

Another feature on the Site is the Minnequa canal, owned by Rocky Mountain Steel Mills. The canal flows across the RCQ property along the northeast corner, diverting water from the Arkansas River at Florence for irrigation purposes and municipal/domestic use. The canal is fully fenced and is siphoned under Red Creek, just north of the Site property boundary.

2.7.2 U.S. Army Corp of Engineers

Holcim engaged BC to begin the preliminary jurisdictional determination (PJD) for the Red Creek Quarry parcel in Fall 2019. BC personnel conducted a field reconnaissance at the Site on May 28, 2019 to observe and document conditions of the property, specifically related to the surface water drainages on the Site. The location of the sites visited are shown in Figure 2.7.2-1. A second field visit was conducted on October 1, 2019, with Joshua Carpenter, regulatory staff with the United States Army Corps of Engineers (USACE), Albuquerque District, Pueblo Regulatory office to review the site conditions and discuss potential jurisdictional resources. Based on these two field visits, BC submitted a preliminary jurisdictional determination (PJD) request to the USACE; on May 21, 2020, the USACE issued the initial PJD letter stating they concurred with the BC assessment. The USACE-approved PJD provided Holcim with the information necessary to start planning for mining operations and the disturbance footprint given the locations of jurisdictional resources.

Based on the need for better defining the limits of ephemeral tributaries to Red Creek on the site, a second field reconnaissance was conducted by BC on December 3, 2020. Initially, the first limits between upland non-jurisdictional drainages and ephemeral tributaries were delineated using the dirt road that runs east-west across the property as the basis for the distinction between jurisdictional and non-jurisdictional resources. As such, a second, initial PJD form was submitted to U.S. Army Corps of Engineers (USACE) on January 8, 2021, with the revised stream field review. The revised USACE PJD approval from the USACE was received on November 10, 2022 (BC 2021, Appendix 4.2). A figure of the delineated stream and wetland resources are provided in Appendix 4.2 (BC 2021).

A desktop evaluation of the aquatic resources along the MTAC began in September of 2023 for a PJD associated with this footprint. The corridor evaluation identified drainages within the MTAC that could be jurisdictional based on the observations made with aerial photos, topographic maps, and other readily available desktop data. The MTAC PJD form will be submitted to the USACE upon application completion. USACE correspondences and BC field documents are provided in Appendix 4.2.



Figure 2.7.2-1: 2019 Site Reconnaissance Map

2.7.3 Site Investigations and Characterization

Five groundwater monitoring wells were installed both to the north and south of Red Creek in November 2021. The objective of the well locations was to assess the groundwater elevations near the surface water seeps observed in the Red Creek drainage. The wells were located upstream and downstream of the seep and within approximately 400 feet of the Red Creek canyon edge. Wells were spaced to ensure the data collected from each well was spatially distributed in order to characterize the hydrologic properties of the water bearing units (Figure 2.7.3-1). Wells 2N and 2S were completed in two different lithologies (Fort Hayes Limestone and Codell sandstone) and are in close proximity to each other in order to monitor the hydrologic conditions in both formations. The monitoring well permits are provided in Appendix 4.3.

