For discussion on
1 June 2021

DWSAC Paper No. 2/2021

DRINKING WATER SAFETY ADVISORY COMMITTEE

Updates on Drinking Water Standards in Overseas Jurisdictions in 2020

PURPOSE

This paper aims to update the Drinking Water Safety Advisory Committee ("Committee") on revisions of drinking water standards made by overseas jurisdictions in 2020, and to seek the Committee's views on our recommended actions in response to such revisions.

BACKGROUND

2. The Water Supplies Department ("WSD") has established a Radar System[1] to keep us abreast of, inter alia, the latest development of drinking water standards in overseas jurisdictions, and will report the department's finding and recommended follow-up action, if any, to the Committee on an annual basis. On advice of the Committee[2], the Drinking Water Safety Unit ("DWSU") of the Development Bureau ("DEVB") may initiate review of the parameters concerned in the Hong Kong Drinking Water Standards ("HKDWS"), Surveillance List or Watch List in accordance with the established framework[3].

3. The revisions of drinking water standards made by overseas jurisdictions in 2020 include the Drinking Water Directive ("DWD") of the European Union ("EU") and the Guidelines for Canadian Drinking Water Quality ("GCDWQ") of Health Canada ("HC").

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[1] The Radar System will regularly scrutinise reports, journals and websites of renowned organisations and institutes to keep abreast of, inter alia, the latest international development on drinking water quality and standards.

[2] Based on the interim endorsement mechanism outlined in DWSAC Paper No. 6/2018, a review of the parameters in the HKDWS will be triggered if the World Health Organization's Guidelines for Drinking-water Quality or drinking water standards commonly adopted by other leading jurisdictions are updated, or on recommendation of the Committee.

[3] See DWSAC Paper No. 3/2019 for details of the framework.

REVISED DWD OF EU

4. The DWD of the EU provides a legal framework to protect human health from the adverse effects of any contamination of drinking water by ensuring the drinking water's wholesomeness and cleanliness. Member States of the EU are required to incorporate DWD requirements into their national laws. In 2017, the World Health Organization ("WHO") Regional Office for Europe ("ROfE") conducted a detailed review of the parameters including their parametric values in the prevailing DWD (viz. DWD 98/83/EC[4]). Taking into account the WHO ROfE's recommendations in the review, the EU promulgated the latest DWD ("revised DWD") in December 2020 for implementation in January 2021. Member States of the EU have two years to transpose the revised DWD into respective national legislations.

5. A comparison of the revised DWD with its last version is given in **Annex 1**, and the major changes are highlighted below:-

(i) inclusion of eight new chemical parameters or groups, namely chlorate, chlorite, haloacetic acids[5] ("HAAs"), sum of per- and polyfluoroalkyl substances ("Sum of PFAS")[6], totality of PFAS ("PFAS Total")[7], microcystin-LR, uranium and bisphenol A;

(ii) inclusion of one new microbial parameter namely *Legionella*;

(iii) revision of the DWD's parametric values ("PV") of five existing chemical parameters, namely antimony, boron, chromium, lead and selenium;

(iv) exclusion of two existing radiological parameters, namely tritium and total indicative dose; and

(v) introduction of a new watch list in due course with two chemical parameters, namely beta-estradiol and nonylphenol to be included at first and microplastics in the future.

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[4] DWD 98/83/EC was promulgated in November 1998.

[5] It is the sum of five representative substances being monochloroacetate, dichloroacetate, trichloroacetate, monobromoacetate and dibromoacetate.

[6] "Sum of PFAS", which is a subset of "PFAS Total", refers to the 20 PFAS listed in the revised DWD, which can be found in **Annex 1**.

[7] "PFAS Total" means the totality of per- and polyfluoroalkyl substances.

6. Information notes providing more details of the above major changes are given in **Annex 2**.

REVISED GCDWQ

7. The GCDWQ have been established by HC in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water based on comprehensive review of known health effects associated with each contaminant, exposure levels and availability of treatment and analytical technologies. The HC promulgated the latest set of GCDWQ ("revised GCDWQ") in September 2020.

8. A comparison of the revised GCDWQ with the earlier version (published in 2019) is given in **Annex 3**, and the major changes are highlighted as follows:-

(i) inclusion of one new chemical parameter, namely strontium;

(ii) revision of the maximum acceptable concentration ("MAC") of two existing chemical parameters, namely barium and cadmium; and

(iii) exclusion of one existing chemical parameter, namely chloramines.

9. Information notes providing more details of the above major changes are given in **Annex 4**.

ASSESSMENTS AND RECOMMENDED ACTIONS

10. We have reviewed the changes made in the revised DWD and GCDWQ based on the framework set out in DWSAC Paper No. 3/2019, and our assessment and recommended actions are detailed in the ensuing paragraphs.

Revised DWD

11. The existing parameters (with PVs newly adjusted) or new parameters in the revised DWD with PVs more stringent than the HKDWS are summarised in **Table 1** below.

Table 1: Existing parameters (with PVs adjusted) or new parameters in the revised DWD with PVs more stringent than the HKDWS

Parameter	**Revised DWD**	**HKDWS**
Antimony (μg/L)	from 5 to 10	20*
Boron (mg/L)	from 1.0 to 1.5 (2.4 for desalinated water or drinking water ("DW") drawn from groundwater)	2.4*
Selenium (μg/L)	from 10 to 20 (30 for DW drawn from groundwater)	40*
Chromium (μg/L)	from 50 to 25	50*
Lead (μg/L)	from 10 to 5	10*
Chlorate (mg/L)	0.25 (new) (0.7 for DW with disinfection methods generating chlorate)	0.3^
Chlorite (mg/L)	0.25 (new) (0.7 for DW with disinfection methods generating chlorite)	0.7*

* The same as the WHO's guideline value ("GV") or provisional guideline value ("PGV").

^ According to the WHO Guidelines[8], the PGV for chlorate is 0.7 mg/L as in some circumstances, it may not be possible to adequately disinfect potable water and maintain chlorate concentrations at or below the health-based value (0.3 mg/L for chlorate) because chlorate is a byproduct of hypochlorite used in the treatment process. In Hong Kong, we adopt the more stringent health-based value of 0.3 mg/L for chlorate in the HKDWS (see DWSAC Paper No. 10/2018).

12. Our assessments and proposed recommended actions are as follows:-

(i) <u>Antimony, boron and selenium</u>

It should be noted that the respective PVs of these three parameters in the earlier version of the DWD were already more stringent than those in the WHO Guidelines. The WHO ROfE in fact recommended the EU relax the respective PVs of the three parameters to the corresponding Guideline Values ("GVs") in the WHO Guidelines. The EU however considered that as there would be no additional compliance cost for relaxing the PVs concerned, they decided to relax them by a lesser extent. As there is no new evidence that suggests any health risks associated with consuming drinking water complying with the HKDWS, and coupled with the fact that the WHO may publish a revision of WHO Guidelines in 2021, we recommend keeping the corresponding HKDWS standard values unchanged for the time being.

[8] It refers to the Guidelines for Drinking-water Quality which was published by the WHO in 2017.

(ii) Chromium and lead

The WHO ROfE in fact recommended keeping the PVs of these two parameters unchanged in the revised DWD, which are in fact the same as the WHO Provisional Guideline Values ("PGVs"). The EU however considered it necessary to adopt more stringent PVs for the two parameters having due regard to the uncertainties in their toxicological database. A transition period of 15 years is allowed for the adoption of the two revised PVs (i.e. January 2036 the latest).

For lead, the revised PV applies to the water supply system up to the point of supply as well as any new materials in the supply system and inside services. For existing inside services, the value of 5 μg/L remains aspirational[9] as the Member States may not have the authority to impose replacement of those lead pipes in the inside services.

For chromium, the WHO has updated its background document for this metal in December 2020, that supports (a) the continual adoption of the value of 50 μg/L which is considered adequately protective, and (b) the removal of the "provisional" status of such value in the WHO Guidelines under revision.

In Hong Kong, the Enhanced Water Quality Monitoring Programme ("Enhanced Programme")[10] already covers the monitoring of chromium and lead. Against the background set out in the preceding three paragraphs, we recommend retention of the current HKDWS standard values for the two metals, whilst continuing with the collection of local data for future review pursuant to the Independent Expert Panel ("IEP")'s recommendation and keeping in view the ongoing revision of the WHO Guidelines.

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[9] According to Article 10 of the revised DWD, Member States of the EU shall (a) conduct a general risk assessment of the potential risks associated with inside services; (b) monitor the lead level in premises where specific risks to water quality and human health relating to lead have been identified; and (c) encourage premises owners to carry out a risk assessment of inside services. For such purposes, the applicable PV is 10 μg/L, though Member States should use their best endeavours to achieve the lower value of 5 μg/L by January 2036. Where monitoring demonstrates that the PV for lead is not met, Member States shall ensure that appropriate measures are taken which, inter alia, include substitution of components made of lead in existing inside service if economically and technically feasible.

