15.	Bromoform	C	100	≤ 100	HKDWS	No change
16.	Total THM_4	C	Ratio ≤ 1	Ratio ≤ 1	HKDWS	No change
17.	Dichloroacetic acid	C	50	≤ 40 for dichloroacetate	HKDWS	No change
18.	Trichloroacetic acid	C	100	≤ 200 for trichloroacetate	HKDWS	No change [Note d]
19.	Bromate	C	10	≤ 10	HKDWS	No change
20.	Chlorite	C	700	≤ 700	HKDWS	No change
21.	Chlorate	C	700	≤ 300	HKDWS	No change
22.	Colour (Hazen Unit)	A/C	15	≤ 15	AG	No change
23.	Turbidity (NTU)	A	~~1 (4a)~~ 1 (4)	≤ 3	AG	No change [Note a]
24.	Odour and Taste	A/C	Unobjectionable	Unobjectionable	AG	No change; See Para. 11
25.	Visible substance	A/C	Nil	-	-	**See Annex 2**
26.	pH	A/C	6.5 - 8.5	6.5 - 9.5	AG	No change [Note a]
27.	Aluminium	A/C	200	≤ 200	AG	No change
28.	Iron	A/C	300	≤ 300	AG	No change
29.	Manganese	A/C	100	≤ 80	AG	**See Annex 2**
30.	Copper	A/C	1 000	≤ 2 000	HKDWS	No change [Note d]; See Para. 13
31.	Zinc	A/C	1 000	≤ 1 500	AG	No change [Note a]
32.	Chloride	A/C	250 000	-	-	No change [Note g,k]
33.	Sulphate	A/C	250 000	-	-	No change [Note g,k]
34.	Total dissolved solids	A/C	1 000 000	-	-	No change [Note g,k]
35.	Total hardness (as $CaCO_3$)	A/C	450 000	-	-	No change [Note g,k]
36.	Permanganate index (as O_2)	A/C	3 000 ~~(6 000 for certain water sources)~~ (renamed from COD_{Mn})	-	-	No change [Note b]
37.	Ammonia (as N)	A/C	500 (renamed from ammonia nitrogen)	-	-	No change [Note b]

Index No.^	Parameter	Category	Index Limit in CN's GB 5749-2022 Unit in µg/L unless otherwise stated	Currently adopted in HK Unit in µg/L unless otherwise stated	 List	Recommendation of Review
38.	Gross alpha radioactivity (Bq/L)	R	0.5	≤ 0.5	HKDWS	No change [Note j]
39.	Gross beta radioactivity (Bq/L)	R	1	≤ 1	HKDWS	No change [Note j]
40.	Chlorine (free)	C	~~≥ 300 and ≤ 4 000 (finished water); ≥ 50 (consumers' end)~~ ≥ 300 and ≤ 2 000 (finished water); ≥ 50 and ≤ 2 000 (consumers' end)	≤ 5 000	HKDWS	No change [Note d]
41.	Chlorine (total)	C	~~≥ 500 and ≤ 3 000 (finished water); ≥ 50 (consumers' end)~~ ≥ 500 and ≤ 3 000 (finished water); ≥ 50 and ≤ 3 000 (consumers' end) (extended the coverage from monochloroamine)	≤ 5 000 ≤ 3 000	HKDWS SL (mono-chloroamine)	No change [Note d]
42.	Ozone	C	~~≤300 (finished water); ≥ 20 (consumers' end)~~ ≤ 300 (finished water); ≥ 20 and ≤ 300 (consumers' end)	-	-	No change [Note h]
43.	Chlorine dioxide	C	~~≥ 100 and ≤ 800 (finished water); ≥ 20 (consumers' end)~~ ≥ 100 and ≤ 800 (finished water); ≥ 20 and ≤ 800 (consumers' end)	-	-	No change [Note h]
44.	*Giardia* (no.)	M	< 1/10L	0/1 000L	SL	No change
45.	*Cryptosporidium* (no.)	M	< 1/10L	0/1 000L	SL	No change
46.	Antimony	C	5	≤ 20	HKDWS	No change [Note d]; See Para. 13
47.	Barium	C	700	≤ 1 300	HKDWS	No change [Note d]
48.	Beryllium	C	2	-	-	**See Annex 2**
49.	Boron	C	~~500~~ 1 000	≤ 2 400	HKDWS	No change [Note d]
50.	Molybdenum	C	70	-	-	**See Annex 2**
51.	Nickel	C	20	≤ 70	HKDWS	No change [Note d]; See Para. 13
52.	Silver	C	50	-	-	No change [Note g,h]
53.	Thallium	C	0.1	-	WL	No change [Note e]
54.	Selenium	C	10	≤ 40	HKDWS	No change [Note d]
55.	Perchlorate	C	70	≤ 70	HKDWS	No change
56.	Dichloromethane	C	20	≤ 20	HKDWS	No change
57.	1,2-Dichloroethane	C	30	≤ 30	HKDWS	No change
58.	Carbon tetrachloride	C	2	≤ 4	HKDWS	No change [Note d]
59.	Vinyl chloride	C	~~5~~ 1	≤ 0.3	SL	No change [Note e]
60.	1,1-Dichloroethene	C	30	-	-	**See Annex 2**
61.	1,2-Dichloroethene	C	50	≤ 50	SL	No change [Note e]
62.	Trichloroethene	C	~~70~~ 20	≤ 8	SL	No change [Note d,e]
63.	Tetrachloroethene	C	40	≤ 40	HKDWS	**See Annex 2**
64.	Hexachlorobutadiene	C	0.6	≤ 0.6	HKDWS	No change
65.	Benzene	C	10	≤ 10	HKDWS	No change
66.	Toluene	C	700	≤ 700	HKDWS	No change
67.	Xylenes (total)	C	500	≤ 500	HKDWS	No change
68.	Styrene	C	20	≤ 20	HKDWS	No change
69.	Monochlorobenzene	C	300	-	WL	No change [Note e]
70.	1,4-Dichlorobenzene	C	300	≤ 300	HKDWS	No change
71.	Trichlorobenzene (total)	C	20	-	WL	No change [Note e]

