EPA Comments – Pebble Project Preliminary Draft EIS, Section 4.17 - Groundwater Hydrology

Agency	Comment No.	Section, Paragraph, and Page #	Cooperating Agency Comment (and Purpose of Comment)	Proposed Resolution (Additions or Deletion of Text)	Response
EPA	1	4.17.1, page 4.17-1	In summary, there would be no direct or indirect impacts on baseline groundwater conditions from implementation of the No Action Alternative.	Since the no action alternative includes ongoing exploration, please describe the impacts that exploration has had on groundwater.	Text added to address pump test impacts.
EPA	2	4.17.2.1, page 4.17-1	Groundwater modeling (Piteau 2018a).	The outcome of model predictions are provided in this section. As requested in comments previously submitted to the Corps and in the comment on section 3.17 above, we continue to recommend that model uncertainties and sensitivities be disclosed so that the level of uncertainty associated with model predictions are understood.	Text and figures have been included in Technical Appendix K4.17, and summarized in Section 4.17, Groundwater Hydrology, to address uncertainties in the model due to the range in input parameters such as hydraulic conductivity, including discussion of the Monte Carlo analysis and its robustness compared to a standard sensitivity analysis.
EPA	3	4.17.2-1, page 4.17-2	Although a specific dewatering design has not been developed at this point, the ultimate pit dewatering design would be based on a series of interim pit phases that successively expand and deepen the pit.	We recommend that the DEIS disclose how dewatering impacts were predicted absent a specific dewatering design.	Text describing the approximate number, spacing and layout of dewatering wells has been added. The predicted impacts were based on model projections. Specific design features would be developed at a later permitting phase.
EPA	4	4.17.2-1, 4.17-2 and 4.17-3	The primary impact to groundwater flow would be in the alluvial, glacial, and bedrock aquifers in the open pit footprint and cone of depression. Groundwater flow in these aquifers would radially flow towards the pit, and be captured by the dewatering system. The groundwater impact would grow as mining proceeds to depth, and the cone of depression surrounding the pit becomes wider and extends to depth. Piteau Associates (2018a)	We recommend that the DEIS include figures that clearly show the predicted depth and extent of groundwater impacts. Specifically, we recommend figures that show: (1) the simulated maximum groundwater drawdown associated with the open pit dewatering cone of depression during mining; (2) the aerial and depth extent of the permanent groundwater sink and post-closure cone of depression; and (3) the change in areal and depth extent of groundwater changes due to the TSF. As examples, please see the Donlin	Figures have been added that show the maximum pit drawdown at the end of operations and post-closure; the areal extent of the post-closure cone of depression; and the areal extent of the zones of influence around the TSFs and main WMP.

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			estimates that the cone of depression at the end of mining would extend approximately 2,500 to 10,000 feet from the crest of the open pit, depending on the hydraulic character of the affected aquifers.	EIS (Figures 3.6-8 through 3.6-10) and the Haile EIS (see Figures 4.3-9 to 4.3-14).	
EPA	5	4.17.2.1 Pit Dewatering, page 4.17-3	The presence of a permanent groundwater sink at the pit would continue to locally influence groundwater flow in the immediate vicinity of the pit; however, the influence on groundwater flow would be relatively small compared to active mining operations. Piteau Associates (2018a) estimates that the post-closure cone of depression would extend 2,000 to 4,000 feet or less during post-closure	We recommend providing a summary of how the “permanent sink” will be maintained and monitored into perpetuity or reference other sections of the EIS where this information is provided.	Text has been added describing pumping and monitoring of the pit throughout post-closure.
EPA	6	4.17.2.1 Water Management Ponds, Page 4.17-4	The WMPs are expected to have no adverse impact on groundwater quality, because they would be lined to prevent leakage of impacted water to the subsurface.	Per our previous comments submitted to the Corps on 8/15/2018, we continue to recommend providing a description of the liner that would be used for the WMPs, a summary of how the lined ponds will be monitored to assure no leakage, and a description of the contingency plans that would be implemented should leaks be detected. In addition, we recommend disclosing how the assertion that leakage would be prevented comports with the one liter/second leakage rate assumed in Piteau 2018.	The cited sentence has been deleted and replaced with discussion of potential liner leakage and a description of monitoring/pumpback wells and contingency plans in Section 4.17, as well as 4.18, Water and Sediment Quality.
EPA	7	4.17.2.1 Water	The WMPs may help restore	Per our previous comments	The magnitude and extent of changes