[10] The Enhanced Programme was launched in December 2017 to monitor the drinking water quality at consumers' taps in randomly selected consumers' premises in respect of antimony, cadmium, chromium, copper, lead and nickel which could be present in internal plumbing systems. Starting from May 2021, the Enhanced Programme was extended to cover the monitoring of residual chlorine and *Escherichia coli*.

(iii) Chlorate and chlorite

In spite of the WHO ROfE's recommendation of adopting the PGVs of 0.7mg/L for chlorate and chlorite in the revised DWD, the EU adopted more stringent PVs based on the European Food Safety Authority ("EFSA")'s derivation. In fact, the same approach[11] has been adopted in drawing up the health-based value of 0.3 mg/L for chlorate in the current HKDWS, which was just published in April 2021. For chlorite, the WHO's PGV of 0.7 mg/L has been adopted in the HKDWS, which is in fact the same as the corresponding PV in the revised DWD for drinking water with disinfection methods generating chlorite. We therefore recommend retaining the current HKDWS standard values for these two chemicals and keeping in view their scientific development.

13. For the two new parameters in the revised DWD, namely uranium and microcystin-LR, with PVs the same as the HKDWS (see Table 2 below for details), we recommend retaining their current HKDWS standard values and keeping in view their scientific development.

Table 2: New parameters of the revised DWD with PVs same as the HKDWS

Parameter	**Revised DWD**	**HKDWS**
Uranium (μg/L)	30	30*
Microcystin-LR (μg/L)	1	1*

* The same as the WHO's PGVs.

14. For the four new chemical and one new microbial parameters in the revised DWD which are not in the HKDWS, Surveillance List or Watch List, our assessments and recommended actions are as follows:-

(i) Bisphenol A

According to the WHO ROfE, there is no evidence of health risks of the endocrine disrupting compounds ("EDCs") associated with consuming drinking water. Since routine monitoring of full range of EDCs would be difficult, expensive and ineffective in preventing contamination of drinking water by EDCs, the WHO ROfE recommended the EU include three representative EDCs, namely bisphenol A, beta-estradiol and nonylphenol, in the revised DWD as the benchmarks for monitoring. In response, the EU decided to include bisphenol A in the revised DWD as a precautionary measure with a PV of 2.5 μg/L based on the EFSA's

[11] The current HKDWS for chlorate was derived based on the same toxicological data, i.e. the Acceptable Daily Intake, adopted by the EU. The slight difference in the standard value of chlorate in HKDWS and that of the revised DWD is likely due to different approaches in rounding up the derived values.

advice. Currently, we have three EDCs, namely beta-estradiol, 17-alpha-ethinylestradiol and estrone, included in our Watch List, and so far, the snapshot monitoring of these chemicals by the WSD revealed no significant levels of these EDCs in raw water sources and drinking water in the territory. According to the WSD's recent snapshot testing in February and March 2021, the levels of bisphenol A in all drinking water samples were all less than 0.050 μg/L, which were well below the PV of 2.5μg/L in the DWD. Notwithstanding this, in view of increasing concern of EDCs in drinking water, we recommend inclusion of bisphenol A as well in our Watch List.

(ii) Sum of PFAS and PFAS Total

The WHO ROfE recommended inclusion of PFOA and PFOS in the revised DWD as they are usually the major PFAS contaminants. Although there exists a wide range of PFAS compounds, their toxicity data are rather limited at present. On this, the EU decided to monitor a wider range of PFAS by adding two new chemical parameters, namely Sum of PFAS (comprising 20 PFAS) and PFAS Total, and Member States of the EU may decide to adopt either one or both of these parameters. In Hong Kong, PFOA and PFOS are already in the Watch List and the WSD's snapshot monitoring revealed that their levels in raw water sources and drinking water are very low. Notwithstanding this, the WSD has conducted snapshot testing of all the 20 PFAS (for the purpose deriving Sum of PFAS in the revised DWD) in raw water in March 2021. The testing results indicated that the sum of the 20 PFAS in all raw water samples were less than 0.033 μg/L which is well below the PV of 0.1 μg/L in the revised DWD. In view of the increasing concern on PFAS in drinking water and the non-availability of testing method for PFAS Total, we recommend inclusion of all the 20 PFAS in the DWD (viz. addition of 18 more PFAS), Sum of PFAS and PFAS Total in our Watch List.

(iii) Haloacetic acids

WHO ROfE recommended EU include HAAs as a new parameter in the revised DWD with a view to monitoring and reducing the levels of this group of disinfection by-products. The EU subsequently adopted the sum of five HAAs, viz. monochloroacetate, dichloroacetate, trichloroacetate, monobromoacetate and dibromoacetate, as a new parameter to assess the overall exposure to HAAs. Currently, we adopt the health-based values derived by the WHO for three of these HAAs,

viz. monochloroacetate, dichloroacetate and trichloroacetate, in the HKDWS. As the WHO has not stipulated GVs for the other two HAAs, viz. monobromoacetate and dibromoacetate, because of inadequate database, or GV for these five HAAs as a group, we have adopted a different approach to address our overall exposure to HAAs by inclusion of (a) the sum ratio[12] of the three HAAs in the HKDWS in the Surveillance List, and (b) the remaining two HAAs (viz. monobromoacetate and dibromoacetate)[13] and haloacetic acids – total in the Watch List. Notwithstanding this, we recommend inclusion of the sum of the five HAAs in the Watch List.

(iv) <u>*Legionella*</u>

The WHO ROfE recommended the EU include *Legionella* in the revised DWD with a view to addressing its potential risks through risk assessment of domestic distribution systems and imposing actions to prevent possible outbreaks of the disease. The PV of less than 1,000 colony-forming unit/L is not a health-based value but acts as a triggering level for investigation and necessary remedial action to restore the quality of water. In Hong Kong, the risk of *Legionella* in water supply system is controlled through maintenance of residual chlorine in drinking water and proper maintenance of inside service. The risk of *Legionella* in inside service has also been addressed in the templates of the Water Safety Plan ("WSP") for Buildings for high risk premises, viz. hospitals and residential care homes for the elderly. On the other hand, the Prevention of Legionnaires' Disease Committee ("PLDC") has published the Code of Practice for Prevention of Legionnaires' Disease ("COP") to provide guidelines for proper design, operation, maintenance and handling of related facilities to avoid the spread of *Legionella*. According to the COP (2021 Edition), developing WSP for water-using apparatus is the preferred approach to manage *Legionella* risks, while regular testing of *Legionella* in cold/hot water systems other than freshwater cooling towers is generally not required. Against this background, we recommend the WSD inform the PLDC that a PV has been set in the revised DWD for *Legionella* and seek PLDC's advice whether there is a need for any follow up actions (e.g. conducting of snapshot testing). We will inform the Committee of the PLDC's advice in due course.

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[12] The formula for calculating sum ratio is $\sum \frac{Concentration\ of\ the\ HAA\ in\ drinking\ water}{Respective\ standard\ value\ of\ the\ HAA}$

[13] The WSD has planned to develop a method for snapshot monitoring of monobromoacetate and dibromoacetate in 2021.

15. For the two radiological parameters, namely tritium and total indicative dose, that have been excluded from the revised DWD, it is due to there being laid down specific arrangements for the monitoring of radioactive substances in drinking water in another EU directive, viz. Council Directive 2013/51/Euratom. In Hong Kong, we have adopted the radiological screening levels of gross alpha and gross beta activity in the HKDWS, which are the same as those in the WHO Guidelines and in line with the screening strategies adopted in EU Directive 2013/51/Euratom. We therefore recommend keeping the current HKDWS standard values for gross alpha / gross beta activity unchanged.

16. For the watch list to be established in the revised DWD, two EDCs, viz. beta-estradiol and nonylphenol, will be included by 12 January 2022 and microplastics in the future as the methodology to measure the latter is yet to be developed. Our assessments and recommended actions on these parameters are provided below:-

(i) <u>Beta-estradiol and nonylphenol</u>

The EU has stipulated guidance values[14] of 1 ng/L for beta-estradiol and 0.3 μg/L for nonylphenol to address the growing public concern about the effects of these EDCs on human health through consumption of drinking water. As stated in paragraph 14(i) above, beta-estradiol is currently in our Watch List and the WSD's snapshot monitoring revealed insignificant levels[15] of beta-estradiol and the other two EDCs, 17-alpha-ethinylestradiol and estrone, in raw water sources and drinking water of Hong Kong. In February and March 2021, the WSD conducted snapshot testing of nonylphenol and all drinking water samples collected were found less than 0.050 μg/L, which were well below the DWD's guidance value of 0.3 μg/L. In view of the above and the increasing concern of EDCs in drinking water, we recommend keeping beta-estradiol and introducing nonylphenol in our Watch List.