Index No.^	Parameter	Category	Index Limit in CN's GB 5749-2022 Unit in µg/L unless otherwise stated	Currently adopted in HK Unit in µg/L unless otherwise stated	 List	Recommendation of Review
72.	Hexachlorobenzene	C	1	-	WL	No change [Note e]
73.	Heptachlor	C	0.4	-	WL	No change [Note e]
74.	Malathion	C	250	-	WL	No change [Note e]
75.	Dimethoate	C	~~80~~ 6	≤ 6	SL	No change [Note e]
76.	Bentazone	C	300	-	WL	No change [Note e]
77.	Chlorothalonil	C	10	-	WL	No change [Note e]
78.	Carbofuran	C	7	≤ 7	SL	No change [Note e]
79.	Chlorpyrifos	C	30	≤ 30	SL	No change [Note e]
80.	Glyphosate	C	700	-	WL	**See Annex 2**
81.	Dichlorvos	C	1	-	-	**See Annex 2**
82.	Atrazine	C	2	≤ 100	SL (Atrazine and its chloro-s-triazine metabolites)	No change [Note d,e]
83.	Deltamethrin	C	20	-	WL	No change [Note e]
84.	2,4-Dichlorophenoxyacetic acid (2,4-D)	C	30	≤ 30	SL	No change [Note e]
85.	Acetochlor	C	20	-	WL	No change [Note e]
86.	Pentachlorophenol	C	9	≤ 9	SL	No change [Note e]
87.	2,4,6-Trichlorophenol	C	200	≤ 200	SL	No change [Note e]
88.	Benzo(a)pyrene	C	0.01	≤ 0.7	HKDWS	No change [Note d]
89.	Di(2-ethylhexyl)phthalate	C	8	≤ 8	HKDWS	No change
90.	Acrylamide	C	0.5	≤ 0.5	SL	No change [Note e]
91.	Epichlorohydrin	C	0.4	≤ 0.4	SL	No change [Note e]
92.	MC-LR	C	1	≤ 1	HKDWS	**See Annex 2 for microcystins**
93.	Sodium	A/C	200 000	-	-	No change [Note g]
94.	Volatile phenols	A/C	2	-	WL	No change [Note e]
95.	Anionic detergent	A/C	300	-	WL	No change [Note e]
96.	MIB	A/C	0.01	≤ 0.05	AG	**See Annex 2**
97.	Geosmin	A/C	0.01	-	WL	**See Annex 2**
A1.	Enterococcus (cfu/100 mL or MPN/100 mL)	M	Not detected	-	-	No change [Note l]
A2	Clostridium perfringens (cfu/100 mL)	M	Not detected	-	-	No change [Note l]
A3.	Vanadium	C	10[@]	-	WL	No change
A4.	Ethylmercuric chloride	C	0.1	-	-	No change [Note i]
A5.	Tetraethyl lead	C	0.1	-	-	No change [Note g]
A6.	Hexachlorocyclohexane (total)	C	5[#]	-	WL	No change
A7.	Parathion	C	3[#]	-	WL	No change
A8.	Parathion methyl	C	9[#]	-	WL	No change
A9.	Lindane	C	2[#]	≤ 2	HKDWS	No change
A10.	DDT	C	1[#]	≤ 1	SL	No change
A11.	Trichlorfon	C	50[@]	-	WL	No change
A12.	Thiophanate-methyl	C	300[@]	-	WL	No change
A13.	Isoprothiolane	C	300[@]	-	WL	No change
A14.	Trifluralin	C	20[@]	≤ 20	HKDWS	No change
A15.	Metalaxyl	C	50[@]	-	WL	No change
A16.	Simetryn	C	30[@]	-	WL	No change
A17.	Acephate	C	80[@]	-	WL	No change
A18.	Formaldehyde	C	900[#]	-	SL	**See Annex 2**