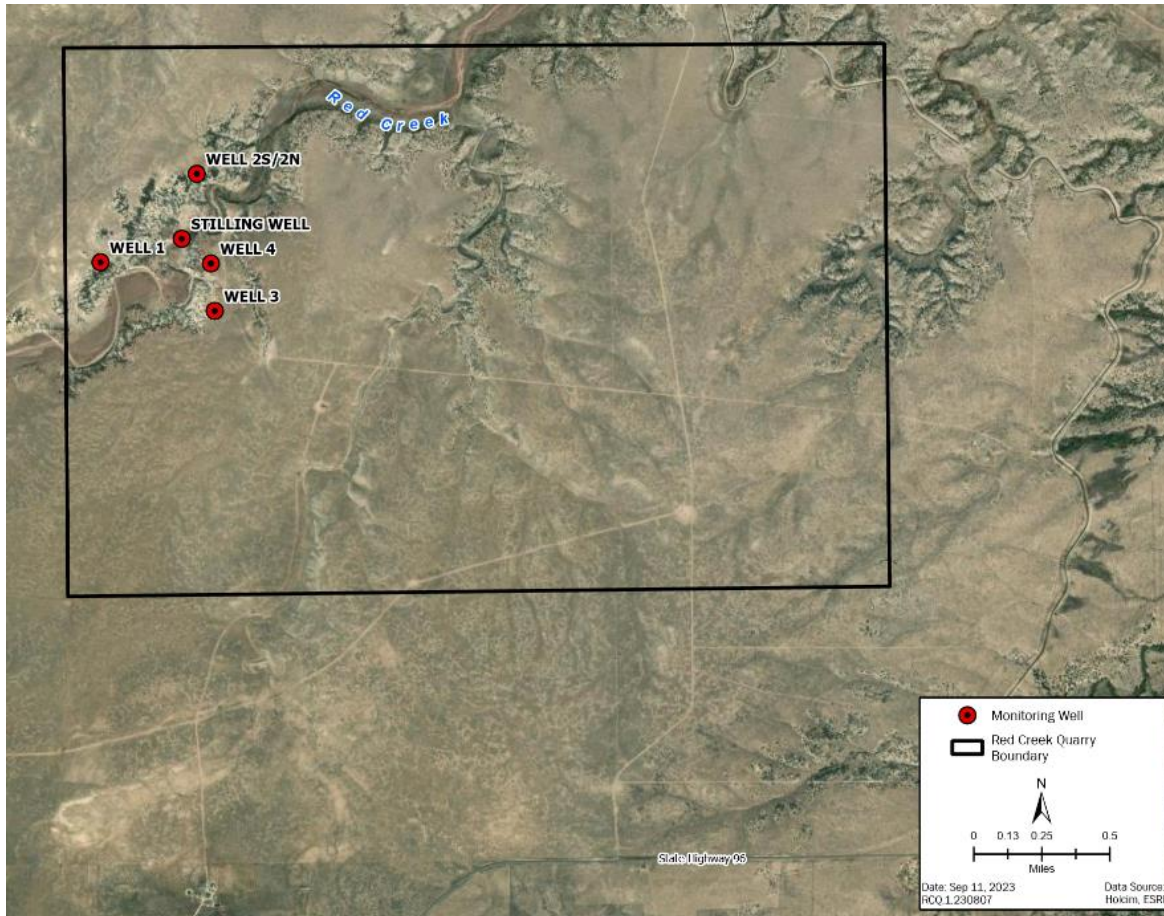


Figure 2.7.3-1: Groundwater Well Location Map

A stilling well was installed along the north side of Red Creek to measure water levels within the saturated alluvium of the creek bed as a proxy measurement of the creek water elevation (Figure 2.7.3-1). The stilling well was drilled using an auger to advance a hole to approximately five feet below ground surface. A five-foot polyvinylchloride (PVC) slotted screen with an end capped was placed into the hole then sand was backfilled in the wellbore up to the surface.

Transducers were installed after development operations in Well 1, Well 2N, Well 2S, Well 3, Well 4, and the Stilling Well to continuously monitor the groundwater levels. Immediately prior to transducer installation, a depth-to water measurement was collected to establish a value between transducer measurement and elevation. Coordinate and elevation data were collected by Holcim for each well casing and adjacent ground surface using survey equipment.

A surface water flow monitoring station consisting of a ramp flume designed to measure flow between 0.1 to 3.5 cubic feet per second (cfs) was installed in August 2022. The location of the flume was selected based on a visual reconnaissance of the stream and the proximity to the surface water seeps.