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[14] Where the guidance values, though not statutory, of substances or compounds in the watch list are exceeded, the EU's Member States shall ensure that the measures stipulated in the DWD, including preventive measures, mitigation measures or appropriate monitoring, are considered, and that those measures considered relevant are taken.

[15] For beta-estradiol, the WSD has identified testing services with better sensitivity (<1 ng/L) for checking the levels against the new guidance value stipulated in the revised DWD.

(ii) Microplastics

The EU has not stipulated any parametric nor guidance value for microplastics in the revised DWD and intends to include the parameter in the EU's watch list in the future because a methodology to measure microplastics in drinking water is yet to be developed by January 2024. In Hong Kong, we have included microplastics in the Watch List but snapshot monitoring is yet to be conducted due to the lack of internationally recognised testing protocol. We therefore recommend no follow up action be taken at this moment.

Revised GCDWQ

17. Whilst strontium has been added to the revised GCDWQ, there is at present no GV nor standard adopted by the WHO and other jurisdictions for this chemical. In Hong Kong, strontium is currently included in the Watch List and the WSD's snapshot monitoring in 2021 indicated that the maximum levels of strontium detected in drinking water was 0.049 mg/L, which was well below the MAC of 7 mg/L. We therefore recommend no follow up action be taken.

18. For barium and cadmium, we note that their new MACs in the revised GCDWQ are less stringent than the HKDWS as summarised in Table 3 below. The current HKDWS for these two parameters adopt the WHO's GVs, which are health-based ones. The WSD's previous monitoring revealed full compliance of all water samples collected with the HKDWS. Therefore, we recommend no follow up action be taken while keeping in view the scientific development.

Table 3: MACs of the revised GCDWQ as compared with the HKDWS

	Revised GCDWQ	**HKDWS**
Barium (mg/L)	from 1 to 2	1.3*
Cadmium (mg/L)	from 0.005 to 0.007	0.003*

* The same as the WHO's GVs.

19. For chloramines that has been excluded from the revised GCDWQ, as we have included chloramines in our Watch List and coupled with the fact that we do not adopt chloramination in our treatment process, we recommend no follow up action be taken.

SUMMARY OF RECOMMENDATIONS

20. We consider that there is no imminent need to trigger a comprehensive review of the HKDWS in respect of those parameters discussed above.

21. In gist, for those parameters or their related parameters (e.g. sum ratio of 3 HAAs) already included in the HKDWS, Surveillance List or Watch List, we recommend keeping them status quo. As for antimony, cadmium, chromium and lead, they are being monitored together with copper and nickel under the Enhanced Programme and we will carry out a review after collecting sufficient local data in three to five years since programme commencement according to the IEP's recommendation. Owing to the suspension of the Enhanced Programme for about a year (from 27 January to 29 November 2020), we will conduct an interim review for the six parameters in 2022, having regard to any revision of the WHO Guidelines by then. For monobromoacetate and dibromoacetate in the Watch List, the WSD is developing suitable methods for carrying out snapshot monitoring in 2021. For microplastics, we will keep in view of the related international development including standard testing methods, guidelines, source and occurrence in drinking water, toxicological effects, etc.

22. For those parameters which are not in the HKDWS, Surveillance List or Watch List, namely bisphenol A, sum of five HAAs, nonylphenol, the 20 PFAS, Sum of PFAS and PFAS Total, we recommend their inclusion in the Watch List. The WSD has commenced snapshot testing of these parameters where applicable with a view to gathering data on their levels in Hong Kong.

23. For *Legionella*, we will report to the PLDC the new standard established by the EU and seek PLDC's advice as to whether any follow up actions are needed such as conducting of snapshot testing. We will revert to the Committee in due course.

24. Our recommended actions are summarised in **Annex 5** for easy reference.

OTHER RELATED INFORMATION

25. It is understood that the revision of the WHO Guidelines may be released later this year and the guideline values of some parameters are expected to change. By then, it may be opportune for us to initiate a comprehensive review of the HKDWS, Surveillance List and Watch List.

26. It is also noted that the United States Environmental Protection Agency ("USEPA") has announced the Lead and Copper Rule Revisions ("LCRR") which will become effective on 16 December 2021. The LCRR includes, *inter alia*, the introduction of a new threshold trigger level of 10 μg/L for lead atop the prevailing action level of 15 μg/L. The USEPA has also promulgated the final regulatory determinations for PFOA and PFOS to pave way for the establishment of drinking water standards for these parameters in future. In this regard, we will keep the Committee abreast of the development.

27. For the Committee's information, there is no revision of the drinking water standards being undertaken or proposed by other leading jurisdictions including United Kingdom, Australia, New Zealand, Singapore and Japan.

ADVICE SOUGHT

28. Members are invited to offer views and endorse our recommended actions in respect of the parameters discussed in this paper.

Development Bureau
Water Supplies Department
May 2021

Summary of the revised Drinking Water Directive ("DWD")
of the European Union

(A) Microbiological parameters

No change in the revised DWD

(B) Chemical parameters

Parameter	PV in previous DWD 98/83/EC	PV in revised DWD	Notes *[Additional information is shown in italics.]*
Antimony	5 μg/L	10 μg/L	
Bisphenol A	-	2.5 μg/L	
Boron	1 mg/L	1.5 mg/L	A parametric value of 2.4 mg/L shall be applied when desalinated water is the predominant water source of the supply system concerned or in regions where geological conditions could lead to high levels of boron in groundwater.
Chlorate	-	0.25 mg/L	A parametric value of 0.7 mg/L shall be applied where a disinfection method that generates chlorate/chlorite, in particular chlorine dioxide, is used for disinfection of water intended for human consumption. Where possible, without compromising disinfection, Member States shall strive for a lower value. This parameter shall be measured only if such disinfection methods are used.
Chlorite	-	0.25 mg/L	
Chromium	50 μg/L	25 μg/L	The parametric value of 25 μg/L shall be met, at the latest, by 12 January 2036. The parametric value for chromium until that date is 50 μg/L.
Haloacetic acids (HAAs)	-	60 μg/L	This parameter shall be measured only when disinfection methods that can generate HAAs are used for the disinfection of water intended for human consumption. It is the sum of the following five representative substances: monochloroacetate, dichloroacetate and trichloroacetate, monobromoacetate and dibromoacetate.

Parameter	PV in previous DWD 98/83/EC	PV in revised DWD	Notes *[Additional information is shown in italics.]*
Lead	10 µg/L	5 µg/L	The parametric value of 5 µg/L shall be met, at the latest, by 12 January 2036. The parametric value for lead until that date shall be 10 µg/L. After that date, the parametric value of 5 µg/L shall be met at least at the point of supply to the domestic distribution system. For the purposes of point (b) of the first subparagraph of Article 11(2), the parametric value of 5 µg/L at the tap shall apply. *[Article 11 refers to the minimum hygiene requirements for materials that come into contact with water intended for human consumption and for the purpose of ensuring the uniform application; Article 11(2) point (b) elaborates the implementation acts to be established.]*
Microcystin-LR	-	1 µg/L	This parameter shall be measured only in the event of potential blooms in source water (increasing cyanobacterial cell density or bloom forming potential).
PFAS Total	-	0.5 µg/L	'PFAS Total' means the totality of per- and polyfluoroalkyl substances. This parametric value shall only apply once technical guidelines for monitoring this parameter are developed in accordance with Article 13(7). Member States may then decide to use either one or both of the parameters 'PFAS Total' or 'Sum of PFAS'. *[Article 13(7) refers to "By 12 January 2024, the Commission shall establish technical guidelines regarding methods of analysis for monitoring of per- and polyfluoroalkyl substances under the 'PFAS Total' and 'Sum of PFAS', including detection limits, parametric values and frequency of sampling."]*

Parameter	PV in previous DWD 98/83/EC	PV in revised DWD	Notes *[Additional information is shown in italics.]*
Sum of PFAS	-	0.1 µg/L	'Sum of PFAS ' means the sum of per- and polyfluoroalkyl *substances* considered a concern as regards water intended for human consumption listed in point 3 of Part B of Annex III. This is a subset of PFAS Total substances that contain a perfluoroalkyl moiety with three or more carbons (i.e. –CnF2n–, n ≥ 3) or a perfluoroalkylether moiety with two or more carbons (i.e. –CnF2nOCmF2m−, n and m ≥ 1). *[Point 3 of Part B of Annex II lists out the 20 specified PFAS:* *Perfluorobutanoic acid (PFBA)* *Perfluoropentanoic acid (PFPA)* *Perfluorohexanoic acid (PFHxA)* *Perfluoroheptanoic acid (PFHpA)* *Perfluorooctanoic acid (PFOA)* *Perfluorononanoic acid (PFNA)* *Perfluorodecanoic acid (PFDA)* *Perfluoroundecanoic acid (PFUnDA)* *Perfluorododecanoic acid (PFDoDA)* *Perfluorotridecanoic acid (PFTrDA)* *Perfluorobutane sulfonic acid (PFBS)* *Perfluoropentane sulfonic acid (PFPS)* *Perfluorohexane sulfonic acid (PFHxS)* *Perfluoroheptane sulfonic acid (PFHpS)* *Perfluorooctane sulfonic acid (PFOS)* *Perfluorononane sulfonic acid (PFNS)* *Perfluorodecane sulfonic acid (PFDS)* *Perfluoroundecane sulfonic acid* *Perfluorododecane sulfonic acid* *Perfluorotridecane sulfonic acid]*
Selenium	10 µg/L	20 µg/L	A parametric value of 30 µg/L shall be applied for regions where geological conditions could lead to high levels of selenium in groundwater.
Uranium	-	30 µg/L	