Index No.^	Parameter	Category	Index Limit in CN's GB 5749-2022 Unit in µg/L unless otherwise stated	Currently adopted in HK Unit in µg/L unless otherwise stated	 List	Recommendation of Review
A19.	Chloral hydrate	C	100#	≤ 100	SL	No change
A20.	Cyanogen chloride	C	70#	-	WL	No change
A21.	NDMA	C	1@	≤ 0.1	HKDWS	No change Note d
A22.	Iodoacetic acid	C	20@	-	-	**See Annex 2**
A23.	1,1,1-Trichloroethane	C	2 000#	-	-	**See Annex 2**
A24.	1,2 Dibromoethane	C	0.05 (renamed from ethylene dibromide)	≤ 0.4	HKDWS	No change Note d
A25.	Pentachloropropane	C	30	-	-	**See Annex 2**
A26.	Ethylbenzene	C	300#	≤ 300	HKDWS	No change
A27.	1,2-Dichlorobenzene	C	1 000#	≤ 1000	SL	No change
A28.	Nitrobenzene	C	17	-	-	**See Annex 2**
A29.	Bisphenol A	C	10	-	WL	No change
A30.	Acrylonitrile	C	100	-	WL	No change
A31.	Acrolein	C	100	-	-	**See Annex 2**
A32.	Glutaraldehyde	C	70	-	WL	No change
A33.	Di(2-ethylhexyl) adipate	C	400	-	-	**See Annex 2**
A34.	Diethyl phthalate	C	300	-	WL	No change
A35.	Dibutyl phthalate	C	3	-	WL	No change
A36.	PAHs (total)	C	2	≤ 0.7 for benzo(a)pyrene	HKDWS	No change
A37.	Polychlorinated biphenyls (total)	C	0.5	-	WL	No change
A38.	Dioxin (2,3,7,8-TCDD)	C	0.00003	-	WL	No change
A39.	PFOA	C	0.08@	-	WL	No change Note c
A40.	PFOS	C	0.04@	-	WL	No change Note c
A41.	Acrylic acid	C	500	-	-	**See Annex 2**
A42.	Naphthenic acid	C	1 000	-	-	**See Annex 2**
A43.	Butyl xanthic acid	C	1	-	-	**See Annex 2**
A44.	2-Naphthol	C	400	-	-	**See Annex 2**
A45.	Dimethyl disulfide	C	0.03@	-	-	**See Annex 2**
A46.	Dimethyl trisulfide	C	0.03@	-	-	**See Annex 2**
A47.	Anisole	C	50	-	-	**See Annex 2**
A48.	Petroleum oils (total)	C	~~300~~ 50	-	WL	No change
A49.	Total organic carbon	C	5 000	-	-	No change Note b
A50.	Iodide	C	100@	-	WL	No change
A51.	Sulphide	C	20#	-	-	**See Annex 2**
A52.	Nitrites (as N)	C	1 000	≤ 3 000 as NO_2^- (equivalent to ≤ 910 as N)	HKDWS	No change
A53.	Asbestos (fibre>10µm) no./10^4L	C	700	-	-	No change Note c
A54.	Uranium	C	30@	≤ 30	HKDWS	**See Annex 2**
A55.	Radium-226 (Bq/L)	R	1@	-	-	**See Annex 2**