The Sampling and Analysis Plan (SAP) was implemented during the baseline monitoring and sampling activities. This SAP is designed to collect data to assess potential water resource impacts from mining operations conducted at the RCQ. Constituent loading to surface water and groundwater could occur during mining operations from stormwater runoff or groundwater seepage into mine pits. The SAP establishes methods that will obtain accurate and defensible data by following site-specific and standard operating procedures (SOP). The SAP, provided in Appendix 4.4, will be implemented for all water monitoring and sampling activities during the life of RCQ.

In conjunction with the SAP, the Quality Assurance Project Plan (QAPP) was developed and implemented during the baseline investigation. It is provided in its entirety in Appendix 4.4. The QAPP describes quality assurance/quality control (QA/QC) procedures that will be followed during implementation of the surface water and groundwater data collection. QA is a management function and refers to the systematic planning of procedures, methods, and standards to ensure that data generated by the testing program are suitable for their intended use. QC is process-oriented and focuses on error identification and verification that data meet the established standards. The standards contained in the QAPP will be used for verification and validation of data generated by field personnel and laboratory subcontractors. The QAPP is intended to serve as a guide to field personnel and laboratory subcontractors for QC activities during the monitoring and reporting phases of this project. Specific details for sampling and analyses are provided in the RCQ Baseline Monitoring SAP and SOPs.

2.7.3.1 Groundwater and Surface Water Baseline Study

In a pre-application meeting, DRMS stated five quarterly monitoring events would be required to compile the necessary data to establish baseline water quality. Brown and Caldwell conducted a multi-year baseline investigation to document and characterize the hydrologic system at the RQC quarry site to evaluate if the proposed mining operations will result in the interception of groundwater, and to determine what if any, hydrologic connection may exist between groundwater and the Red Creek perennial surface water. The Red Creek Quarry Baseline Water Investigation is provided in its entirety in Appendix 4.5.

Field activities conducted as part of this investigation included installation of five groundwater monitoring wells, installation of pressure transducers to collect water level data, and the collection of groundwater samples for laboratory analysis. Additional field activities included the installation of a ramp flume and stilling well transducer, visual observation and documentation of surface flow locations, and the collection of surface water samples for laboratory analysis. Groundwater modeling was conducted in support of mine permitting activities to evaluate potential groundwater impacts from planned mining operations at the RCQ. The groundwater modeling report is provided under separate cover.

The results of the five quarterly surface and groundwater monitoring events identified several naturally occurring analytes present at concentrations above regulated water quality standards, including selenium, uranium, radon, and sulfate. Several groundwater and surface water studies conducted by others also found elevated concentrations of these analytes within the same lithological units and similar surface water bodies in Colorado.

Water quality data suggests the source of the surface water within the perennial section of Red Creek is groundwater based on the similarities of major ion and metal concentrations. Surface water concentrations of major ions tend to fall within the ranges observed in samples collected from the groundwater wells. Variations in the water composition of the surface water samples indicate the influence of creek bed sediments, evaporation, precipitation, and multiple groundwater seeps or springs contribute to the water quality and flow in Red Creek.

The baseline study will be extended for four additional calendar quarters in 2024. Due to groundwater and surface water constituent exceedances identified during the five-quarter baseline study, the study will continue in the 2024 calendar year. This will provide additional data that will assist in determining seasonal or weather event related impacts to water quality. Monitoring will recommence in March of 2024 with the analytical suite reduced to exclude constituents that were below detection levels and/or did not have a water quality standard (Table 2.7.3.1-1). The resulting addendum to the Baseline Study (Appendix 4.5) will be submitted to the Division within 60 days of the last day of Q4 2024.

