DISTRICT COURT, WATER DIVISION 2, COLORADO Pueblo County Courthouse Pueblo Judicial Building 501 North Elizabeth Street, Suite 116 Pueblo, Colorado 81003	DATE FILED: April 29, 2019 9:55 AM CASE NUMBER: 2016CW3102 **▲COURT USE ONLY▲**
CONCERNING THE APPLICATION FOR WATER RIGHTS OF: **HOLCIM (US) INC.** IN FREMONT AND PUEBLO COUNTIES.	Case Number: 16CW3102
FINDINGS OF FACT, CONCLUSIONS OF LAW, JUDGMENT AND DECREE	

This matter, having come before the Court on the application of Holcim (US) Inc., and the Court, having considered the pleadings, the comments of the Division Engineer, and being otherwise fully advised in the premises does hereby find and conclude as follows:

FINDINGS OF FACT

1. The Applicant is:
Holcim (US) Inc. ("Holcim")
c/o Derrick Dease, Area Environmental Manager
3500 State Highway 120
Florence, CO 81226
Telephone: 719-288-1423

2. **Application and Dismissal of Nontributary Claim.** Holcim filed the Application in this matter on December 30, 2016, seeking a nontributary underground water right, approval of a change of water rights, and approval of a plan for augmentation. An Amended Application was filed on January 6, 2017. On September 27, 2018, Holcim filed its Unopposed Motion Pursuant to C.R.C.P. 41(a)(2) for Voluntary Dismissal Without Prejudice of its Claim for a Nontributary Ground Water Right ("Motion"). The Court granted the Motion on September 27, 2018, and as requested in the Motion, ruled that Holcim's claim for nontributary groundwater right and related augmentation plan component described in the Amended Application were dismissed without prejudice and that Holcim will not re-file the claim for nontributary underground water right for five years from the date of said Order unless Holcim obtains the advance written consent from the City of Florence.

3. **Notice and Jurisdiction**. Pursuant to C.R.S. § 37-92-302(3), notice of this action was published in the Pueblo Chieftain on January 14, 2017, and in the Cañon City Daily Record on January 20, 2017. The Court has jurisdiction over the subject matter of these proceedings and over all parties affected thereby, whether or not they have appeared. The land and water rights in this case are not included within the boundaries of any designated ground water basin.

4. **Statements of Opposition.** Statements of opposition were filed by the City of Aurora; the City of Florence; the Arkansas Valley Ditch Association; the Board of Water Works of Pueblo, Colorado; the City of Colorado Springs, acting by and through its enterprise Colorado Springs Utilities; PC Water, LLC; Penrose Water District and Tri-State Generation and Transmission Association, Inc. The State Engineer and Division Engineer for Water Division 2 filed an unopposed motion to intervene on October 11, 2017, which the Referee granted by order dated October 12, 2017.

5. **Stipulations.** The following parties have withdrawn their Statements of Opposition or have entered a stipulated settlement with Holcim that has been approved by the Court.

   5.1. Tri-State Generation and Transmission Association, Inc. withdrew its Statement of Opposition on October 25, 2018.

   5.2. PC Water, LLC entered into a stipulation on November 16, 2018, which was approved by Court Order entered November 19, 2018.

   5.3. City of Aurora entered into a stipulation on December 11, 2018, which was approved by Court Order entered December 13, 2018.

   5.4. Board of Water Works of Pueblo, Colorado entered into a stipulation on January 4, 2019, which was approved by Court Order entered January 7, 2019.

   5.5. City of Florence entered into a stipulation on February 19, 2019, which was approved by Court Order entered February 20, 2019.

   5.6. Arkansas Valley Ditch Association entered into a stipulation on February 27, 2019, which was approved by Court Order entered February 28, 2019.

   5.7. The City of Colorado Springs, acting through its enterprise, Colorado Springs Utilities, entered into a stipulation on February 28, 2019, which was approved by Court Order entered March 1, 2019.

   5.8. Penrose Water District entered into a stipulation on March 15, 2019, which was approved by Court Order entered March 21, 2019.

5.9. The State Engineer and the Division Engineer for Water Division No. 2 entered into a stipulation on April 10, 2019, which stipulation (as amended on April 15, 2019 to substitute the correct version of proposed decree) was approved on April 15, 2019.

6. **Summary of Consultation.** The Division Engineer consulted with the Water Referee concerning the Application and filed a Summary of Consultation on March 10, 2017. Holcim filed a response to the Summary of Consultation on April 14, 2017.

7. **Re-Referral.** The Water Judge referred this case to the Referee on January 3, 2017. The case was re-referred to the Water Judge on August 28, 2018.