* Parameters deleted by jurisdiction(s)

For CN only:
^ Same as the index no. in GB 5749-2022. Index numbers with prefix "A" are parameters in the informative Appendix A of GB 5749-2022 (reference index list). If the drinking water contains substances listed in the Appendix A, reference can be made to the limits therein for evaluation.
# Parameters moved to reference index list
@ Parameters newly added to reference index list

Abbreviations

Category: A- Aesthetic, C – Chemical, M- Microbial, R – Radiological

Jurisdiction: AU – Australia, CA – Canada, CN – People's Republic of China, EU – European Union, HK – Hong Kong, JP – Japan, NZ – New Zealand, SG – Singapore, UK – England and Wales of United Kingdom, USA - United States of America, WHO – World Health Organization

Parameter: AMPA – aminomethylphosphonic acid, Cr(VI) – Chromium (VI), DDT – Dichlorodiphenyltrichloroethane, HAA_5 – Sum of five haloacetic acids viz. mono-, di- and trichloroacetate acid and mono- and dibromoacetate, MIB – 2-Methyl-isoborneol, MC-LR – Microcystin-LR, MCPA – 4-(2-methyl-4-chlorophenoxy)acetic acid, N – Nitrogen, NDMA – N-nitrosodimethylamine, PAHs – Polycyclic aromatic hydrocarbons, PFAS – per- and polyfluoroalky substances, $PFAS_{20}$ – Sum of 20 PFAS stipulated by EU in Drinking Water Directive, PFBS – Perfluorobutane sulfonic acid, PFHxS – Perfluorohexane sulfonic acid, PFOA – Perfluorooctanoic acid, PFOS – Perfluorooctane sulfonic acid, Total THM_4 – sum ratio of total trihalomethanes viz. bromoform, bromodichloromethane, dibromochloromethane and chloroform.

Others: AG – Aesthetic Guidelines, Bq/L – Becquerel per litre, cfu – colony forming unit, desal – desalinated water, COD_{Mn} – Chemical Oxygen Demand (Permanganate), EP – Enhanced Water Quality Monitoring Programme, GV – Guideline Value, GDWQ – Guidelines for Drinking-water Quality, HA – Health Advisory, HBV – Health-Based Value, HK – Hong Kong, HKDWS – Hong Kong Drinking Water Standards, L – Litre, MAV – Maximum Acceptable Value, mL – millilitre, MPN – Most Probable Number, mSv/yr – millisievert per year, no. – number, NO_3^- – Nitrate, NTU – Nephelometric Turbidity Unit, O_2 – Oxygen, OG – Operational Guidance, P – Provisional, PGV – Provisional Guideline Value, PRV – Provisional Reference Value, PV – Parametric Value, SL – Surveillance List, ST – Short Term, SV – Standard Value, TCU – True Colour Unit (equivalent to Hazen Unit), WL – Watch List, µg/L – microgram per litre

Notes for individual parameter

(1) PV of 700 µg/L shall be applied when a disinfection method that generates chlorate and chlorite, in particular chlorine dioxide, is used for disinfection of drinking water.
(2) For regions where geological conditions may lead to high level in ground water.
(3) The revised EU's Drinking Water Directive will not set out PVs on radioactivity as they are covered under the Directive 2013/51/Euratom.
(4) 3 NTU when decentralized and small centralized water supply are restricted with by water source and treatment technology.
(4a) 3 NTU when restricted by water source and purification technology.
(5) WSD's reference value of 10 cfu/mL for service reservoirs, water tanks and cross harbour mains; and 20 cfu/mL for water main, fresh water pumping station, connection points, supply point to the Airport, water selling kiosk and distribution points.

Notes on reasons where no change is required after review

(a) Aesthetic guideline value is based on HK's context.
(b) Not health-related parameter. It is rather an operational parameter.
(c) Should keep in view for future review by WHO and other jurisdictions.
(d) HKDWS SVs are derived according to the established methodology and are consistent with WHO's GDWQ. The values of SL are consistent with WHO's GDWQ.
(e) Undetectable or level well below that of health concern in HK's raw water or drinking water.
(f) Deletion / movement of parameter(s) by respective jurisdiction(s).
(g) Parameter with no relevance to HK's context.
(h) This is not used as residual disinfectant in HK.
(i) This is not a registered pesticide in HK and is banned in CN.
(j) HKDWS SV for radiological parameters based on WHO's screening levels.
(k) WSD can continue its routine testing to characterize water quality and provide customers information.
(l) HKDWS SV for *E. coli* as indicator bacteria is consistent with WHO's GDWQ.