Table 2.7.3.1-1: Justification for Analyte List Reduction

Surface Water		Groundwater	
Analyte	Reason	Analyte	Reason
Ammonia (as N)	No Water Quality Standard	Ammonia (as N)	No Water Quality Standard
Total Phosphorus, Dissolved	93% below detection limit	Total Phosphorus, Dissolved	No Water Quality Standard
Oil and Grease	100% below detection limit	Oil and Grease	No Water Quality Standard
Mercury, Total	100% below detection limit	Mercury, Total	No Water Quality Standard
Mercury, Dissolved	100% below detection limit	Mercury, Dissolved	100% below detection limit
Hexavalent Chromium	100% below Water Quality Standard	Hexavalent Chromium	No Water Quality Standard
Trivalent Chromium	100% below Water Quality Standard	Trivalent Chromium	No Water Quality Standard
Radium 226	No Water Quality Standard	Radium 226	100% below detection limit
Radium 228	No Water Quality Standard	Radium 228	100% below Water Quality Standard
2-Chlorophenol	No Water Quality Standard	2-Chlorophenol	100% below detection limit

2.7.3.2 Groundwater Modeling

Groundwater flow modeling (Modflow) was performed on Red Creek to estimate the potential rates of groundwater entering the RCQ. In addition, the model was used to estimate potential mining impacts to Red Creek. The technical memo is provided in its entirety as Appendix 4.6. The site conceptual model was built on available data in the area and information obtained from the existing Holcim mine plan Leapfrog model. The site-specific Leapfrog geologic model includes the base Codell Sandstone, overlying Fort Hayes Limestone, and additional overlying sediments. The contact between the Codell and Fort Hayes dips toward the north across the site. Groundwater occurs primarily within the Codell Sandstone and within the lower portion of the Fort Hayes limestone in localized areas. Sediments overlying the Fort Hayes are generally unsaturated.

Based on conservatively high potential impacts to the Codell, it was determined that the rate of groundwater entering the quarry may increase from Mine Plan Block 0-10 through Mine Plan Block 20-30. Following Mine Plan Block 20-30 the pit floor elevations are above the interpolated water table and are therefore dry. The evaluation of mining impacts to Red Creek suggested no significant influence on the creek.

The model results discussed represent a simplistic assessment for mining influence on groundwater in RCQ. To improve and extend model predictions beyond Mine Plan Block 20-30, additional groundwater monitor wells will be installed throughout the site as mining progresses into Year 20-30 block. Holcim commits to submitting a technical revision in the event modeling indicates unforeseen groundwater exposure.

2.7.4 Potential Mining Impacts to Water Quality and Quantity

Based on groundwater modeling, mining will not impact water quantity in Red Creek. To be protective of water quality, Holcim will implement a surface and groundwater monitoring plan.

2.7.4.1 Monitoring Plan

Surface and groundwater monitoring will continue on a semi-annual basis between the end of the baseline study and commencement of mine development in Section 24. The analytical suite will be the reduced suite approved by the Division for the 2024 sampling events. Sampling and monitoring will occur during the second calendar quarter (April thru June) and fourth calendar quarter (October thru December) each year. Reporting will occur no more than 30 days after the end of the sampling quarter. The second calendar quarter report will be submitted by August 1 of each year. The fourth calendar quarter report will be submitted by February 1st of the following year.

Surface and groundwater monitoring will recommence on a quarterly basis two calendar quarters prior to mine development in Section 24. The analytical suite will include analytes listed in Tables 2.7.4.1-1 and 2.7.4.1-2 below. Monitoring reports will be submitted to the Division within 30 days of the last day of the monitoring quarter. Any changes to the monitoring program will be submitted to Division as a request for a Technical Revision.

Groundwater locations will include Well 1 that lies north of Red Creek, and Wells 3 and 4 that lie south of Red Creek. Two wells will be monitored south of Red Creek because the groundwater shows natural variation in water quality as observed during the baseline water quality program. Surface water will be sampled at the seep and at SW RC2. SW RC2 is the furthest east location thus it is the most downgradient surface water location. Groundwater level data will be collected using the installed pressure transducers during the interim monitoring program. Red Creek flow data will be collected at the flume using the installed pressure transducer. Transducer data will be downloaded and reviewed quarterly.

The following analytical suite for surface and groundwater samples is proposed based on the results of the Baseline Study (Tables 2.7.4.1-1 and 2.7.4.1-2). The analyte lists are the same for surface and groundwaters to be able to evaluate the connection between the water quality for both types of water. After three years of monitoring, Holcim will submit a Technical Revision requesting a reduction of the analytical suite for those constituents with concentrations that are consistently below instrument detection limits or below regulatory standards.