8. **Introduction.** Holcim is the owner and operator of a limestone quarry ("Quarry") and cement manufacturing plant ("Plant") located east of Florence, in Fremont County, Colorado. The Arkansas River bisects the Holcim property, with the Plant located south of the river, and the Quarry currently located north of the river. The location of the Plant and Quarry, including the current mine permit boundary, are shown on **Exhibit A**. Holcim owns numerous direct flow water rights that it uses to operate the Plant and which are not the subject of this Decree. Holcim's operations cause certain lagged depletions not related to Plant operations which are the subject of the augmentation plan described herein. Specifically, Holcim's limestone mining operation in the Quarry has created several ponds which result in evaporative depletions (collectively, the "Quarry Ponds"). Holcim also pumps water from the Quarry Ponds which it uses for dust suppression. Finally, Holcim constructed a wetlands area adjacent to the Arkansas River ("Wetlands"), which currently causes net depletions from both evaporation and evapotranspiration. Holcim has replaced these depletions over several years pursuant to Substitute Water Supply Plans approved by the Division of Water Resources. Holcim seeks court approval of an augmentation plan for replacement of Applicant's depletions in the Quarry and Wetlands. Finally, Holcim seeks to a change a water right originally decreed to the Davis and McCumber Ditch, from irrigation to industrial/mining/manufacturing, dust suppression, commercial, augmentation, replacement, mining reclamation, and irrigation for mining reclamation.

9. **Property Location.**

The "Subject Property" is owned by Holcim and is generally described as follows: portions of Section 8 (SE1/4 and portions of the E1/2 of the SW1/4, portions of the SE1/4 of the NW1/4 and portions of the S1/2 of the NE1/4), Section 9 (S1/2 and portions of the N1/2 of the SW1/4, portions of the SW1/4 of the NW1/4, and the SW1/4 and portions of the NW1/4 of the SE1/4), Section 12 (E1/2 of the SE1/4 and the SW1/4 of the SE1/4), Section 13 (E1/2 and the S1/2 of the SW1/4), Section 14 (portion of the S1/2 of the SE1/4), Section 15 (portion of the SE1/4), Section 16 (all), Section 17 (E1/2; NW1/4; E1/2 of the SW1/4 and a portion of the NW1/4 of the SW1/4), Section 18 (portions of the E1/2 of the NE1/4 and portions of the NE1/4 of the SE1/4), Section 20 (NE1/4 and portions of the SE1/4, portions of the E1/2 of the NW1/4, and portions of NE1/4 of the SW1/4), Section 21 (N1/2; W1/2 and portions of the E1/2 of the SW1/4 and portions of the W1/2

of the SE1/4), Section 22 (N1/2 and portions of the N1/2 of SW1/4 and portions of the SE1/4 of the SW1/4, and portions of the SE1/4), Section 23 (N1/2, SW1/4, and portions of the SE1/4 of the SW1/4, N1/2 of the SE1/4, and portions of the SW1/4 of the NE1/4), Section 24 (S1/2; NE1/4; and the E1/2, NW1/4, and a portion of the SW1/4 of the NW1/4), Section 26 (a portion of the E1/2 of the NW1/4), Section 28 (portion of the NW1/4 of the NW1/4), and Section 29 (a portion of the N1/2 of the NE1/4), Township 19 South, Range 68 West of the 6th P.M., Fremont County, Colorado, and Section 18 (W1/2 of the NW1/4 and W1/2 of the SW1/4) and Section 19 (NW1/4 and the W1/2 of the SW1/4), Township 19 South, Range 67 West of the 6th P.M., Pueblo County, Colorado, totaling approximately 5,183.25 acres, and excluding therefrom public road rights-of-way, including but not limited to U.S. Highway 50, Colorado State Highway 120, and Fremont County Road 115. The Subject Property is generally depicted on the map attached as **Exhibit B** hereto. Applicant owns additional lands in Fremont and Pueblo Counties, State of Colorado. Such additional lands include a 250-foot wide strip of land, located in sections 28, 33 and 34 in Township 19 South, Range 68 West and Sections 3, 10, 14, 15, and 23, in Township 20 South, Range 68 West, 6th P.M., Fremont County, and an approximately 3,795-acre parcel of land located in Sections 24 and 25, Township 20 South, Range 68 West, 6th P.M., Fremont County, and Sections 19, 20, 29, and 30, Township 20 South, Range 67 West, 6th P.M., Pueblo County, adjacent to such strip and located south and east of the Subject Property (all as more particularly described in the deed recorded at reception no. 889838 in the office of the Fremont County Clerk and Recorder and in the deed recorded at reception no. 1887257 in the office of the Pueblo County Clerk and Recorder) (such strip and parcel are referred to herein as the "Reserve Property").

CHANGE OF WATER RIGHT

10. **Name of Structure.** Davis and McCumber Ditch (Priority No. 273/Hayner Ditch Water Right).

11. **Previous decrees.** Water rights were originally decreed to the Davis and McCumber Ditch in a general adjudication dated February 3, 1894, in Fremont County, Colorado. The decree confirmed a total of 0.6 cfs under Priority No. 273 based upon the claim of Sylvester Davis, Holcim's predecessor in interest.[1] The point of diversion of Priority No. 273 was changed to the Hayner Ditch headgate in Case No. 4670, decree dated March 15, 1926, Fremont County District Court. There was and is no other water right decreed to the Hayner Ditch; therefore, this Ruling refers hereinafter to this priority as the Hayner Ditch Water Right.

12. **Appropriation Date:** May 31, 1882.

13. **Legal description of structure.** The Hayner Ditch headgate is decreed to be located on the South bank of the Arkansas River, at a point 650 feet South and 900 feet East of the

[1] Other water rights were also decreed to the Davis and McCumber Ditch in the same general adjudication. Another 1 cfs originally decreed to the Davis and McCumber Ditch (Priority No 33) was transferred to the Canon Ditch, and the remaining 0.93 cfs remained in the Davis and McCumber Ditch. These priorities are not the subject of this Decree.