Annex 2

Recommended Updates to Hong Kong Drinking Water Standards, Surveillance List, Watch List and Aesthetic Guidelines

Item	Parameter	Category	Current Status (HKDWS SV/AGV)	Action	Recommendation (HKDWS SV/AGV)	Notes on Proposed Revision
1.	Acrolein	C	–	Add	WL	Note (a)
2.	Acrylic acid	C	–	Add	WL	Note (a)
3.	Anatoxins	C	Anatoxin-a in WL	Revise	Anatoxins in WL	To align with the parametric name in WHO 2022. WHO considers the available data was inadequate to permit derivation of health-based GV and only a short-term reference value of 0.03mg/L is provided.
4.	Anisole	C	–	Add	WL	Note (a)
5.	Beryllium	C	–	Add	WL	Note (a)
6.	Butyl xanthic acid	C	–	Add	WL	Note (a)
7.	Cylindrospermopsins	C	WL	Upgrade	HKDWS SV (≤0.7μg/L)	Note (b)
8.	Di(2-ethylhexyl) adipate	C	–	Add	WL	Note (a)
9.	1,1-Dichloroethene	C	–	Add	WL	Note (a)
10.	Dichlorvos	C	–	Add	WL	Note (a),(c)
11.	Dimethyl disulfide	C	–	Add	WL	Note (a)
12.	Dimethyl trisulfide	C	–	Add	WL	Note (a)
13.	Diquat	C	–	Add	WL	Note (c)
14.	Formaldehyde	C	SL	Downgrade	WL	This chemical occurs in drinking water at concentrations well below those of health concern. WHO therefore considers no formal guideline is necessary. Past monitoring data in local raw and treated water was consistently <225μg/L.

Item	Parameter	Category	Current Status (HKDWS SV/AGV)	Action	Recommendation (HKDWS SV/AGV)	Notes on Proposed Revision
15.	Geosmin	A	WL	Change	AGV (≤40ng/L)	Based on WSD's records, local consumers raised no complaints on water quality when the level of geosmin did not exceed 40ng/L in impounding reservoirs. It is therefore appropriate to set its AGV to 40ng/L.
16.	Glyphosate and aminomethylphosphonic acid ("AMPA")	C	Glyphosate in WL	Revise	Glyphosate and AMPA in WL	Undetectable locally. Expand the parameter with reference to Singapore.
17.	HAA_5	C	WL	Upgrade	SL	Although WHO has not stipulated GVs/PGVs for mono- and dibromoacetate nor HAA_5, and brominated DBPs are not of concern in Hong Kong ("HK") (because of low bromide levels in source water and low chance of occurrence under high pH of treated water), three other HAAs (viz. mono-, di- and trichloroacetate) are detected in treated water and thus it is important to continue monitoring the levels and trends of these three HAAs together with mono- and dibromoacetate as a whole under HAA_5. It is therefore appropriate to move HAA_5 to SL to keep track of its levels in the local drinking water.
18.	Hexafluoropropylene oxide dimer acid and its ammonium salt (GenX chemicals)	C	–	Add	WL	One of the PFAS stipulated by USEPA. PFAS is of public / worldwide concern, and the current 20 PFAS in WL do not include GenX chemicals.

Item	Parameter	Category	Current Status (HKDWS SV/AGV)	Action	Recommendation (HKDWS SV/AGV)	Notes on Proposed Revision
19.	Iodoacetic acid	C	–	Add	WL	Note (a)
20.	Manganese	C / A	AGV (≤80µg/L)	Add	HKDWS SV (≤80µg/L)	WHO 2022 has introduced a health-based PGV, and manganese has been detected in the local drinking water in the past.
				Retain	AGV (≤80µg/L)	Based on WSD's experience in handling consumer complaints, AGV of manganese was lowered from ≤100µg/L to ≤80µg/L in March 2022, which also aligns with WHO's PGV. As the current AGV is already more stringent than the value of 100µg/L being adopted by the Mainland ("CN") and Australia for aesthetic purpose, and the local historical monitoring data indicates that the prevailing AGV of ≤80µg/L is achievable and measurable, it is recommended for retention.
21.	2-Methyl-isoborneol ("MIB")	A	AGV (≤50ng/L)	Revise	AGV (≤40ng/L)	Based on WSD's records, local consumers raised no complaints when MIB levels did not exceed 40ng/L. It is considered appropriate to lower its AGV to 40ng/L.
22.	Microcystins	C	HKDWS SV (≤1µg/L for Microcystin-LR)	Revise	HKDWS SV (≤1µg/L for Microcystins)	Note (b)
23.	Molybdenum	C	–	Add	WL	Note (a)
24.	Naphthenic acid	C	–	Add	WL	Note (a)