In the event of a water quality exceedance, Holcim will notify the appropriate regulatory agency and implement an Adaptive Management Plan (AMP) strategy. An AMP strategy allows for the inclusion of knowledge gained and adaptation of mitigation measures as mining operations evolve. The basic AMP process includes the following steps:

1. Identify source of exceedance and operational uncertainties;
2. Quantify impacts;
3. Evaluate strategies and mitigation implementation; and
4. Monitor the performance.

Table 2.7.4.1-1 Surface Water Analyte Lists

Surface Water Samples				
Analyte	Fraction	Method	Method Detection Limit (mg/l)	WQCC Surface Water Regulation 32 (µg/L)
<i>Inorganic</i>				
Nitrate	Dissolved	E300.0	0.006	100,000
Nitrite	Dissolved	E300.0	0.003	500
Phosphorus	Dissolved	E365.1	0.008	110
Sulfate	Dissolved	E300.0	0.4	-
Sulfide	Dissolved	SM4500-S2	0.35	2
<i>Metals and Metalloids</i>				
Aluminum	Dissolved	200.8	0.02	-
Antimony	Dissolved	200.8	0.0001	-
Arsenic	Total and Dissolved	200.8	0.0005	340
Barium	Dissolved	200.7	0.002	-
Beryllium	Dissolved	200.7	0.0013	-
Boron	Dissolved	200.7	0.0074	-
Cadmium	Dissolved	200.8	0.00005	2.03
Chromium	Dissolved	200.8	0.0005	-
Chromium III	Total and Dissolved	SM3500-CR B	0.009	231
Chromium VI	Dissolved	SM3500-CR B	0.009	11
Cobalt	Dissolved	200.7	0.0023	-
Copper	Dissolved	200.7	0.0023	29.3
Iron	Dissolved	200.7	0.0031	-
Lead	Dissolved	200.8	0.00013	10.9
Manganese	Dissolved	200.8	0.0004	2,618
Mercury	Total	245.1		-
Molybdenum	Total	200.8	0.00025	-
Nickel	Dissolved	200.8	0.001	168
Selenium	Dissolved	200.8	0.0003	4.6
Silver	Dissolved	200.8	0.000025	3.5
Thallium	Dissolved	200.8	0.00005	-
Uranium	Dissolved	200.8	0.00005	6,915
Vanadium	Dissolved	200.7	0.0007	428
Zinc	Dissolved	200.8	0.0025	-
<i>Radiological</i>				
Gross Alpha Particle Activity	Total			-
<i>Other</i>				
Oil and grease	Total	E1664A	3	-
TDS	Total	SM2540C	5	-
TSS	Total	SM2450D	2.5	-