(C) Indicator Parameters

No change in the revised DWD

(D) Radioactivity

Parameter	PV in previous DWD 98/83/EC	PV in revised DWD	Information from the revised DWD
Tritium	100 Bq/L	-	Directive 2013/51/Euratom lays down specific arrangements for the monitoring of radioactive substances in water intended for human consumption. Therefore, this Directive should not set out parametric values on radioactivity.
Total indicative dose	0.1 mSv/year	-	

(E) Parameters Relevant for the Risk Assessment of Domestic Distribution Systems (new)

Parameter	PV in revised DWD	Notes *[Additional information is shown in italics.]*
Legionella	<1000 cfu*/L	This parametric value is set for the purposes of Articles 10 and 14. Actions provided for in those Articles could be considered even when the value is below the parametric value, e.g. in case of infections and outbreaks. In these cases, the source of infection should be confirmed and the species of *Legionella* should be identified. *[Article 10 refers to the requirements for the risk assessment of domestic distribution systems whereas Article 14 refers to the requirements for remedial action and restrictions of use in the event of non-compliance with parametric values.]*
Lead	10 µg/L	This parametric value is set for the purposes of Articles 10 and 14. Member States should use their best endeavours to achieve a lower value of 5 µg/L by 12 January 2036.

* colony forming unit

(F) Parameters to be included in the Watch List in the Revised DWD

Parameter	Guidance value in revised DWD	Information from the revised DWD
Microplastics	Not applicable	By 12 January 2024, the Commission shall adopt delegated acts in accordance with Article 21 in order to supplement this Directive by adopting a methodology to measure microplastics with a view to including them on a watch list to be established by 12 January 2022.
Nonylphenol	0.3 µg/L	Beta-estradiol and nonylphenol shall be included in the first watch list in view of their endocrine-disrupting properties and the risk they pose to human health. The first watch list shall be established by 12 January 2022.
Beta-estradiol	1 ng/L	

Source: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020L2184 *(Retrieved on 8 April 2021.)*

Information Notes on
Revised Drinking Water Directive ("DWD") of European Union ("EU")

(A) Chemical Parameters

<table>
<tr><td>Parameter</td><td>Antimony</td></tr>
<tr><td>Previous parametric value ("PV")</td><td>5 μg/L</td></tr>
<tr><td>Revised PV</td><td>10 μg/L</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- The World Health Organization ("WHO") Regional Office for Europe ("ROfE") recommended EU relax the PV for antimony from 5 to 20 μg/L which is the guideline value ("GV") of the first addendum to the 4th edition of WHO Guidelines for Drinking-water Quality published in 2017 ("WHO Guidelines"). However, since a stricter value (5 μg/L) has been in place for the DWD, EU considered there will be no additional compliance cost for relaxing the PV for antimony by a lesser extent, i.e. from 5 to 10 μg/L.</td></tr>
<tr><td>Current status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>20 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^ Same as WHO's GV

Monitoring results of random daytime ("RDT") samples under Enhanced Programme (25 Dec 2017 – 9 May 2021)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 1 μg/L</td><td>< 1 μg/L</td><td>< 1 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>20 μg/L</td></tr>
<tr><td>UK</td><td>5 μg/L</td></tr>
<tr><td>USA</td><td>6 μg/L</td></tr>
<tr><td>Canada</td><td>6 μg/L</td></tr>
<tr><td>Australia</td><td>3 μg/L</td></tr>
<tr><td>New Zealand</td><td>20 μg/L</td></tr>
<tr><td>Singapore</td><td>20 μg/L</td></tr>
<tr><td>Japan</td><td>20 μg/L (target value)</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged for the time being because no new evidence suggests any health risk associated with consuming drinking water complying HKDWS.
- Continue with the collection of local data for future review pursuant to the IEP's recommendation.
- Keep in view the ongoing revision of WHO Guidelines.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Bisphenol A</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>2.5 µg/L</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE suggested that there is no evidence of health risks of endocrine-disrupting compounds (“EDCs”) associated with consuming drinking water.
- WHO ROfE considered that routine monitoring of full range of EDCs would be difficult, expensive and ineffective in preventing contamination of drinking water. Therefore, WHO ROfE recommended EU include three representative EDCs, viz. beta-estradiol, bisphenol A and nonylphenol, which are known to be present in surface waters impacted by direct releases from industries, treated sewage effluent or other discharges, in the revised DWD as the benchmarks for monitoring.
- Based on the advice of the European Food Safety Authority (“EFSA”) in 2015, EU decided that bisphenol A should be added to the DWD with a PV of 2.5 µg/L as a precautionary measure.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
- WSD has conducted snapshot testing in February and March 2021:
Raw water
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.190 µg/L</td><td>0.060µg/L</td><td>< 0.050 µg/L</td></tr>
</table>
Final water at WTWs
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 0.050 µg/L</td><td>< 0.050 µg/L</td><td>< 0.050 µg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Include bisphenol A in the Watch List in view of increasing concern of EDCs in drinking water.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Boron</td></tr>
<tr><td>Previous PV</td><td>1 mg/L</td></tr>
<tr><td>Revised PV</td><td>1.5 mg/L;
2.4 mg/L shall be applied when desalinated water is the predominant source of the supply system concerned or in regions where geological conditions could lead to high levels of boron in ground water.</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU relax the PV for boron from 1 to 2.4 mg/L which is the WHO's GV. However, since a stricter value (1 mg/L) has been in place for the DWD, EU considered that there will be no additional compliance cost for relaxing the PV for boron by a lesser extent and to be generally in line with the standard value for natural mineral water stipulated by EFSA. The PV of 2.4 mg/L shall be applied for desalinated water or in regions with high boron levels in ground water.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>2.4 mg/L^</td><td>×</td><td>×</td></tr>
</table>
^ Same as WHO's GV

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.07 mg/L</td><td>0.025 mg/L</td><td>< 0.02 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>2.4 mg/L</td></tr>
<tr><td>UK</td><td>1 mg/L</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>5 mg/L</td></tr>
<tr><td>Australia</td><td>4 mg/L</td></tr>
<tr><td>New Zealand</td><td>1.4 mg/L</td></tr>
<tr><td>Singapore</td><td>2.4 mg/L</td></tr>
<tr><td>Japan</td><td>1 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged for the time being because no new evidence suggests any health risk associated with consuming drinking water complying with HKDWS.
- The current HKDWS standard value will also be applicable for monitoring of the drinking water from the Tseung Kwan O desalination plant to be commissioned in 2023.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Chlorate and chlorite</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>Chlorate: 0.25 mg/L
Chlorite: 0.25 mg/L
(0.7 mg/L shall be applied for chlorate/chlorite when a disinfection method that generates chlorate/chlorite, in particular chlorine dioxide, is used for disinfection of water intended for human consumption.)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended the EU adopt the provisional guideline values (“PGVs”) of 0.7 mg/L for chlorate and chlorite as stipulated in WHO Guidelines and lower values would be appropriate if feasible. EU adopted more stringent PVs of 2.5 mg/L for both chlorate and chlorite based on EFSA’s derivation.
- PV of 0.7 mg/L shall be applied when a disinfection method that generates chlorate and chlorite, in particular chlorine dioxide, is used for disinfection of drinking water.
- These parameters shall be measured only if disinfection methods that might generate chlorate and chlorite are used.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>Chlorate
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>0.3 mg/L^</td><td>×</td><td>×</td></tr>
</table>
Chlorite
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>0.7 mg/L#</td><td>×</td><td>×</td></tr>
</table>
^ Same as health-based value derived based on the same toxicological data, i.e. the Acceptable Daily Intake, adopted by the EU. The difference in the HKDWS standard value and the PV of the revised DWD is likely due to the different approaches in rounding up the derived values.

Same as WHO’s PGV, which is designated as provisional by WHO because control of chlorite in drinking water is difficult if aged hypochlorite or chlorine dioxide is used but disinfection shall not be compromised for compliance with PGV. Also, same as the corresponding PV in the revised DWD for drinking water with disinfection methods generating chlorite.