Northwest corner of Section 21, Township 19 South, Range 68 West, of the 6th P.M. in Fremont County, Colorado and shown on **Exhibit A**.

14. **Decreed source of water.** Arkansas River.

15. **Historical Use.** The Hayner Ditch Water Right was decreed for irrigation use and historically diverted water from the south bank of the Arkansas River to irrigate up to 56.2 acres. While the original 1894 decree for the Davis & McCumber Ditch referenced an irrigated acreage of 58.5 acres, it did not specify what amount of acres were supported by the Davis right (Priority No. 273) in its transfer to the Hayner Ditch. In his testimony during the original Davis & McCumber Ditch adjudication, Mr. Davis made a claim for irrigation of 38.75 acres of the total of 94.5 acres for which claims were made for the Davis & McCumber Ditch, which was approximately 41% of the irrigated area claimed for the Davis & McCumber Ditch, and which would equal an upper limit of lawful irrigation by the Hayner Ditch Water Right of 24 acres.

15.1. Holcim's engineering consultant performed an analysis of the historical use of water diverted under the Hayner Ditch Water Right. Key components of that analysis included:

15.1.1. Overall Methodology. The historical use analysis was performed by estimating the irrigation water requirement (IWR) for alfalfa in the vicinity of Canon City from 1930-2014, using a Blaney-Criddle ET methodology for estimating potential evapotranspiration (ET) as contained in the Colorado Decision Support Systems (CDSS) StateCU Model and climate data from Canon City. Monthly diversions (reduced by 50% for both ditch loss and farming inefficiencies) were then compared to the IWR, with the lesser value being selected as the consumptive use for the month in question. As described in more detail in subparagraph 15.1.4, the analysis treated irrigation occurring from 1986-2014 as zero consumptive use years for purposes of determining average annual consumptive use.

15.1.2. Diversions. Diversion records available through the CDSS show both daily and monthly diversions through the Hayner Ditch from 1930-1985, occurring generally from April through October, with a handful of diversions in March and November. The average diversion for this time period was 101.47 acre-fee per year. In 1971, Holcim acquired the Hayner Ditch Water Right and the land that was historically irrigated under the Hayner Ditch and, in 1980, leased the Hayner Ditch lands for continued irrigation of alfalfa hay. Daily diversion records from the ditch headgate are available through 1985.

15.1.3. Irrigated Acreage/Crop Types. Water Commissioner field notes from 1950-1969 indicate 45 acres irrigated under the Hayner Ditch in 1950 (mainly

alfalfa), 40 in 1951, 30 in 1952, and 17-18 acres from 1953-1969. No data is available from these field notes on cropping from 1970-1979. Historical aerial photographs from Water Division 2 show approximately 56.2 and 40 acres of potentially irrigated land in 1954 and 1972, respectively. Holcim and certain opposers dispute the amount of acreage that could have been lawfully irrigated by the Hayner Ditch Water Right. Although Holcim believes an upper limit of 24 lawfully irrigated acres is appropriate, to resolve this dispute Holcim has agreed to limit the lawfully irrigated acres for the Hayner Ditch Water Right to a maximum of 13.9 acres in the analysis. As further described below, this reduction yielded an average annual historical consumptive use for this right of 17.15 acre-feet.

15.1.4. Consumptive Use. Based on these data and the reduced lawful irrigated acreage, the analysis found that the Hayner Ditch Water Right yielded an average annual consumptive use from 1930-1985 of 26.9 acre-feet/year. Although irrigation occurred for a portion of the historical acreage from 1986 to 2014, the analysis did not take credit for any consumptive use occurring during this time period because diversions occurred at an undecreed point of diversion. Therefore, the analysis showed an average annual consumptive use for 1930 to 2014 of 17.15 acre-feet/year for the Hayner Ditch Water Right. The monthly historical consumptive use for the Hayner Ditch is shown in Table 1:

Table 1 – Hayner Ditch Historical Consumptive Use

Month	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Historical Consumptive Use (AF)	0.00	0.00	0.00	0.75	2.65	3.88	4.39	3.36	1.70	0.41	0.00	0.00	17.15

15.1.5. Return Flows. Water that was diverted under the Hayner Ditch Water Right, but not consumptively used by the crop, returned to the river either as surface drainage from the irrigated fields or as ground water via the alluvial aquifer. Holcim's engineering consultant performed an analysis of the historical return flows attributable to irrigation from the Hayner Ditch Water Right, using the following process:

15.1.5.1. Historical consumptive use (determined in November 2017 as 23.32 acre-feet) was subtracted from monthly historical diversions to determine total return flow volume during the irrigation season.

15.1.5.2. Total return flow volume was divided into 40% attributable to surface return flow and 60% attributable to ground water return flow.

15.1.5.3. Ground water return flow volume was lagged to the river using the Glover methodology as contained in the Integrated Decision Support (IDS) Alluvial Water Accounting System (AWAS), with the following assumptions:

- Transmissivity of the alluvial aquifer = 40,000 gpd/ft;
- specific yield = 0.2;
- width of the alluvial aquifer = 3,000 feet (measured distance); and
- average distance of ground water flow back to the river = 1,056 feet (measured distance).