Table 2.7.4.1-2 Groundwater Analyte Lists

Groundwater Samples				
Analyte	Fraction	Method	Method Detection Limit (mg/l)	WQCC Groundwater Regulation 41 (µg/L)
<i>Inorganic</i>				
Nitrate	Dissolved	E300.0	0.006	10
Nitrite	Dissolved	E300.0	0.003	1
Phosphorus	Dissolved	E365.1	0.008	-
Sulfate	Dissolved	E300.0	0.4	250
Sulfide	Dissolved	SM4500-S2	0.35	-
<i>Metals and Metalloids</i>				
Aluminum	Dissolved	200.8	0.02	5,000
Antimony	Dissolved	200.8	0.0001	6
Arsenic	Dissolved	200.8	0.0005	10
Barium	Dissolved	200.7	0.002	2,000
Beryllium	Dissolved	200.7	0.0013	4
Boron	Dissolved	200.7	0.0074	750
Cadmium	Dissolved	200.8	0.00005	5
Chromium	Dissolved	200.8	0.0005	100
Chromium +3	Dissolved	SM3500-CR B	0.009	-
Chromium +6	Dissolved	SM3500-CR B	0.009	-
Cobalt	Dissolved	200.7	0.0023	50
Copper	Dissolved	200.7	0.0023	200
Iron	Dissolved	200.7	0.0031	300
Lead	Dissolved	200.8	0.00013	-
Manganese	Dissolved	200.8	0.0004	50
Mercury	Dissolved	245.1		2
Molybdenum	Dissolved	200.8	0.00025	210
Nickel	Dissolved	200.8	0.001	100
Selenium	Dissolved	200.8	0.0003	20
Silver	Dissolved	200.8	0.000025	50
Thallium	Dissolved	200.8	0.00005	2
Uranium	Dissolved	200.8	0.00005	16.8
Vanadium	Dissolved	200.7	0.0007	100
Zinc	Dissolved	200.8	0.0025	2,000
<i>Radiological</i>				
Gross Alpha Particle Activity	Total	E900.0	-	15
<i>Other</i>				
Oil and grease	Total	E1664A	3	-
TDS	Total	SM2540C	5	-
TSS	Total	SM2450D	2.5	-

2.7.4.2 Points of Compliance

Two wells that will be used as Points of Compliance (POC) will be constructed along the banks of Red Creek and within the north permit boundary. Point of Compliance Well #1 (POC-1) will be constructed prior to commencement of mine development in Section 24. Point of Compliance Well #2 (POC-2) will be constructed one year prior to activity in Mine Block Years 20 – 30. Figure 2.7.4.2-1 shows the location of the wells to be downgradient from mining activity and in an area within the permit boundary that will not be disturbed during the life of the mine. Mine development is not anticipated for up to 18 months. Holcim commits to submitting a Technical Revision regarding construction of POC-1 within 90 days of any disturbance within Section 24.