Monitoring results (1 Jan 2017 – 31 Dec 2020)

Chlorate
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.2 mg/L</td><td><0.025 mg/L</td><td><0.025 mg/L</td></tr>
</table>
Chlorite
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td><0.025 mg/L</td><td><0.025 mg/L</td><td><0.025 mg/L</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Chlorate and chlorite</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>Chlorate
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>0.7 mg/L (provisional)</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>1 mg/L</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>0.8 mg/L (provisional)</td></tr>
<tr><td>Singapore</td><td>0.7 mg/L</td></tr>
<tr><td>Japan</td><td>0.6 mg/L</td></tr>
</table>
Chlorite
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>0.7 mg/L (provisional)</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>1 mg/L</td></tr>
<tr><td>Canada</td><td>1 mg/L</td></tr>
<tr><td>Australia</td><td>0.8 mg/L</td></tr>
<tr><td>New Zealand</td><td>0.8 mg/L (provisional)</td></tr>
<tr><td>Singapore</td><td>0.7 mg/L</td></tr>
<tr><td>Japan</td><td>0.6 mg/L (target value)</td></tr>
</table></td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard values unchanged for these two chemicals, of which the value for chlorate are derived based on the same approach adopted by EU in derivation of PV for chlorate, and the value for chlorite is same as the PV for chlorite in the revised DWD for drinking water with disinfection methods generating chlorite.
- Keep in view the scientific development.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Chromium</td></tr>
<tr><td>Previous PV</td><td>50 μg/L</td></tr>
<tr><td>Revised PV</td><td>25 μg/L (at the latest by 12 January 2036)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended the EU keep PV unchanged in the revised DWD. The EU however considered it necessary to adopt a more stringent PV for chromium having due regard to the uncertainties in the toxicological database. A transition period of 15 years after the entry into force of the revised DWD is allowed and the PV for chromium until that date shall be 50 μg/L. By the end of this transition period (i.e.12 January 2036), at the latest, the PV of 25 μg/L shall be met.</td></tr>
<tr><td>Current status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>50 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^ Same as WHO's PGV. WHO has updated its background document for chromium in December 2020, that supports (a) the continual adoption of the value of 50 μg/L, which is considered adequately protective, and (b) the removal of the "provisional" status of such value in the WHO Guidelines under revision.

Monitoring results (RDT sample) under Enhanced Programme (25 Dec 2017 – 9 May 2021)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>3 μg/L</td><td>< 1 μg/L</td><td>< 1 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>50 μg/L (provisional)</td></tr>
<tr><td>UK</td><td>50 μg/L</td></tr>
<tr><td>USA</td><td>100 μg/L</td></tr>
<tr><td>Canada</td><td>50 μg/L</td></tr>
<tr><td>Australia</td><td>50 μg/L</td></tr>
<tr><td>New Zealand</td><td>50 μg/L</td></tr>
<tr><td>Singapore</td><td>50 μg/L</td></tr>
<tr><td>Japan</td><td>50 μg/L (Cr(VI))</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged, which is considered to be adequately protective.
- Continue to collect local data for future review pursuant to the IEP's recommendation.
- Keep in view the ongoing revision of the WHO Guidelines.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Haloacetic acids (HAAs)</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>60 μg/L for the sum of the five representative substances including monochloroacetate (MCAA), dichloroacetate (DCAA), trichloroacetate (TCAA), monobromoacetate (MBAA) and dibromoacetate (DBAA).</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU include HAAs as a new parameter in the revised DWD with a view to monitoring and reducing the levels of this group of disinfection by-products. EU subsequently adopted the sum of the above five representative substances.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>MCAA, DCAA, TCAA
<table>
<tr><th>HKDWS</th><th>Surveillance List</th><th>Watch List</th></tr>
<tr><td>MCAA: 20 μg/L^
DCAA: 40 μg/L#
TCAA: 200 μg/L^</td><td>✓
Sum ratio of 3 HAAs</td><td>×</td></tr>
</table>
^ Same as WHO's GVs
# Same as health-based value derived by WHO

MBAA, DBAA and Haloacetic acids - total
<table>
<tr><th>HKDWS</th><th>Surveillance List</th><th>Watch List</th></tr>
<tr><td>×</td><td>×</td><td>✓</td></tr>
</table>
• WHO considers inadequate database for derivation of GVs for MBAA and DBAA;
• No WHO's GV for these 5 HAAs as a group;
• Hong Kong's approach to address the overall exposure to HAAs is via (a) sum ratio of the three HAAs in the HKDWS (viz. MCAA, DCAA and TCAA) included in the Surveillance List; and (b) the remaining two HAAs* (viz. MBAA and DBAA) and haloacetic acids – total included in the Watch List.
* WSD has planned to develop a method for snapshot monitoring of these 2 chemicals in 2021.

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><th></th><th>Maximum</th><th>Average</th><th>Minimum</th></tr>
<tr><td>MCAA</td><td>< 10 μg/L</td><td>< 10 μg/L</td><td>< 10 μg/L</td></tr>
<tr><td>DCAA</td><td>24 μg/L</td><td>< 12 μg/L</td><td>< 12 μg/L</td></tr>
<tr><td>TCAA</td><td>< 25 μg/L</td><td>< 25 μg/L</td><td>< 25 μg/L</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Parameter</td><td colspan="2">Haloacetic acids (HAAs)</td></tr>
<tr><td>Adoption in other jurisdictions</td><td colspan="2"><table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>60 μg/L
[sum of MCAA, DCAA, TCAA, MBAA & DBAA]</td></tr>
<tr><td>Canada</td><td>80 μg/L
[sum of MCAA, DCAA, TCAA, MBAA & DBAA]</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table></td></tr>
<tr><td>Recommended Actions</td><td colspan="2">- Keep the current HKDWS standard values for MCAA, DCAA and TCAA.
- Keep the sum ratio of 3 HAAs in the Surveillance List, and MBAA, DBAA and haloacetic acids – total in the Watch List.
- Include the sum of 5 HAAs in the Watch List.</td></tr>
</table>

Parameter	Lead
Previous PV	10 μg/L
Revised PV	5 μg/L (at the latest by 12 January 2036)
Rationale of the revised DWD	- WHO ROfE recommended the EU keeping PV of 10 μg/L (same as WHO's PGV) unchanged, but noted that concentrations should be as low as reasonably practicable. - EU considers it necessary to adopt a more stringent PV for lead having due regard to the uncertainties in the toxicological database, and retains the PV of 10 μg/L for 15 years after the entry into force of the revised DWD. By the end of this transition period (i.e.12 January 2036), at the latest, the PV of 5 μg/L shall be met at least at the point of supply to the domestic distribution system. - EU acknowledges that existing lead pipes in houses and buildings are a persisting issue and since their Member States do not always have the authority to impose the replacement of those pipes, the value of 5 μg/L for lead remains aspirational when it comes to obligations related to inside services. However, for all new plumbing materials that come into contact with water intended for human consumption to be authorised in accordance with the revised DWD, 5 μg/L should apply at the drinking tap. - Member States of the EU shall (a) conduct a general risk assessment of the potential risks associated with inside services; (b) monitor the lead level where specified risks to water quality and human health relating to lead have been identified; and (c) encourage premises owners to carry out a risk assessment of inside services. For such purposes, the applicable PV is 10 μg/L, though Member States should use their best endeavours to achieve the lower value of 5 μg/L by January 2036. Where monitoring demonstrates that the PV for lead is not meet, Member States shall ensure that appropriate measures are taken which, inter alia, include substitution of components made of lead in existing inside services if economically and technically feasible.