15.1.5.4. The average sum of surface water return flows and lagged groundwater return flows for the study period of 1930-2014 based on this analysis is summarized in Table 2 below.

Table 2 – Hayner Ditch Water Right Return Flows

Month	Hayner Ditch Surface Water Return Flows (AF)	Hayner Ditch Lagged Groundwater Return Flows (AF)	Hayner Ditch Total Return Flows (AF)
January	0.00	1.05	1.05
February	0.00	0.83	0.83
March	0.11	0.70	0.82
April	1.00	0.91	1.91
May	3.26	1.93	5.19
June	3.55	3.05	6.60
July	3.38	3.56	6.93
August	2.90	3.69	6.58
September	1.63	3.31	4.94
October	0.69	2.59	3.27
November	0.03	1.86	1.89
December	0.00	1.34	1.34
Total	16.54	24.82	41.36

16. **Proposed change.**

16.1. Alternate Types of Use: Holcim seeks to change the use of the Hayner Ditch Water Right from irrigation use to use for industrial/mining/manufacturing, dust suppression, commercial, augmentation, replacement, mining reclamation, and irrigation for mining reclamation (the "Changed Uses"). The Changed Uses may be accomplished prior to or after storage in one or more reservoirs which may be constructed on the Subject Property or the Reserve Property. The Changed Uses may be accomplished on the Subject Property, the Reserve Property, and any property owned or acquired by Holcim or its successors in interest that is adjacent to the Subject Property or the Reserve Property.

16.2. New Point of Diversion: Holcim also seeks to change the point of diversion for the Hayner Ditch Water Right to the Holcim Portland Plant pumping station on the Arkansas River aka the Ideal Pumping Plant ("Ideal Pumping Plant"), the decreed location of which is on the south bank of the Arkansas River at a point which is 79 West 431 feet from the Northeast Corner of Section 20, Township 19 South, Range 68 West, 6th P.M., Fremont County. The consumptive use and irrigation season return flow components of historical diversions on the Hayner Ditch Water Right will be diverted in priority, measured and returned to the Arkansas River at the Ideal Pumping Plant, located approximately 1,130 feet upstream of the Hayner Ditch headgate. There are no intervening water rights between the Ideal Pumping Plant and the Hayner Ditch headgate. Holcim's diversions under the Hayner Ditch Water Right at the Ideal Pumping Plant are limited to the amount of water that is physically and legally available at the Hayner Ditch headgate, which diversions shall not exceed 0.6 cfs. Because the historical Hayner Ditch headgate is no longer operable, Holcim may show such legal and physical availability by demonstrating that water is physically and legally available for diversion under the Changed Hayner Ditch Water Right at the Ideal Pumping Plant. Monthly accounting by Holcim will allow for historical consumptive use credits from the transfer of the Hayner Ditch Water Right to be used during the irrigation season for replacement of depletions, or at other times after storage in and release from one or more reservoirs which may be constructed on the Subject Property or the Reserve Property.

16.3. Return Flow Factors/Determination of Amount and Location of Consumptive Use Credit: Monthly return flow factors ("RFFs"), based on the average return flows over the study period, will be applied to monthly diversions to determine irrigation season and non-irrigation season return flow obligations. Holcim will have no obligation to replace return flows until Holcim has used the Hayner Ditch Water Rights for the Changed Uses. During such time, Holcim shall leave the Hayner Ditch Water Rights in the Arkansas River. Once Holcim has used the Hayner Ditch Water Rights for the Changed Uses, it will replace historical return flows at times when the return flows would have accrued to the stream and there is a call from a

downstream water right or an intervening exchange senior to December 30, 2016. Table 3 summarizes RFFs that will be applied to measured Hayner Ditch in-priority diversions to determine consumptive use credits and return flow obligations. To determine consumptive use credit, irrigation season RFFs will be multiplied by irrigation season diversions in that month and the consumptive use credit will be the difference between the diversion and the return flow obligation in that month. Non-irrigation season RFFs will be multiplied by the previous season's total delivery to get the return flow obligations during the non-irrigation season. If there is a downstream call senior to December 30, 2016, historical return flows during the winter months will be a replacement obligation in Holcim's plan for augmentation decreed herein. Consumptive use credits will be taken at the historical location of the Hayner Ditch headgate, which is downstream of Portland stream gage, located near Holcim's Portland Plant in the SE1/4 of Section 17, T19S, 68W, 6th P.M. (Latitude 38°23'18", Longitude 105°00'56") (the "Portland Gage"), and the upstream of the confluence of Bear Creek and the Arkansas River.

16.4. Volumetric Limits on Consumptive Use. The future consumptive use credits under the changed Hayner Ditch Water Right will be subject to the following volumetric limits:

16.4.1. Maximum monthly and annual consumptive use credits are calculated as the maximum that occurred for each month and year in the study period (assuming a maximum of 13.9 lawfully irrigated acres during such period), and are shown in Table 3 below.