Item	Parameter	Category	Current Status (HKDWS SV/AGV)	Action	Recommendation (HKDWS SV/AGV)	Notes on Proposed Revision
25.	2-Naphthol	C	–	Add	WL	Note (a)
26.	Nitrobenzene	C	–	Add	WL	Note (a)
27.	Pentachloropropane	C	–	Add	WL	Note (a)
28.	Radium-226	R	–	Add	WL	Note (a)
29.	Saxitoxins	C	WL	Upgrade	HKDWS SV (≤3µg/L)	Note (b)
30.	Sulphide	C	–	Add	WL	Note (a)
31.	Tetrachloroethene	C	HKDWS SV (≤40µg/L)	Downgrade	SL	The levels of this chemical in raw and treated water have been <10µg/L, well below WHO's updated GV of 100µg/L. Concentrations of concern are largely limited either to spills into small volume water bodies that are drawn directly into supply with little dilution or time for volatilisation; or to situations experiencing ongoing contamination of groundwater. Occurrence at level of concern is not anticipated locally as we have a large volume, reasonably well-protected surface water supply.
32.	Trichloroacetonitrile	C	SL	Downgrade	WL	WHO considers the available data was inadequate to permit derivation of health-based value. Past monitoring data in raw and treated water in HK was consistently <0.25µg/L.
33.	1,1,1-Trichloroethane	C	–	Add	WL	Note (a)

Item	Parameter	Category	Current Status (HKDWS SV/AGV)	Action	Recommendation (HKDWS SV/AGV)	Notes on Proposed Revision
34.	Tritium	R	–	Add	WL	To cope with the potential impact of radioactive wastewater discharge in Fukushima to the drinking water supplied from the new Tseung Kwan O Desalination Plant ("TKODP"), WSD has commenced a monitoring programme to collect the background tritium level of the TKODP. So far, the monitoring indicates that there has been no contamination to the local seawater by tritium. With the commissioning of TKODP, tritium in desalinated water will be monitored.
35.	Uranium	C	HKDWS SV (≤30μg/L)	Downgrade	SL	Uranium has not been detected at levels of concern in local water supplies (maximum level in drinking water was 1.5μg/L). Concentrations of concern are largely limited to naturally contaminated groundwater. Occurrence at level of concern is not anticipated locally for a reasonably well-protected surface water supply.
36.	Visible substance	A	-	Add	AGV (no visible substance)	Being adopted by CN. WSD would respond to customers on visible substance as part of the standard customer response process.

Category: A-Aesthetic, C – Chemical, M – Microbial, R – Radiological

Note (a): Parameters stipulated by CN. As GB5749-2022 provides limits for evaluation for these parameters, there could be public concern and thus it is conducive to keep an eye on their levels.

Note (b): Under the effect of climate change, HK's source water may support populations of cyanobacteria at concentrations that could produce cyanotoxins at levels giving rise to health concern. Therefore, WSD needs to monitor these cyanotoxins with respective standards in place to enable responsive actions be taken.

Note (c): Pesticide that is not banned in CN and/or is registered for use in HK, hence fulfilling the criteria for inclusion in WL.

Annex 3

Assumptions for Deriving Standard Values for New/Updated Chemical Parameters in HKDWS Study