<table>
<tr><td>Parameter</td><td>Lead</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>10 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^Same as WHO's PGV (designated provisional on the basis of treatment performance and analytical achievability)

Monitoring results (RDT samples) under Enhanced Programme (25 Dec 2017 – 9 May 2021)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>19 μg/L*</td><td>< 1 μg/L</td><td>< 1 μg/L</td></tr>
</table>
*9 RDT samples exceeded the HKDWS with a maximum value of 19 μg/L whilst no exceedance was found in the corresponding Tier-2 30-Minute Stagnation samples.
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>10 μg/L (provisional)</td></tr>
<tr><td>UK</td><td>10 μg/L</td></tr>
<tr><td>USA</td><td>15 μg/L*</td></tr>
<tr><td>Canada</td><td>5 μg/L</td></tr>
<tr><td>Australia</td><td>10 μg/L</td></tr>
<tr><td>New Zealand</td><td>10 μg/L</td></tr>
<tr><td>Singapore</td><td>10 μg/L</td></tr>
<tr><td>Japan</td><td>10 μg/L</td></tr>
</table>
* The United States Environmental Protection Agency ("USEPA") has announced the Lead and Copper Rule Revisions ("LCRR") which will become effective on 16 December 2021. The LCRR includes, inter alia, the introduction of a new threshold trigger level of 10 μg/L for lead atop the prevailing action level of 15 μg/L.
</td></tr>
<tr><td>Recommended Actions</td><td>
- Keep the current HKDWS standard value unchanged.
- Continue to collect local data for future review pursuant to the IEP's recommendation.
- Keep in view the ongoing revision of the WHO Guidelines.
</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Microcystin-LR</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>1 μg/L</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU adopt WHO's PGV of 1 μg/L for microcystin-LR, which is a group of naturally occurring potent liver toxins, to ensure that treatment processes are adequate to prevent significant levels of microcystins from reaching consumers and provide a measure to reassure that drinking water is safe if blooms occur. EU decided to adopt the same as the PV.
- The parameter will be measured only in case of potential blooms in source water (increasing cyanobacterial cell density or bloom forming potential).</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>1 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^Same as WHO's PGV (designated as provisional because of limited database and new data for toxicity of cyanobacterial toxins being generated)

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 0.5 μg/L</td><td>< 0.5 μg/L</td><td>< 0.5 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>1 μg/L (provisional)</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>1.5 μg/L</td></tr>
<tr><td>Australia</td><td>1.3 μg/L</td></tr>
<tr><td>New Zealand</td><td>1 μg/L (provisional)</td></tr>
<tr><td>Singapore</td><td>1 μg/L</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged, which is the same as WHO's PGV and the revised DWD's PV.
- Keep in view the scientific development.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Per- and polyfluoroalkyl Substances (PFAS)</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>0.1 μg/L for Sum of PFAS[1];
0.5 μg/L for PFAS Total.</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended the EU include PFOA and PFOS in the revised DWD as a group of industrially-derived substances which occurs widely and shows persistence in the water environment and is of health and public concern.
- EU decided to monitor a wider range of PFAS by adding two new chemical parameters, namely Sum of PFAS (comprising 20 PFAS) and PFAS Total.
- The PVs for these 2 parameters shall only be applied once technical guidelines for monitoring the parameters are developed and Member States of the EU may decide to adopt either one or both of these parameters.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>PFOA and PFOS only*</td></tr>
</table>
* PFOA: Perfluorooctanoic acid;
PFOS: Perfluorooctane sulfonic acid

Monitoring results (1 Jan 2017 – 31 Dec 2020)
Raw water
<table>
<tr><td></td><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>PFOA</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td></tr>
<tr><td>PFOS</td><td>0.019 μg/L</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td></tr>
</table>
Treated water
<table>
<tr><td></td><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>PFOA</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td></tr>
<tr><td>PFOS</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td><td>< 0.01 μg/L</td></tr>
</table>
</td></tr>
</table>

[1] 'Sum of PFAS' means the sum of 20 per- and polyfluoroalkyl substances considered a concern for water intended for human consumption listed in Annex III, part B, point 3 in the revised DWD. This is a subset of 'PFAS Total' substances that contain a perfluoroalkyl moiety with three or more carbons (i.e. –CnF2n– moiety with perfluoroalkylether moiety with two or more carbons (i.e. –CnF2nOCmF2m−, n and m ≥ 1).

<table>
<tr><td>Parameter</td><td>Per- and polyfluoroalkyl Substances (PFAS)</td></tr>
<tr><td></td><td>
- WSD has conducted snapshot testing of all the 20 PFAS for raw water in March 2021:

Raw water
<table>
<tr><th></th><th>Maximum</th><th>Average</th><th>Minimum</th></tr>
<tr><td>PFBA</td><td>0.0053 μg/L</td><td>0.0032 μg/L</td><td>0.0013 μg/L</td></tr>
<tr><td>PFPA</td><td>0.0010 μg/L</td><td><0.0007 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFHxA</td><td>0.0011 μg/L</td><td>0.0007 μg/L</td><td>0.0003 μg/L</td></tr>
<tr><td>PFHpA</td><td>0.0006 μg/L</td><td><0.0005 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFOA</td><td>0.0036 μg/L</td><td>0.0026 μg/L</td><td>0.0011 μg/L</td></tr>
<tr><td>PFNA</td><td>0.0004 μg/L</td><td>0.0003 μg/L</td><td>0.0003 μg/L</td></tr>
<tr><td>PFDA</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFUnDA</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFDoDA</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFTrDA</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td></tr>
<tr><td>PFBS</td><td>0.0035 μg/L</td><td><0.0026 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFPS</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFHxS</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFHpS</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFOS</td><td>0.0040 μg/L</td><td>0.0029 μg/L</td><td>0.0007 μg/L</td></tr>
<tr><td>PFNS</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFDS</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td><td><0.0003 μg/L</td></tr>
<tr><td>PFUnDS</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td></tr>
<tr><td>PFDoS</td><td>0.0088 μg/L</td><td><0.0030 μg/L</td><td><0.0010 μg/L</td></tr>
<tr><td>PFTrDS</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td><td><0.0010 μg/L</td></tr>
<tr><td>Sum of 20 PFAS</td><td><0.033 μg/L</td><td><0.022 μg/L</td><td><0.011 μg/L</td></tr>
</table>
- Results of snapshot testing on treated water samples to be conducted in May 2021 will be available in July 2021 (tentatively).
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><th>Jurisdiction</th><th>Guideline/Standard value</th></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>*</td></tr>
<tr><td>Canada</td><td>0.2 μg/L (PFOA); 0.6 μg/L (PFOS)</td></tr>
<tr><td>Australia</td><td>0.56 μg/L (PFOA); 0.07 μg/L (sum of PFOS and perfluorohexane sulfonate)</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
* The USEPA has promulgated the final regulatory determinations for PFOA and PFOS to pave way for the establishment of drinking water standards for these parameters in future.
</td></tr>
<tr><td>Recommended Actions</td><td>
- Keep PFOS and PFOA in the Watch List and current snapshot monitoring (with reference to USEPA Health Advisory Level of 70 ng/L).
- Include all the 20 PFAS (viz. addition of 18 more PFAS), Sum of PFAS and PFAS Total in the Watch List in view of the increasing concern of PFAS in drinking water.
</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Selenium</td></tr>
<tr><td>Previous PV</td><td>10 μg/L</td></tr>
<tr><td>Revised PV</td><td>20 μg/L;
30 μg/L shall be applied for regions where geological conditions could lead to high levels of selenium in ground water.</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU relax the PV for selenium from 10 to 40 μg/L, which is the WHO's PGV. However, since a stricter value (10 μg/L) has been in place for the DWD, EU considered that there will be no additional compliance cost for relaxing the PV for selenium by a lesser extent, and PV of 30 μg/L shall be applied for drinking water drawn from groundwater of regions where geological conditions could lead to high level.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>40 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^Same as WHO's PGV (designated as provisional because of the uncertainties inherent in the scientific database)

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td><3 μg/L</td><td>< 3 μg/L</td><td>< 3 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>40 μg/L (provisional)</td></tr>
<tr><td>UK</td><td>10 μg/L</td></tr>
<tr><td>USA</td><td>50 μg/L</td></tr>
<tr><td>Canada</td><td>50 μg/L</td></tr>
<tr><td>Australia</td><td>10 μg/L</td></tr>
<tr><td>New Zealand</td><td>10 μg/L</td></tr>
<tr><td>Singapore</td><td>40 μg/L</td></tr>
<tr><td>Japan</td><td>10 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged for the time being because of no new evidence suggests any health risk associated with consuming drinking water complying with the HKDWS.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Uranium</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>30 μg/L</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU adopt WHO's PGV of 30 μg/L, which is protective against radioactivity from natural uranium that has been shown to cause kidney toxicity. EU decided to adopt the same as the PV.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>30 μg/L^</td><td>×</td><td>×</td></tr>
</table>
^ Same as WHO's PGV (designated as provisional because of because of scientific uncertainties surrounding uranium toxicity)

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.51 μg/L</td><td>< 0.2 μg/L</td><td>< 0.2 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>30 μg/L (provisional)</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>30 μg/L</td></tr>
<tr><td>Canada</td><td>20 μg/L</td></tr>
<tr><td>Australia</td><td>17 μg/L</td></tr>
<tr><td>New Zealand</td><td>20 μg/L (provisional)</td></tr>
<tr><td>Singapore</td><td>30 μg/L</td></tr>
<tr><td>Japan</td><td>2 μg/L (provisional target value)</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged, which is the same as WHO's PGV and DWD's PV.
- Keep in view the scientific development.</td></tr>
</table>

