Comments for Draft Technical Guidance 15
Concentration Limits for the Protection of Aquatic Receiving Environments

Section/Issue	Comments	Stakeholder Recommendation	Ministry Response
General: 10x dilution	Is there a scientific basis for assuming 10x dilution of contamination within 10 m of the high water mark of a surface water body containing aquatic life?	N/A	Based on the ministry's current research, there is no known scientific basis for assuming that the 10 m offset from the high water mark will ensure 10 times dilution of contaminants in every circumstance. There are many scientific documents that attempt to determine dilution at or near surface water bodies. However, these studies are site specific and cannot be extrapolated to provide generalizations for all sites. In its research on this topic, Environment Canada determined that several Canadian jurisdictions only allow the use of a transport model or dilution factor at distances of at least 10 m (laterally and vertically) from the receptor, partly due to possible limitations of the models, the distance required for dispersion/biodegradation to occur, and possible measurement error. The guidance document on Federal Interim Groundwater Quality Guidelines (May 2010) suggests that a minimum 10 m offset is necessary to ensure that the dilution zone is protected.
General: Conflict with Fisheries Act	"Thousands of agricultural drainages are routinely "maintained" but are still used by a significant number of "fish" including salmonoids and are considered "fish habitat" under the *Fisheries Act*." "One cannot assume that all maintained water courses do not contain aquatic life. The "Aquatic Life" definition as per the *Fisheries Act* will include many maintained water courses." "The definition of storm conveyances contradicts the *Fisheries Act*. For example: fish bearing waters vs storm conveyances."	The ministry should provide guidance that the definition and application of the guidelines vs. aquatic life standards does not contradict the *Fisheries Act.* Delete the reference to "maintained water course" to reduce confusion. The ministry should provide definitions for aquatic life and aquatic receiving environment. The ministry should provide clarity of compliance in storm water conveyances.	The final version of the guidance document attempts to reconcile the potential conflict between the guidance and the *Fisheries Act* by referring to new definitions for "aquatic receiving environment" and "maintained water courses" as well as definitions for "constructed ditch" and "constructed pond" which have been added to Procedure 8 Definitions and Acronyms for Contaminated Sites . These definitions provide guidance to environmental consultants in determining what is considered by the ministry as a "maintained water course" and also define when "maintained water courses" are considered aquatic receiving environments. In addition, Table 3 in the final version of the guidance provides a summary of applicable

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			concentration limits in aquatic receiving environments and maintained water courses. Finally a box note was added to remind proponents of the possibly different Federal requirements.
Dilution Zone	What standard or guideline applies in the 10 m setback (i.e. dilution zone)? Is the ministry implying that the BC WQG applies in this setback? What is applicable for an APEC located in the 10 m setback zone?	The AW standard should apply within the dilution zone. The guidance should state that it is up to the practitioner to use discretion on what applies in the dilution zone. The document should state that the guidelines should apply in the dilution zone.	The final version of the guidance provides advice in the "Dilution Zone" section of the document. The guidance does not specify concentrations limits within the dilution zone, rather if the concentration limits cannot be met either at the 10 m setback from the high water mark (AW standards) or at the high water mark (WQG) then a site-specific risk based approach is recommended to determine whether substance concentrations in groundwater represent unacceptable risks to aquatic life. Please note, that for all circumstances, you must ensure that investigation samples represent worst case conditions in order to assess whether the concentrations limits are met.
Dilution Zone	Does draft Technical Guidance15 infer that one should not drill in the 10 m setback from the ecoactive zone? Drilling and test pitting for investigation may not allowed in the riparian zone (e.g. riparian assessment area, Riparian Area Regulation). Does draft Technical Guidance15 have any relationship to the definition of the zone in that regulation?	N/A	Investigating/drilling within the 10 m setback is not discouraged, although in some cases it may not be possible. If intrusive investigation contravenes the Riparian Area Regulation at your site, we recommend looking at other options available to you using a site-specific approach.
Dilution Zone	The horizontal distance (e.g. 10 m setback) from high water mark or the high water mark may be difficult to assess.	N/A	Informed professional judgement is recommended in situations where the high water mark or the dilution zone is difficult to assess. Some alternatives are also provided in the surface water section of the final version of the document.