Table 3 – Hayner Ditch Return Flow Factors and Volumetric Limitations

Month	Hayner Ditch Irrigation Season RF Factors	Hayner Ditch Non-Irrigation Season RF Factors[a]	Maximum CU Credit (AF/yr)	20-yr Rolling Average Diversion Limits (AF/yr)	Maximum Diversion Limits (AF/yr)
January	n/a	0.016	0.00	0.00	0.00
February	n/a	0.013	0.00	0.00	0.00
March	n/a	0.013	0.00	0.31	20.63
April	0.552	n/a	7.20	3.46	32.13
May	0.438	n/a	11.03	11.86	36.89
June	0.474	n/a	11.23	13.93	35.70
July	0.487	n/a	13.82	14.25	36.89
August	0.563	n/a	11.53	11.69	36.89
September	0.748	n/a	8.93	6.60	35.70
October	n/a	0.051	5.95	2.49	30.94
November	n/a	0.029	0.00	0.09	6.94

Month	Hayner Ditch Irrigation Season RF Factors	Hayner Ditch Non-Irrigation Season RF Factors[a]	Maximum CU Credit (AF/yr)	20-yr Rolling Average Diversion Limits (AF/yr)	Maximum Diversion Limits (AF/yr)
December	n/a	0.021	0.00	0.00	0.00
Total	n/a	n/a	41.53	64.69	195.17

a. October return flows will be determined by multiplying the October return flow factor by the sum of the Hayner Ditch headgate diversions for the months of April through September. If there is water available for diversion in October, the CU credit will be the difference between the diversion amount and the return flow obligation, subject to the maximum CU credit shown above.

16.4.2. In addition, consumptive use credits shall not exceed 343 acre-feet over a 20-year rolling average.

17. **Dry-Up.** The Hayner Ditch headgate and initial segment of the Ditch no longer exist. The areas historically irrigated by the Hayner Ditch Water Right have been dried-up by the placement of fill material, which is not amenable to plant growth and which raises the ground elevation so as to prevent use of the Hayner Ditch on the historically irrigated acreage. The Hayner Ditch irrigated acreage, now dried-up, is depicted on **Exhibit C**, and has been identified to the satisfaction of the Division Engineer.

PLAN FOR AUGMENTATION:

18. Holcim seeks a ruling that its plan for augmentation to replace out-of-priority lagged depletions caused by Quarry Pond evaporation, water pumped from the Quarry Ponds for dust suppression, and evaporation and evapotranspiration from the Wetlands will not cause injury to any owner or persons entitled to use water under a vested water right or a decreed conditional water right. The plan for augmentation is detailed below.

19. **Structures to Be Augmented.**

19.1. Quarry Ponds: The Holcim Quarry currently includes 1,392 acres of active mining. The Quarry is bisected from north to south by the original streambed of Bear Creek, a tributary to the Arkansas River. Currently, the western portion of the Quarry is used for placement of overburden and cement kiln dust from the cement manufacturing process, and the eastern portion includes active mining of the Fort Hays Limestone. Mining operations at the Quarry have resulted in the interception of surface water and shallow subsurface return flows from upland irrigation of lands under the Beaver Park irrigation system, that prior to the Quarry, would have flowed into Bear Creek and the Arkansas River. The intercepted water is collected in various ponds that periodically appear and disappear within the Quarry, and then is either pumped back directly to the Arkansas River or consumptively used through

evaporation or for dust suppression. Historically, the Quarry Ponds included three major ponds known as the North Pond, the East Pond, and the Glory Hole Sump, all of which are located in the upper Codell Sandstone that underlies the Fort Hays Limestone mined in the Quarry. However, the Glory Hole Sump has recently been filled and no longer results in depletions from evaporation. A fourth pond area has recently developed in an area known as the Sand Pit, on the western side of the active quarry. As a result, for the purposes of this plan for augmentation, the "Quarry Ponds" refers to the North Pond, East Pond, and the Sand Pit. The East Pond collects surface and shallow subsurface irrigation return flows from irrigated lands under the Beaver Park irrigation system that discharge into the Quarry from the surface along the eastern Quarry wall and through a culvert in the northeastern corner of the Quarry. The water is pumped from the East Pond and discharged to the Arkansas River, pursuant to Holcim's Colorado Pollutant Discharge Elimination System permit. Holcim plans to continue to pump water from the East Pond. In the event Holcim decides to discontinue pumping from the East Pond, Holcim will, in addition to replacing any lagged depletions attributable to that pond in accordance with this Decree, either backfill the East Pond so it no longer collects water or it will account for a "first fill." Lagged depletions attributable to the Quarry Ponds and requiring replacement are further described in paragraphs 20.1 and 20.2.

19.2. Location of Quarry Ponds:

19.2.1. The North Pond is located in the NW1/4 of the NE1/4 of Section 17, Township 19S, Range 68W in the 6th P.M., Fremont County, Colorado.

19.2.2. The East Pond is located in the N1/2 of the NE1/4 of Section 21, Township 19S, Range 68W of the 6th P.M.

19.2.3. The Sand Pit is a collection of small ponds that appear seasonally in the Quarry and are located in the SW1/4 of Section 16, Township 19S, Range 68W of the 6th P.M.[2]

19.2.4. A map showing the general location of the North Pond, East Pond, and Sand Pit areas is attached as **Exhibit D**.