(B) <u>Microbial parameter</u>

<table>
<tr><td>Parameter</td><td>Legionella</td></tr>
<tr><td>Previous PV</td><td>-</td></tr>
<tr><td>Revised PV</td><td>< 1 000 cfu/L
(as triggering level for investigation and necessary remedial action to restore the quality of water)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU include Legionella in the revised DWD with a view to addressing its potential risks through risk assessment of domestic distribution systems and imposing remedial actions to prevent possible outbreaks of the disease.
- Member States may decide to focus the monitoring on priority premises (such as, hospitals, healthcare institutions, retirement homes, childcare facilities, schools, educational institutions, buildings with a lodging facility, restaurants, bars, sports and shopping centers, leisure, recreational and exhibition facilities, penal institutions and campgrounds) where specific risks have been identified.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
• Risk of Legionella in drinking water system is controlled through maintenance of residual chlorine in drinking water and proper maintenance of inside service.
• Risk of Legionella has been addressed in the templates of Water Safety Plan (“WSP”) for Buildings for high risk premises viz. hospitals and residential care homes for the elderly.
• Prevention of Legionnaires’ Disease Committee (“PLDC”) has published the Code of Practice for Prevention of Legionnaires’ Disease (“COP”) to provide guidelines for proper design, operation, maintenance and handling of related facilities to avoid the spread of Legionella. According to the COP (2021 Edition), developing WSP for water-using apparatus is the preferred approach to manage Legionella risks, while regular testing of Legionella in cold/hot water systems other than freshwater cooling towers is generally not required.
</td></tr>
</table>

<table>
<tr><td>Parameter</td><td colspan="2">Legionella</td></tr>
<tr><td>Adoption in other jurisdictions</td><td colspan="2"><table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table></td></tr>
<tr><td>Recommended Actions</td><td colspan="2">- Inform PLDC that a PV has been set in the revised DWD for Legionella and seek PLDC’s advice whether there is a need for any follow up actions (e.g. conducting of snapshot testing).</td></tr>
</table>

(C) Radiological Parameters

<table>
<tr><td>Parameter</td><td>Tritium</td></tr>
<tr><td>Previous PV</td><td>100 Bq/L</td></tr>
<tr><td>Revised PV</td><td>- (Deleted)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- Directive 2013/51/Euratom lays down specific arrangements for the monitoring of radioactive substances in drinking water. Therefore, the revised DWD will not set out PVs on radioactivity.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
- Determination of specific radionuclide would be conducted only when the radioactivity screening test of gross alpha activity (HKDWS = 0.5 Bq/L)^ and gross beta activity (HKDWS = 1.0 Bq/L)^ exceeded the HKDWS values.
^ Same as the WHO’s screening levels
Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td></td><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>Gross alpha</td><td>< 0.1 Bq/L</td><td>< 0.1 Bq/L</td><td>< 0.1 Bq/L</td></tr>
<tr><td>Gross beta</td><td>< 0.2 Bq/L</td><td>< 0.2 Bq/L</td><td>< 0.2 Bq/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Adoption</td><td>Guidance level</td></tr>
<tr><td>WHO</td><td>✓</td><td>10 000 Bq/L</td></tr>
<tr><td>UK</td><td>✓</td><td>100 Bq/L</td></tr>
<tr><td>USA</td><td>×</td><td>-</td></tr>
<tr><td>Canada</td><td>✓</td><td>7 000 Bq/L</td></tr>
<tr><td>Australia</td><td>×</td><td>-</td></tr>
<tr><td>New Zealand</td><td>×</td><td>-</td></tr>
<tr><td>Singapore</td><td>×</td><td>-</td></tr>
<tr><td>Japan</td><td>×</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep current HKDWS standard values for gross alpha activity and gross beta activity unchanged, which are the same as those in the WHO Guidelines and in line with the screening strategies adopted in EU Directive 2013/51/Euratom.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Total Indicative Dose (TID)</td></tr>
<tr><td>Previous PV</td><td>0.10 mSv/year</td></tr>
<tr><td>Revised PV</td><td>- (Deleted)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- Directive 2013/51/Euratom lays down specific arrangements for the monitoring of radioactive substances in water intended for human consumption. Therefore, the revised DWD will not set out PVs on radioactivity.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
- Determination of specific radionuclide would be conducted only when the radioactivity screening test of gross alpha activity (HKDWS = 0.5 Bq/L)^ and gross beta activity (HKDWS = 1.0 Bq/L)^ exceeded the standard values of HKDWS.

^ Same as the WHO’s screening levels

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td></td><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>Gross alpha</td><td>< 0.1 Bq/L</td><td>< 0.1 Bq/L</td><td>< 0.1 Bq/L</td></tr>
<tr><td>Gross beta</td><td>< 0.2 Bq/L</td><td>< 0.2 Bq/L</td><td>< 0.2 Bq/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Indicative Dose</td></tr>
<tr><td>WHO</td><td>0.1 mSv/year</td></tr>
<tr><td>UK</td><td>0.1 mSv/year</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>0.1 mSv/year</td></tr>
<tr><td>Australia</td><td>1 mSv/year</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep current HKDWS standard values for gross alpha activity and gross beta activity unchanged, which are the same as those in the WHO Guidelines and in line with the screening strategies adopted in EU Directive 2013/51/Euratom.</td></tr>
</table>

(D) Watch List (to be established by EU)

<table>
<tr><td>Parameter</td><td>Beta-estradiol</td></tr>
<tr><td>Previous Guidance Value</td><td>-</td></tr>
<tr><td>Guidance Value</td><td>1 ng/L (guidance value in first watch list of DWD to be established by 12 January 2022)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU include three representative EDCs viz. beta-estradiol, bisphenol A and nonylphenol and beta-estradiol in the revised DWD as benchmarks for monitoring.
- EU decided to include beta-estradiol in the first watch list in view of their endocrine disrupting properties and risk they pose to human health through consumption of drinking water.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>✓</td></tr>
</table>
Monitoring results* (1 Jan 2017 – 31 Dec 2020)
Raw water
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 4 ng/L</td><td>< 4 ng/L</td><td>< 4 ng/L</td></tr>
</table>
Treated water
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 4 ng/L</td><td>< 4 ng/L</td><td>< 4 ng/L</td></tr>
</table>
*WSD has identified the testing service for beta-estradiol with better sensitivity (<1 ng/L) for checking the levels against the new guidance value stipulated in the revised DWD.
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep beta-estradiol in the Watch List.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Microplastics</td></tr>
<tr><td>Previous Guidance Value</td><td>-</td></tr>
<tr><td>Revised Guidance Value</td><td>Not yet available, as a methodology to measure microplastics in drinking water yet to be developed.</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- In order to address growing public concern about the effects of microplastics on human health through the consumption of drinking water, EU decided that a methodology to measure microplastics in drinking water shall be adopted by 12 January 2024, with a view to including the parameter in the watch list in future.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>✓</td></tr>
</table>
- Snapshot monitoring is yet to be conducted due to lack of internationally recognised testing protocol.
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep microplastics in the Watch List and no follow up action be taken at this moment.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Nonylphenol</td></tr>
<tr><td>Previous Guidance Value</td><td>-</td></tr>
<tr><td>Revised Guidance value</td><td>0.3 μg/L (guidance value in first watch list of DWD to be established by 12 January 2022)</td></tr>
<tr><td>Rationale of the revised DWD</td><td>- WHO ROfE recommended EU include three representative EDCs viz. beta-estradiol, bisphenol A and nonylphenol in the revised DWD as benchmarks for monitoring.
- EU decided to include nonylphenol in the first watch list in view of their endocrine disrupting properties and risk they pose to human health through consumption of drinking water.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>×</td></tr>
</table>
WSD has conducted snapshot monitoring of nonylphenol in February and March 2021:
Raw water
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 0.050 μg/L</td><td>< 0.050 μg/L</td><td>< 0.050 μg/L</td></tr>
</table>
Final water at WTWs
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>< 0.050 μg/L</td><td>< 0.050 μg/L</td><td>< 0.050 μg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>Canada</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Include nonylphenol in the Watch List in view of increasing concern of EDCs in drinking water.</td></tr>
</table>

Summary of the Revised Guidelines for Canadian Drinking Water Quality ("GCDWQ") (Sep 2020)

Table 1. Microbiological Parameters

No change in the revised GCDWQ

Table 2. Chemical and Physical Parameters

Parameter	Previous MAC* (mg/L) (Jun 2019)	Revised MAC (mg/L) (Sep 2020)	Common Sources	Health Considerations	Applying the Guidelines/Comments
Barium (Inorganic chemical)	1	2	Naturally occurring; releases or spills from industrial uses	**Health basis of MAC:** Kidney effects	MAC is for total barium and takes into consideration exposure estimates from all sources.
Cadmium (Inorganic chemical)	0.005	0.007	Leaching from galvanized pipes and solders; industrial and municipal waste	**Health basis of MAC:** Kidney damage. **Other:** Bone effects (decreased bone density)	MAC is for total cadmium and takes into consideration exposure estimates from all sources. Sampling should be done at the tap to reflect average exposure similar to sampling done for lead. The contribution of cadmium in drinking water is generally from the galvanized steel used in pipes and well components. The best approach to minimize exposure to cadmium from drinking water is to replace galvanized steel and components. Drinking water treatment devices are also an effective option.
Chloramines (Disinfectant)	3	-	Monochlor-amine is used as a secondary disinfectant; formed in drinking water when chlorine is added in the presence of ammonia	Guideline value not necessary due to low toxicity at concentrations found in drinking water	Chloramine residuals in most Canadian drinking water distribution systems are typically below 4 mg/L.
Strontium (Inorganic chemical)	-	7	Naturally occurring (erosion and weathering of rocks); effluents from mining or other industries	**Health basis of MAC**: Bone effects (adverse effects on bone formation in infants as well as rickets, osteomalacia)	MAC is protective of the most sensitive sub-population, infants.