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Standards/ Guidelines	Does 1/10 the AW standard apply where there are no existing WQG?	N/A	If there is no approved or working water quality guideline (BC WQG) and you exceed the AW standard 10 m back from the high water mark, you are required to assess the risk of potential exposure to the receiving environment. A box note was added with regards to the schedule 6 substances LEPHw and VPHw, that do not have WQGs, for which it is acceptable to use 1/10 the AW standard to approximate the concentration limits.
Standards/ Guidelines.	Mn and Fe are a by-product of hydrocarbon degradation. There are no existing AW standards for these parameters. Do you have to analyze for them in the dilution zone as there are WQG for these parameters? Is it the intent of draft Technical Guidance 15 to regulate Fe, Mn and Al within the dilution zone or at the high water mark?	N/A	There is no legal requirement to assess contaminants that do not have an AW standard (e.g. Fe, Mn and Al). However, there are some situations where these parameters could constitute pollution under the *Environmental Management Act* and may pose unacceptable risks to aquatic life. In addition, a box note was added to provide further clarification.
Standards/ Guidelines	When comparing to the BC WQG in the groundwater or porewater are total metal analyses required?	N/A	Dissolved metals analysis is considered representative of the mobile metal fraction in groundwater and is accepted practice. Porewater in the ecologically active zone and surface water samples should be analysed for total metals as this is representative of exposure concentrations. This has been clarified in the document.
Surface Water	What standard/guideline is applicable in storm water ditches or conveyances?	N/A	Storm water conveyances are considered under the definition of “maintained water courses” in the final version of the guidance. If the storm conveyance in question meets the definition of a “maintained water course” generally the AW standards are applicable. For further direction, please refer to Table 3 in the final version of the guidance.

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Dilution zone	Our understanding of the 10-fold dilution was that this occurred at the point of discharge into the surface water body and not that the groundwater concentrations were diluted within the 10m zone ("dilution zone"). Please correct us on this and provide rationale.	N/A	AW standards are protective of aquatic life under the assumption that a 10-fold dilution is available before the water comes into contact with aquatic life (Schedule 6, footnote 2a). Specific wording was added to the guidance for clarification.
Sediment depth	The ecologically active zone ("EAZ") for sediment is defined as the top 1 metre of stable sediment. Based on the definition of stable sediment, this would infer that the EAZ is not from the sediment surface but rather some depth below e.g. 2-3m below sediment surface. Is this correct? Some clarification may be required.	N/A	The ecologically active zone is defined as the top 1 meter if sediment is stable. Under unstable conditions a greater depth should be considered. This was clarified in the guidance.
Sediment depth	Based on the definition of sediment, is there a "bottom" i.e. bedrock? This could result in a significant investigation zone where sediment standards apply. We disagree with this.	N/A	Technical Guidance 15 is intended for use at contaminated sites where preliminary and detailed site investigations have been completed, and sediment has been satisfactorily characterized and delineated under the requirements of the Contaminated Sites Regulation.
Dilution zone	It appears that the Ministry has not considered dilution through vertical transport for groundwater within the ARE as they have with horizontal transport within the dilution zone. From Technical Guidance 15 and our experience, the application of WQS below the ARE to depth infinitum is unrealistic. This application requires further consideration as this adds to considerable cost to our clients.	N/A	Vertical dilution can be included under a risk assessment approach, but not when using the concentration limits at fixed locations as described in Technical Guidance 15.
General	We appreciate that the ministry has provided clarity on the water use standards applicable to aquatic receiving environments.	N/A	No response required.
General	CSRD staff feels that there would be no impact on the CSRD process.	N/A	No response required.