Item	Recommended Value[1]
Body weights of adults/children/infants (kg)	60/10/5
Allocation of Tolerable Daily Intake ("TDI") / Acceptable Daily Intake (ADI)[2] for chemical parameters to drinking water excluding pesticide, industrial chemical, disinfection by-product, disinfectant and cyanotoxin (%)	20
Allocation of ADI[2] for pesticide to drinking water (%)	~~1~~ 20[3]
Allocation of TDI[2] for industrial chemical to drinking water (%)	~~10~~ 20[3]
Allocation of TDI[2] for disinfection by-product to drinking water (%)	80
Allocation of TDI[2] for disinfectant (%)	100
Allocation of TDI[2] for cyanotoxin (%)	80 (100 for acute exposure)
TDI/ADI data (e.g. Benchmark Dose Limit, No Observed Adverse Effect Level, Lowest Observed Adverse Effect Level ("LOAEL"))	Where there is no unique circumstances specific for Hong Kong population or new data from other jurisdictions, adopt WHO default.
Water consumption for adults/children/infants per day (L)	2/1/0.75
Uncertainty factor ("UF") for inter-species variation adopted to calculate ADI/TDI	1-10 Where there is no unique epidemiological studies on ADI/TDI for Hong Kong or new data from other jurisdictions, adopt WHO values.
UF for intra-species variation adopted to calculate ADI/TDI	
UF for the use of LOAEL as the "Point of Departure" to calculate ADI/TDI	
UF for the adequacy of study or dataset adopted to calculate ADI/TDI	
Excess lifetime cancer risk, the risk level used to determine standard / guideline values for genotoxic carcinogens	10^{-5} (one additional case of cancer per 100 000 of the population ingesting drinking-water containing the substance at the guideline value for 70 years[4])

[1] Values with strikethrough line and marked red are existing assumptions recommended for updating. Similar to the approach adopted by WHO, any update to the assumptions in deriving the standard value in the current HKDWS Study only applies to the new or updated parameters.

[2] The listed values are for generic adoption. Where specific information available from WHO or other jurisdictions is found applicable, it will be adopted in deriving HKDWS SV.

[3] The HKDWS Study recommends that the default allocation factor of 20% as stipulated in WHO 2022 should be adopted.

[4] No adjustment in life expectancies is considered needed as this have not been observed for countries with population having longer life expectancies similar to that of Hong Kong.

Recommended Updates to Monitoring Programme of New/Revised Parameters in HKDWS Study [Note 1]

(Proposed changes are **bold and underlined**.)

	Parameter	Proposed Status	Monitoring Frequency at Different Locations			Sampling Protocol	Notes
			Water Treatment Work ("WTW")	Fixed Sampling Points [Note 2]	Random publicly accessible consumers' taps		
1.	Manganese ("Mn")	HKDWS & AG	Weekly	2 / year	**Test for Mn in conjunction with colour (i.e. 76 samples in each of the 18 DCDs annually)**	Fully Flushed ("FF")	Mn and colour are closely relevant to water discolouration. Mn will also be tested at consumer end on discolouration or staining complaint cases.
2.	Microcystins	HKDWS	Monthly for WTWs receiving source water from Plover Cove or Tai Lam Chung Reservoirs; Quarterly for other WTWs	2 / year	NA		Current monitoring regime of microcystin-LR will apply to the revised microcystins and the newly added cylindrospermopsins and saxitoxins. They are naturally occurring compounds which might be released from cyanobacteria bloom in source waters. Their concentrations will not change along the distribution system.
3.	Cylindrospermopsins	HKDWS					
4.	Saxitoxins	HKDWS					
5.	Tetrachloroethene	SL	**NA**	**2 / year**	**NA**		Trend monitoring.
6.	Uranium	SL					
7.	HAA_5	SL					Monitoring frequency of HAA_5 will be the same as that of the sum ratio of three haloacetates, which is also in SL.

	Parameter	Proposed Status	Monitoring Frequency at Different Locations			Sampling Protocol	Notes
			Water Treatment Work ("WTW")	Fixed Sampling Points Note 2	Random publicly accessible consumers' taps		
8.	2-Methyl-isoborneol ("MIB")	AG	Monthly for WTWs receiving source water from Plover Cove or Tai Lam Chung Reservoirs; Quarterly for other WTWs	2 / year	NA	FF	Current monitoring regime of MIB will apply to the newly added geosmin. They are metabolites from algal activities. Their concentrations will not increase along the distribution system.
9.	Geosmin	AG					
10.	Visible substance	AG	**NA**	**NA**	**NA; Test will be conducted upon receiving a complaint**	**FF**	To deal with consumers' complaints.
11.	Taste & Odour	AG	Monthly	2 / year	76 samples in each of the 18 DCDs annually; **Tests will not be conducted when PACTs are found not in a hygienic condition**	FF	–

Note:

1. For parameters in WL, snapshot monitoring shall be adopted where appropriate following the criteria stipulated at paragraphs 22 and 23 of DWSAC Paper No. 2/2019.
2. There are currently 42 fixed sampling points over the territory.