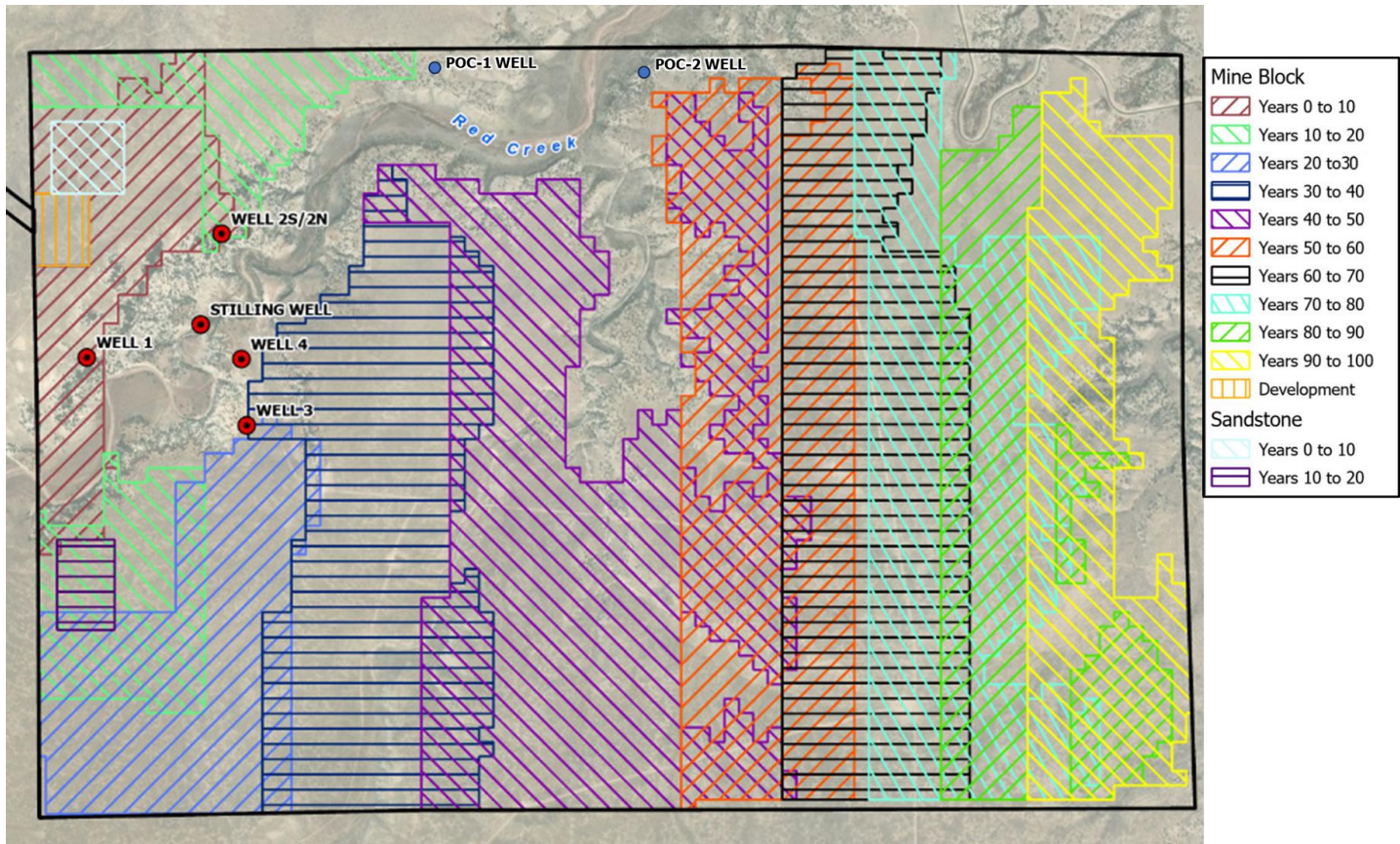


Figure 2.7.4.2-1: Approximate location of the future POC well

2.7.5 Mine Water Source and Uses

Water will be needed at the RCQ Mine Site for both dust suppression and sanitary purposes. Holcim has anticipated the need for two groundwater wells to provide the supply for these uses. Well siting will occur in 2024 and applications for well permits will be submitted to the Division of Water Resources once the well locations have been selected. It is anticipated that these wells will be installed in 2025. The replacement supplies for potential depletions in 2025 will continue to be a long-term lease of fully consumable water from Pueblo Board of Water Works (PBWW), which is currently being used to cover depletions at the BCQ, pursuant to the Holcim augmentation plan decreed in Case No. 16CW3102. Terms of the water lease provide for up to 175 acre-feet per year of replacement water to cover depletions from both the Holcim Bear Creek Quarry and the Holcim Wetlands SWSP/16CW3102 Decree on an annual basis. The lease also provides Holcim the option to renew through December 2039. The request for

Substitute Water Supply Plan is provided in its entirety in Appendix 4.7. An approval from Division of Water Resources (DWR) will be obtained prior to exposing groundwater.

2.7.5.1 Dust Suppression

Water needed for dust suppression is dependent on the amount of product mined and the mining operations. Holcim will be utilizing a more efficient mining process that reduces equipment impacts and dust. Dust suppression systems will also be installed on the conveyor system that transports mined product to the cement plant. Dust suppression projections for the BCQ estimated a maximum use of 70 acre-feet per year. However, the RCQ would likely only need 60% of that amount, or approximately 40 acre-feet per year once mining begins.

Dust suppression needs during construction are difficult to estimate. Therefore, water pumped from the wells for this use will be measured and reported, but are not expected to exceed 20 acre-feet per year. Dust suppression uses will be considered 100% consumptive.

2.7.5.2 Sanitary Needs

Typical water use at the BCQ and Cement Plant for domestic needs (bathrooms, kitchen) are on the order of 30 acre-feet per year for 25 staff. The RCQ site will have approximately 25 staff, and so these uses are estimated to be only 1 to 2 acre-feet per year (based on typical per capita usage). These uses are considered to be 10% consumptive, with the remaining water returning to the groundwater system through a septic/leach field system.