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Definitions	Page 1 - The term "*porewater*" is used in the definition of "*aquatic receiving environment*" but porewater is not otherwise defined – presumably it refers to water within sediment in the "ecologically active zone" (upper one metre of sediment). Perhaps that detail could be added to the definition (i.e. porewater in the ecologically active zone - Figures 1 and 2 imply this).	N/A	There is no vertical depth limit to the application of WQGs; Figure 1 was modified to show that all water contained in sediments is considered porewater. Figure 1 now distinguishes between porewater and porewater in the ecologically active zone, which is relevant in the decision whether dissolved or total substance concentrations should be used in the assessment. Also porewater is now defined in Procedure 8 "Definitions and Acronyms for Contaminated Sites.
Salinity	Page 2 –Salinity in transitional zones, and hence the standards chosen to assess a site will depend on temporal factors and will consequently vary – inconsistency in the choice of standards is likely to result.	The ministry's definition of Fraser River salinity boundaries might benefit from a third bullet indicating that between the Patullo Bridge and the George Massey Tunnel, or western tip of Mitchell Island, the water is considered to transition between freshwater and marine/estuarine water and therefore, both freshwater and marine water AW groundwater standards apply to sites located within the 500 m zone long these reaches of the river. Given that there are other locations in coastal areas of the province where this would be an issue, and it would not be practical to stipulate what the ministry considers to be freshwater and estuarine/marine boundaries for all potentially affected waters, it would be useful to state as a general notation that in freshwater/estuarine water transitional zones, both freshwater and marine water uses and associated	A general statement on transitional zones was added following the two points of reference in the Fraser River. Further advice is also available in the ministry's Contaminated Sites Q&A on the issue.

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		standards apply.	
Intertidal sediments	Table, Item 3 "Intertidal Sediment" refers to Schedule 4, 5 and 10 for human health protection and the text states "*…the Regulation's Schedules 4, 5 and 10 soil standards for the protection of human health apply to sediments in intertidal zones if an operable exposure pathway is present at the site.*" What determines the land use for an intertidal area – the land use at the adjacent property? If so, this could lead to commercial soil standards and residential soil standards applying to a contiguous stretch of intertidal sediment, with no linkage between the applicable standards and public access and recreational use that might occur irrespective of upland land use.	N/A	Soil standards for residential land and parkland use apply to sediments in intertidal zones, unless site-specific circumstances determine the land use. This has been clarified in the final version of the guidance..
Intertidal sediments	What is the intended level of human health protection for a freshwater body that has seasonal water level changes and beach areas below the high water mark are exposed for extended periods during dry spells or once spring freshet is over? If ecologically based sediment standards are deemed to apply, why is a more stringent level of human health protection deemed necessary for freshwater sediment between the low and high water marks than that for intertidal sediment?	N/A	This has been clarified in Fig. 2 of the final version of the guidance.
Figure 2	Figure 2 could use some clarification. The circled numbers 1 to 4 are not defined. It looks like 3 refers to SedQC for aquatic receptors and Schedules 4, 5 and 10 for human health protection, but this is not clearly stated.	The circled numbers should be defined with text indicating the standards that apply.	Numbering of Figure 2 was made consistent with Table 2, and an explanatory note added to both figures that refers to the tables for numbering.
Dilution zone.	On Page 3, the discussion on dilution zone criteria is unclear. Three bullets are specified,	We suggest rewording as follows: "it is permissible for GW concentrations to	Reworded to clarify that each of the three approaches can be used.

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	but are the acceptable options either the first, second or third bullet; or are the acceptable options the first and second bullet combined, or the third bullet? The way the section is worded makes this unclear, particularly the first bullet.	exceed the WQG's within 10 m of the aquatic receiving environment provided dilution within that mixing zone is sufficient to meet WQG's or site-specific risk-based criteria that are protective of the receiving environment."	
CLs for water	It is unclear whether a concentration limit can be chosen, i.e. either at the 10 m setback or at the HWM, or both concentration limits have to be met.		The ministry prefers that both locations with concentration limits are addressed in the investigation, however sampling at the HWM is only required if the groundwater sample(s) collected at the 10 meter setback exceed AW standards. This has now been clarified in the final version of the guidance. .
Other changes made by MOE			"High water mark has now been defined in Procedure 8 "Definitions and Acronyms for Contaminated Sites." A statement that WQGs are largely based on the CWQGs was removed, as some guidelines are derived by MOE using a protocol different from CCME. The use of dissolved versus total substance concentrations in the different media was clarified. The paragraphs within the "Concentration limits for water" were renamed for clarity. The different assessment zones were added to Figures 1 and 2. Box notes that clarify the use of Protocol 13 for aquatic receiving environments were added.