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		Management Ponds, Page 4.17-4	downgradient groundwater flow to maintain existing flow conditions as surplus water is treated and discharged downstream of the mine site.	submitted to the Corps on 8/15/2018, we continue to recommend describing the magnitude and extent to which the treated water discharges would result in changes to groundwater flow.	in groundwater flows in the NFK, SFK and UTC basins, both with and without discharge of treated water, are addressed in the sections describing the impacts of the pyritic TSF, main WMP, and pit.
EPA	8	4.17.2.1 Bulk TSF, Page 4.17-4	Construction of the bulk TSF would locally impact surface water features at the site, and potentially impact groundwater/surface water interactions; this impact is expected to be small in extent (e.g., near the vicinity of the bulk TSF), but permanent.	We recommend providing a summary of how groundwater will be permanently impacted by discussing the estimated extent as well as providing a figure that shows the extent of the groundwater impacts.	Text and a figure (Figure 4.17-5) have been added to further describe extent of effects in relation to local features.
EPA	9	4.17.2.1 Bulk TSF, Page 4.17-4	Tailings seepage that is not captured could create a local groundwater mound beneath the TSF that could have a local influence on groundwater flow.	We recommend providing a reference to the section of the EIS that describes the TSF seepage collection system. In addition, based on the seepage collection system design, we recommend that the EIS provide an estimate of the amount of seepage that would not be captured by the system and describe the extent to which the seepage would influence groundwater flow (e.g., describe what is meant by "local").	The text has been revised to state that an estimated 0.1 cfs will seep from the main TSF tailings into shallow groundwater. Some of that water is expected to flow to and be captured by the SCP. Some water could also flow into deeper fractures in bedrock and become entrained in groundwater flow systems. Text and a figure have been added to describe the extent of the water table mound associated with the main TSF.
EPA	10	4.17.2.4 Natural Pipeline Corridor – Shallow Groundwater Interception, Page 4.17-6	Potential contamination of shallow groundwater and surface water could occur during pipeline construction from inadvertent spills of fuel and fluids from heavy machinery and trenching equipment operating in close proximity to the water table.	We recommend referencing a Spill Prevention Control Plan and including a draft plan in the DEIS.	Chapter 5, Mitigation, describes BMPs, permit requirements, and industry standards to include development and maintenance of Oil Discharge Prevention and Contingency Plans (ODPCPs) and Spill Prevention, Control, and Countermeasures (SPCC) Plans. These plans would be required prior to construction and would be developed at a later permitting phase.

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					(Note that the cited text has been deleted from this section, as the topic is covered in other sections of the EIS: Section 4.18, Water and Sediment Quality, and Section 4.27, Spill Risk).
EPA	11	4.17.5 Table 4.17-1, Page 4.17-8	Diverted groundwater would be largely captured, treated, and discharged to the affected drainages during construction and operations to restore natural flow conditions.	Section 4.17.2.1 does not currently describe how natural groundwater flow conditions would be restored. We recommend that the DEIS include the information that supports this conclusion.	Text has been added to describe the restoration of natural flow in UTC and SFK drainages from estimated WTP discharges.
EPA	12	Page 4.17-9	Groundwater use would be highest during construction and operations, and is expected to largely recover to pre-mining levels once mining ends and reclamation occurs, except for the Bulk TSF and open pit.	As discussed in the comments above, we recommend that the DEIS include figures that show areal and depth extent of groundwater changes during mining and at long-term post-closure.	Figures have been added to Section 4.17, Groundwater Hydrology, and Appendix K4.17, showing the areal and depth extent of groundwater changes around the pit, TSFs, and WMPs. Table 4.17-1 has been edited to add a line specific to potable water (groundwater) supply use only.
EPA	13	4.17.6.1, Page 4.17-11	Cumulative effects Overall, the incremental contribution of Alternative 1, and impact to groundwater from the project and the past, present, and reasonably foreseeable future actions (RFFAs), would be localized high-intensity changes in the vicinity of the mine site during the life of the project, because the effects of the project on groundwater are limited to a relatively small area, and would be reduced in post-closure as the site is reclaimed and groundwater returns to pre-mining conditions in all areas except the bulk TSF and the	We recommend that additional information be provided to fully disclose cumulative impacts to groundwater hydrology associated with the Pebble project buildout. The conclusion in the cited text is not supported by any analysis. We recommend providing a discussion of the areal extent and depth of hydrogeological changes during mining and at closure associated with open pit dewatering, waste rock storage, TSF seepage, diversions, and discharges. We recommend that figures be provided to support the discussion of cumulative impacts and show the extent of impacts. In addition, if terms like “localized”	Further analysis of buildout scenario has been added in the cumulative effects subsection of Section 4.17, Groundwater Hydrology, including an estimate of areal extent and depth. Revised text specifically references areas and distances in relation to a general buildout figure added to Section 4.1, Introduction to Environmental Consequences; additional resource-specific figures are not essential to make a reasoned choice among alternatives. Estimates of geographic extent and magnitude have been added to the text.

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			open pit where groundwater impacts would remain.	and "high intensity" are being used, we recommend that they either be defined or replaced with estimates of the geographic extent and magnitude. For example, modeling may be needed to better characterize cumulative impacts of the Pebble project buildout.	