19.3. Wetlands: The Holcim Wetlands along Hardscrabble Creek ("Wetlands") were constructed from reclaimed gravel pits on both the east and west sides of Hardscrabble Creek at its confluence with the Arkansas River from 2005 to 2008 as a condition of Holcim's Clean Water Act Section 404 permit issued by the U.S. Army Corps of Engineers, Albuquerque District, to mitigate the future loss of 19.68

[2] Another pond located in the Quarry, known as the Duck Pond (aka the Portland Quarry Pond), is not the subject of this Ruling, as evaporative and dust suppression depletions associated therewith are the subject of the decree entered in Case No. 92CW35 on November 3, 1994.

acres of wetlands in and near the Bear Creek channel at the Holcim Quarry ("Bear Creek Wetlands"). The Wetlands are currently larger than the 19.68 acres required in the 404 permit, and Holcim has not completed mining through the Bear Creek Wetlands. If the Wetlands are modified by natural or manmade processes to encompass an area equal to or less than the area of the Bear Creek Wetlands, the depletive impact to the Arkansas River would be no greater than under conditions that existed prior to eradication of wetlands by mining activities, and no depletion replacement would be required under this plan. However, because the area of the Wetlands currently exceeds the mined through Bear Creek Wetlands, quantification of depletions associated with the Wetlands site is necessary, as further described in paragraph 20.3 herein. The current western portion of the Wetlands was historically primarily open water ("West Wetland"). The current eastern portion of the Wetlands is primarily made up of emergent wetlands ("East Wetland").

19.4. Location of Wetlands: The Wetlands are located in Sections 17 and 18, Township 19S, Range 68W of the 6th P.M., more specifically in the E1/2 of the E1/2 of Section 18, and the W1/2 of Section 17, Township 19S, Range 68W of the 6th P.M. 2014, 2015, 2017, and 2018 aerial photographs of the Wetlands are attached as **Exhibit E**.

20. **Calculation of Depletions.**

20.1. Quarry Ponds – Evaporation. The total surface area of exposed water in the Quarry in the North Pond, East Pond, and Sand Pit has fluctuated between 3 and 8 acres between 2011 and 2017. Holcim will calculate monthly net evaporation from the exposed water in Quarry Ponds and replace depletions on a daily basis as follows:

20.1.1. Surface areas of the North Pond and East Pond will be determined from existing measurement devices (i.e. pressure transducers) that have been installed at both the North Pond and East Pond that relate pond levels to surface area and volume, staff gages, aerial photography, or other devices and methods acceptable to the Division Engineer, at least once per month. If a monthly photograph or measurement is not available, Holcim will assume a total acreage of 1.4 acres for the North Pond and 0.3 acres for the East Pond, the maximum area observed in each pond in the 5 years prior to entry of this Decree.

20.1.2. The total surface area of the Sand Pit will be determined from aerial photography taken via drone or other method acceptable to the Division Engineer at least once per month. The maximum observed extent of the Sand Pit is 1.6 acres. If a monthly photograph is not available, Holcim will assume a total acreage of 2 acres. In its projection described in paragraph 37 below, Holcim will assume the Sand Pit is a total area of 2 acres.

20.1.3. Gross annual evaporation (45.0 inches per year) and percent monthly evaporation will be derived from the National Oceanic and Atmospheric Administration (NOAA) Technical Report NWS 33 for Wagon Wheel Gap, Colorado (NOAA 1982). The percent monthly evaporation for each month will be multiplied by the gross annual evaporation to calculate monthly gross evaporation.

20.1.4. Net evaporation for the water in the Quarry Ponds will be calculated as follows: Monthly net evaporation = pond surface area x (monthly gross evaporation – effective precipitation), where effective precipitation = 70 percent of monthly precipitation. Precipitation will be derived from the NOAA climate station in Cañon City.

20.1.5. Table 4 provides the calculation of net evaporation applied to 1 acre of exposed water surface area of the Quarry Ponds using average monthly precipitation from the NOAA station at Cañon City.

Table 4 – Quarry Pond Evaporative Consumptive Use

Month	**Total Open Pond Area[a] (ac)**	**Percent of annual evap.[b]**	**Gross Evaporation[b] (in.)**	**Precip.[c] (In.)**	**Net Evap. (ft)**	**Net Evap. (ac-ft)**
January	1.00	3.0%	1.35	1.05	0.05	0.05
February	1.00	3.5%	1.58	1.38	0.05	0.05
March	1.00	5.5%	2.48	1.12	0.14	0.14
April	1.00	9.0%	4.05	0.81	0.29	0.29
May	1.00	12.0%	5.40	1.98	0.33	0.33
June	1.00	14.5%	6.53	1.71	0.44	0.44
July	1.00	15.0%	6.75	0.94	0.51	0.51
August	1.00	13.5%	6.08	0.84	0.46	0.46
September	1.00	10.0%	4.50	0.42	0.35	0.35
October	1.00	7.0%	3.15	0.63	0.23	0.23
November	1.00	4.0%	1.80	0.70	0.11	0.11
December	1.00	3.0%	1.35	0.51	0.08	0.08
Total	N/A	100%	45.00	12.10	3.04	3.04

a. Table developed for 1 acre of open pond area for demonstration purposes.
b. Percent and Gross Annual Evaporation is taken from Maps 1-4, NOAA Technical Report NWS 33
c. Precipitation is average of 2000-2012 values at NOAA climate station, Cañon City.

