EPA Comments – Pebble Project Preliminary Draft EIS, Section 3.17 - Groundwater Hydrogeology

Agency	Comment No.	Section, Paragraph, and Page #	Cooperating Agency Comment (and Purpose of Comment)	Proposed Resolution (Additions or Deletion of Text)	Response
EPA		3.17 - General	Baseline hydrogeology for alternatives	This section focusses on baseline hydrogeology for the proposed action (Alternative 1). We recommend that this section of the DEIS also discuss baseline hydrogeology for alternatives 2 and 3 including the north road and alternative port site. If hydrogeologic information is not available for alternatives, then please describe if and when it will be collected and when it will be included in the EIS. If additional data is not being collected, then please describe how this affects the impact analysis in Section 4.17.	Baseline information for Alternatives 2 and 3 has been added.
EPA		Section 3.17.1.1, Page 3.17-1	Hydrogeological Characterization Programs	This section references the hydrogeologic characterization data collection activities. Per previous comments submitted to the Corps on 7/5/2018, we recommend that the EIS describe the adequacy of the hydrogeologic characterization data collection and assessment, whether there are any data gaps, and how the data gaps might affect the impact assessment.	Section 4.1 addresses data gaps. No hydrogeologic data gaps have been identified; however text has been added to indicate that the analysis would be improved with completion of a groundwater model calibration report including a robust sensitivity analysis.
EPA		Section 3.17.1 Mine Site, Page 3.17-1	This section describes existing hydrogeologic conditions in the mine site area (Figure 3.17-1) that are anticipated to be the most affected by project activities. For example, dewatering associated with the open pit would create a zone of influence around the area of the open pit where groundwater	We recommend summarizing the hydrogeologic condition changes expected to occur in the mine site that provide the basis for determining the area “most affected by project activities.” We recommend referencing figures where appropriate. In addition, as requested in our previous comments submitted to the Corps on 7/5/2018, we continue to recommend that the EIS disclose the official classifications of underlying	Impacts-type text reduced here based on USACE comments, and forward reference added to Section 4.17 where these changes are evaluated. Aquifers in Alaska

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			levels and groundwater quantity, groundwater/surface water interactions, and surface water flows would be affected. Other influences on groundwater and surface water levels and flow may include groundwater seepage and flow pathways away from the tailings storage facility (TSF) and water management ponds.	aquifers (designated by the state) including identifying all underground sources of drinking water, as well as disclose the locations/distance of the nearest drinking water protection areas/drinking water wells/surface water intakes.	are not officially classified by the State; however Section K3.18.1.2 describes protections that apply to the quality of groundwater in aquifers. The locations of nearest drinking water wells have been added to Section 3.17.4. The locations of surface water intakes and protection areas are provided in Section 3.16.4.
EPA		Page 3.17-4, Figure 3.17-2 Monitoring Well, Piezometer, and Seep locations		We recommend providing additional information in Figure 3.17-2, which contains a large number of data points without identifications. At a minimum, we recommend that monitoring well ID #s, cross-section line designations, and stream gaging station ID#s should be included, especially near the relevant Mine Site features and/or locations used for baseline establishment and future compliance monitoring. We also recommend including a note on the Figure referencing where additional details (i.e., summary tables) can be found.	Well, cross-section, and stream gage ID #s have been added to expanded sections of this figure in Appendix K3.17 (Figures K3.17-1a through -1g). A note has been added that cross-references well completion data in Table K3.18-17. Selected cross-section designations are also included on Figure 3.17-4.
EPA		Section 3.17.1.2	Shallow groundwater flow	We recommend providing additional Figures	Figures and text

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		Hydrostratigraphic Units, Page 3.17-6	patterns in the overburden at seasonal low levels are illustrated in Figure 3.17-9.	representing shallow groundwater flow patterns that indicate seasonal variability, or consistency, as appropriate.	have been added to describe the variability of vertical gradients and a figure has been added to show seasonal high water table.
EPA		Section 3.17.1.3 and Figures 3.17-5 thru 3.17-8 Geologic Cross Sections, Pages 3.17-8 through 3.17-11	Many of the faults act as flow barriers, while others appear as flow conduits resulting in compartmentalized groundwater flow with the bedrock at depth. The compartments limit regional groundwater flow within the deep bedrock.	We recommend indicating where seeps are known to exist and other surface water/groundwater interface locations, as well as where faults act as flow barriers and where they facilitate "compartmentalized" groundwater flow may exist.	Locations of seeps were added. Test describing "compartmentalized" groundwater was revised to indicate that this is a possibility, but that review of water-level data does not result in the identification of compartments. Locations of compartments have not been identified.
EPA		3.17.1.3 Hydrogeology Overview, Page 3.17-13	Groundwater gradients in the vicinity of the Pebble deposit are vertically upward with a minimal horizontal component, indicating that groundwater in the vicinity of the deposit locally discharges to the upper reaches of the SFK River, and is unlikely to flow across groundwater divides or migrate appreciable distances down the valley before discharging to surface water.	We recommend referencing where data indicate upward vertical gradients and illustrating this information in figures.	Four new figures have been added to Appendix K3.17 showing upward and downward vertical gradients.
EPA		3..17.1.6 Site-Wide Water Balance Model	Site-wide water balance model, mine site groundwater flow models	Per our scoping comments and additional comments submitted to the Corps on 7/5/2018,	Text has been

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		and 3.17.1.7 Mine Site Groundwater Flow Model, Pages 3.17-27 and 3.17-30	(Schlumberger and Piteau).	we continue to recommend that the EIS discuss the adequacy and accuracy of the models used to characterize baseline conditions and assess impacts. Appendix K3.17 discusses model calibration but does not describe why the specific models were selected for use or disclose any limitations and uncertainties associated with the model input parameters, assumptions, and outcomes. For example, there is no information provided that describes the accuracy of the estimates of groundwater flow changes, drawdown, and seepage. This information is needed to disclose the certainty associated with the impact assessment predictions and inform mitigation needs. We recommend that this information be added to the appendices (Appendix K3.17 or possibly create a new appendix, K4.17). As examples, see Section 4.3 of the Haile Gold Mine Final EIS (USACE, Charleston District, July 2014) and the Donlin Gold Final EIS (USACE, Alaska District, April 2018) which provide summaries of the basis, evaluation, approach, and sensitivity analysis of all models used.	added to Appendix K3.17 regarding model selection rationale. A new Appendix K4.17 has been created to describe uncertainties in input parameters, model calibration, sensitivity analysis, and outcomes.
EPA		3.17, page 3.17-31	Groundwater and surface water interaction was characterized based on detailed streamflow surveys and the site-wide WBM. Figure 3.16-4 (see Section 3.16, Surface Water Hydrogeology) depicts stream gage locations.	We recommend that the DEIS include additional discussion of groundwater/surface water interaction across the mine site study area, including areas of potential dewatering impact. For example, we recommend describing, and indicating on figures, information collected from monitoring wells, seeps, and surface water staff gages, which can be used to measure such interactions. We note that Figure 3.16-4 shows the gaging stations within the area, but has no information related to the interactions, and recommend adding this information here or in another	Descriptions and a map showing gaining and losing segments of streams (surface water/groundwater interaction) have been added to Section 3.17. Additional text describes the effects of dewatering on streams and

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				Figure.	wetlands.