*MAC: Maximum Acceptable Concentration

Table 3. Radiological Parameters

No change in the revised GCDWQ

Source: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html *(Retrieved on 8 April 2021)*

Information Notes on
Revised Guidelines for Canadian Drinking Water Quality ("GCDWQ") (2020)

(A) Chemical Parameters

<table>
<tr><td>Parameter</td><td>Barium</td></tr>
<tr><td>Previous Maximum Acceptable Concentration ("MAC")</td><td>1 mg/L</td></tr>
<tr><td>Revised MAC</td><td>2 mg/L</td></tr>
<tr><td>Rationale of the revised GCDWQ</td><td>- Drinking water that contains high levels of barium may lead to kidney problems. Based on updated scientific data and information related to the health effects of barium, Health Canada reviewed and assessed all identified health risks associated with barium in drinking water taking into consideration of exposure estimates from all sources and the availability of appropriate treatment technology and relaxed the MAC.
- The revised MAC is protective of the most vulnerable members of society, such as infants and children.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>1.3 mg/L^</td><td>×</td><td>×</td></tr>
</table>
^ Same as World Health Organization ("WHO")'s Guideline Value ("GV")

Monitoring results (1 Jan 2017 – 31 Dec 2020)
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.024 mg/L</td><td>0.014 mg/L</td><td>0.002 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>1.3 mg/L</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>2 mg /L</td></tr>
<tr><td>EU</td><td>-</td></tr>
<tr><td>Australia</td><td>2 mg /L</td></tr>
<tr><td>New Zealand</td><td>0.7 mg/L</td></tr>
<tr><td>Singapore</td><td>1.3 mg/L</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged and no follow up action be taken.
- Keep in view the scientific development.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Cadmium</td></tr>
<tr><td>Previous MAC</td><td>0.005 mg/L</td></tr>
<tr><td>Revised MAC</td><td>0.007 mg/L</td></tr>
<tr><td>Rationale of the revised GCDWQ</td><td>- Drinking water that contains high levels of cadmium may affect the kidneys and bones. Based on updated scientific data and information related to the health effects of cadmium, Health Canada reviewed and assessed all identified health risks associated with cadmium in drinking water taking into consideration of exposure estimates from all sources and the availability of appropriate treatment technology and relaxed the MAC.
- The revised MAC is protective of the most vulnerable members of society, such as infants and children.</td></tr>
<tr><td>Current status in Hong Kong</td><td>
<table>
<tr><th>HKDWS</th><th>Surveillance List</th><th>Watch List</th></tr>
<tr><td>0.003 mg/L^</td><td>×</td><td>×</td></tr>
</table>
^same as WHO’s GV

Monitoring results of random daytime (RDT) samples under Enhanced Programme (25 Dec 2017 – 9 May 2021)
<table>
<tr><th>Maximum</th><th>Average</th><th>Minimum</th></tr>
<tr><td>0.002 mg/L</td><td>< 0.001 mg/L</td><td>< 0.001 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><th>Jurisdiction</th><th>Guideline/Standard value</th></tr>
<tr><td>WHO</td><td>0.003 mg/L</td></tr>
<tr><td>UK</td><td>0.005 mg/L</td></tr>
<tr><td>USA</td><td>0.005 mg/L</td></tr>
<tr><td>EU</td><td>0.005 mg/L</td></tr>
<tr><td>Australia</td><td>0.002 mg/L</td></tr>
<tr><td>New Zealand</td><td>0.004 mg/L</td></tr>
<tr><td>Singapore</td><td>0.003 mg/L</td></tr>
<tr><td>Japan</td><td>0.003 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep the current HKDWS standard value unchanged and no follow up action be taken.
- Continue with the collection of local data for future review pursuant to the IEP’s recommendations.
- Keep in view the scientific development.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Strontium</td></tr>
<tr><td>Previous MAC</td><td>-</td></tr>
<tr><td>MAC</td><td>7 mg/L</td></tr>
<tr><td>Rationale of the revised GCDWQ</td><td>- Strontium can replace calcium in bones and cause rickets. Drinking water that contains high levels of strontium may pose a risk to infants because their bones are actively developing. Health Canada reviewed and assessed all identified health risks associated with strontium in drinking water including new studies and approaches and taking into consideration of exposure estimates from all sources and the availability of appropriate treatment technology.
- The new MAC is protective of the most sensitive sub-population, infants.</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><td>HKDWS</td><td>Surveillance List</td><td>Watch List</td></tr>
<tr><td>×</td><td>×</td><td>✓</td></tr>
</table>

WSD has conducted snapshot testing of strontium in February and March 2021:
Raw water
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.047 mg/L</td><td>0.034 mg/L</td><td>0.016 mg/L</td></tr>
</table>
Final water at WTWs
<table>
<tr><td>Maximum</td><td>Average</td><td>Minimum</td></tr>
<tr><td>0.049 mg/L</td><td>0.044 mg/L</td><td>0.037 mg/L</td></tr>
</table>
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><td>Jurisdiction</td><td>Guideline/Standard value</td></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>EU</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep strontium in the Watch List and no follow up action be taken.</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Chloramines</td></tr>
<tr><td>Previous MAC</td><td>3.0 mg/L</td></tr>
<tr><td>MAC</td><td>- (Deleted)</td></tr>
<tr><td>Rationale of the revised GCDWQ</td><td>- Health Canada considered that the MAC is no longer necessary due to low toxicity at concentrations found in drinking water</td></tr>
<tr><td>Current Status in Hong Kong</td><td>
<table>
<tr><th>HKDWS</th><th>Surveillance List</th><th>Watch List</th></tr>
<tr><td>×</td><td>×</td><td>✓</td></tr>
</table>
• In Hong Kong, chloramination is not adopted in water treatment process.
</td></tr>
<tr><td>Adoption in other jurisdictions</td><td>
<table>
<tr><th>Jurisdiction</th><th>Guideline/Standard value</th></tr>
<tr><td>WHO</td><td>-</td></tr>
<tr><td>UK</td><td>-</td></tr>
<tr><td>USA</td><td>-</td></tr>
<tr><td>EU</td><td>-</td></tr>
<tr><td>Australia</td><td>-</td></tr>
<tr><td>New Zealand</td><td>-</td></tr>
<tr><td>Singapore</td><td>-</td></tr>
<tr><td>Japan</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Recommended Actions</td><td>- Keep chloramines in the Watch List and no follow up action be taken.</td></tr>
</table>

Annex 5

Recommended Actions for the Parameters

Parameter	Recommended Actions
Antimony	• Keep current HKDWS standard value • Continue with collection of local data for future review • Keep in view the ongoing revision of WHO Guidelines
Barium	• Keep current HKDWS standard value
Beta-estradiol	• Keep in Watch List
Bisphenol A	• Include in Watch List
Boron	• Keep current HKDWS standard value
Cadmium	• Keep current HKDWS standard value • Continue with collection of local data for future review
Chlorate	• Keep current HKDWS standard value
Chlorite	• Keep current HKDWS standard value
Chloramines	• Keep in Watch List
Chromium	• Keep current HKDWS standard value • Continue with collection of local data for future review • Keep in view the ongoing revision of WHO Guidelines
Haloacetic acids (HAAs)	• Include sum of the five HAAs in Watch List
Lead	• Keep current HKDWS standard value • Continue with collection of local data for future review • Keep in view the ongoing revision of WHO Guidelines
Legionella	• Inform the PLDC that a PV has been set in the revised DWD and seek its advice whether there is a need for any follow up actions (e.g. conducting of snapshot testing)
Microcystin-LR	• Keep current HKDWS standard value
Microplastics	• Keep in Watch List
Nonylphenol	• Include in Watch List
Selenium	• Keep current HKDWS standard value
Strontium	• Keep in Watch List
Sum of PFAS / PFAS Total	• Include all 20 PFAS (viz. addition of 18 more PFAS), Sum of PFAS and PFAS Total in Watch List
Tritium	• Keep current HKDWS standard values for gross alpha / gross beta activity unchanged
Total indicative dose	
Uranium	• Keep current HKDWS standard value