20.2. Quarry Ponds - Dust Suppression: Water is pumped from the North Pond and East Pond for dust suppression purposes during Quarry operations. Under Substitute Water Supply Plans approved by the State Engineer since 2012, Holcim has estimated that it needs up to 58 acre-feet per year from the Quarry Ponds for dust suppression.[3] Pumping for dust suppression from the North Pond and East Pond shall be metered. Lagged depletions from dust suppression shall be considered 100 percent consumptive under this plan for augmentation when they accrue to the stream out-of-priority.

20.3. Wetlands: The Wetlands have the potential to cause depletions to the Arkansas River from (1) evaporation of exposed ground water through open water surfaces in the Wetlands; and (2) evapotranspiration ("ET") of ground water from wetland vegetation. Historically, the West Wetland was primarily an open water surface, while the East Wetland is primarily an emergent wetland covered in vegetation.

20.3.1. Open Water Surface Evaporation: Due to their close proximity to the Arkansas River, both the open water and vegetated areas of the Wetlands are affected by river stage and channel fluctuations of the river. The Wetlands were delineated in October 2014, as described in the wetland delineation contained in the Wetland and Riparian Resources Status Report for the Hardscrabble Creek Mitigation Site prepared for the U.S. Army Corps of Engineers and Holcim dated December 12, 2014. This delineation determined the boundaries of the Wetlands and the established wetland acreages from the mitigation efforts. The total delineated Wetlands were approximately 33-acres, and the maximum constructed size of the open water surface at the Wetlands at high river stage was approximately 12.5 acres. Therefore, maximum historical gross evaporation from the open surface areas is estimated to be 46.88 acre-feet for the maximum surveyed surface area of 12.5 acres. This calculation relies on the regional pan evaporation data from Maps 1-4 of NOAA Technical Report NWS 33: *Evaporation Atlas for the Contiguous 48 States*, and the average monthly precipitation data from the NOAA station at Cañon City.

20.3.2. ET deduction: Pursuant to C.R.S. § 37-92-305(12)(a), Holcim may deduct ET due to native phreatophytes that historically existed in the former gravel pit areas now covered by open water. Historical aerial photography and historical mapping provided with the 1999 gravel mining permit application for what is now the Wetlands demonstrate that a native cottonwood forest once covered a maximum 7.2 acres of area now covered by open water in

[3] The decree in Case No. 92CW35 allows Holcim to pump 55 acre-feet per year from the Duck Pond as an alternate point of diversion under the Porter Ditch water right for dust suppression purposes. That decreed usage is not the subject of this plan for augmentation.

the Wetlands. The mapping from the 1999 gravel mining permit application is attached as **Exhibit F**.

20.3.2.1. The deduction for preexisting cottonwood ET may be up to 37.04 acre-feet, calculated as follows:

- Cottonwood ET (inches) = [K * (T * p)/100]
- K = 1.48 for cottonwood forest with 100% dense cover and a depth to water table of 3 feet, which is applied to all months
- T = mean monthly temperature from 1950-1999 (when gravel mining began)
- P = monthly percentage of daytime hours at 40 degrees latitude.

20.3.3. Open water evaporation after deduction of phreatophyte ET, using the delineated historical maximum open water surface area of 12.5 acres, is 10.51 acre-feet (0.84 acre-feet per surface acre). Table 5 provides the calculation of net evaporation applied to 12.5 acres of exposed water surface area in the open water area of the Wetlands.

Table 5 – Wetlands Evaporative Consumptive Use

Month	**Total Open Pond Area[a] (ac)**	**Percent of annual evap.[b]**	**Gross Evap.[b] (in.)**	**Gross evap. (ac-ft)**	**Preexisting phreatophyte ET[c] (af-ft)**	**Net Evap. (ac-ft)**
January	12.5	3.0%	1.35	1.41	0.00	1.41
February	12.5	3.5%	1.58	1.64	0.00	1.64
March	12.5	5.5%	2.48	2.58	0.00	2.58
April	12.5	9.0%	4.05	4.22	4.00	0.22
May	12.5	12.0%	5.40	5.63	5.28	0.34
June	12.5	14.5%	6.53	6.80	6.17	0.63
July	12.5	15.0%	6.75	7.03	6.78	0.25
August	12.5	13.5%	6.08	6.33	6.16	0.17
September	12.5	10.0%	4.50	4.69	4.83	0.00
October	12.5	7.0%	3.15	3.28	3.81	0.00
November	12.5	4.0%	1.80	1.88	0.00	1.88
December	12.5	3.0%	1.35	1.41	0.00	1.41
Total	N/A	100.0%	45.00	46.88	37.04	10.51

a. Wetland areas taken from wetland delineation survey by Brown and Caldwell on 10/1-10/2/2014, which is the delineated open water area for the constructed

Wetlands. The area may be adjusted if the open water area decreases due to natural changes not caused by Holcim.

b. Percent and Gross Annual Evaporation is taken from Maps 1-4, NOAA Technical Report NWS 33
c. Cottonwood ET estimated from Rantz (1968) using K=1.48, and 7.17 acres of open area that used to be covered by dense cottonwood forest.

20.4. Wetland ET: Vegetation growing in the Wetlands consumes ground water, resulting in lagged depletions to the Arkansas River. The average annual consumptive use for the Wetlands is 4.85 acre-feet per acre of emergent wetland. This calculation is based on the following data and assumptions:

20.4.1. Daily climate data from the Canon City NOAA weather station was used for 1950-2016.

20.4.2. Crop growth characteristic for small-stand cattails, which were the predominant species at the Wetlands, were taken from Allen 1998. The cover crop coefficients cited in Allen 1998 were then multiplied by the daily alfalfa reference ET calculated by IDSCU at Penrose, Colorado.

20.4.3. The number of days of the growing season was limited by spring and fall frost dates. This allowed for longer growing seasons than the 154-day limit cited by Allen 1998.

20.4.4. Effective precipitation was deducted from the wetland potential ET to determine wetland consumptive use.

20.5. Based on the October 2014 delineation of the Wetlands, there were 21.4 acres of emergent wetland. Of this total, 13.79 acres of emergent wetland were in the East Wetland and 7.6 acres of emergent wetland were in the West Wetland. A breach and realignment of the Arkansas River through the West Wetland in approximately September 2017 eliminated 4.0 acres of the total 7.6 acres of emergent wetland in the West Wetland. Accordingly, the total emergent wetlands area within the Wetlands is now 17.4 acres. Approximately 10.22 acres of the 19.68 acres of the Bear Creek Wetlands have been removed through mining activities through October 2017. Holcim may offset depletions from the Wetlands for each acre (or fraction thereof) of the Bear Creek Wetlands that is removed through mining activity, as specified in Paragraph 20.9. Therefore, the current total consumptive use of emergent wetland is 7.18 net additional acres of emergent wetlands, with a depletion of 34.82 acre-feet. Table 6 shows the calculation for ET for 1 acre of emergent wetland area for demonstration purposes. Using the 10.22 acres of Bear Creek Wetlands that had been removed through mining activities through October 2017, the total annual ET for the net additional 7.18 wetland acres would be 34.82 acre-feet.

Table 6 – Wetland Evapotranspiration Rate Per Net Additional Acre of Emergent Wetland

Month	Emergent wetland area[a] (ac)	Wetland ET[b] (ft/ac)	Wetland ET (ac-ft)
January	1.0	0.00	0.00
February	1.0	0.00	0.00
March	1.0	0.00	0.00
April	1.0	0.07	0.07
May	1.0	0.47	0.47
June	1.0	1.03	1.03
July	1.0	1.24	1.24
August	1.0	1.08	1.08
September	1.0	0.77	0.77
October	1.0	0.19	0.19
November	1.0	0.00	0.00
December	1.0	0.00	0.00
Total		4.85	4.85

a. Table developed for 1 acre of emergent wetland area for demonstration purposes. The emergent wetland area equals 17.4 acres. As of October 2017, 10.22 acres of Bear Creek wetlands have been removed per approved U.S. Army Corps of Engineers Clean Water Act Section 404 permit, which required Holcim to construct Hardscrabble Wetlands, and credit was applied for these 10.22 acres, equaling 7.18 net acres requiring depletion replacement.

b. Monthly wetland ET calculated using ASCE Standardized Method, Kc from Allen (1998) for cattails, and climate data from Canon City NOAA station (1950-2016).

20.6. River Channelization/Future Calculation of West Wetland Open Water Surface Requiring Net Evaporation Replacement. The Wetlands, particularly the West Wetland, have recently been subjected to substantial alteration due to encroaching Arkansas River flows through the area, and realignment of the Arkansas River channel. As of September 2017, the Arkansas River channel had broken through the West Wetland and realigned to run through the West Wetland, rather than through its previous alignment north of the Wetlands. September 2017 and June 2018 aerial photographs of the Wetlands showing the realignment of the Arkansas River through the West Wetland are included in **Exhibit E**. Based on this aerial photography, the open water surface areas have been eliminated by the Arkansas River during at least part of the year. While the main channel of the Arkansas River now flows through the Wetlands, the topography of the West Wetland currently still allows for some net increased water surface areas as compared to the previous condition of the Arkansas River shown in the August 2014 aerial photograph included in **Exhibit E.** Holcim will determine the future open water surface of the West Wetland requiring replacement of net evaporation as follows:

20.6.1. Unless Holcim submits aerial photography taken via drone or other method acceptable to the Division Engineer, as described below, Holcim will replace depletions monthly from 12.5 acres of open water surface, the maximum historical surface area of the open water within the West Wetland at high river stage. Pursuant to C.R.S. § 37-92-305(12)(a) and paragraph 20.3.2 herein, Holcim may continue to deduct *pro rata* ET due to historical native phreatophytes in the calculation of depletions requiring replacement. The maximum *pro rata* deduction shall be 2.96 acre-feet of ET per acre (37.04 acre-feet/12.5 acres).

20.6.2. Holcim may, but is not required to, serve aerial photography on the Division Engineer and the Opposers in this case to demonstrate that the open water surface is less than 12.5 acres. Should Holcim provide such aerial photography, Holcim will also provide a calculation of the area of the new channel of the Arkansas River within the West Wetland as compared to the water surface area of the West Wetland and corresponding segment of the previous river channel shown in the 2014 aerial photograph included in **Exhibit E**, and a calculation of the revised net additional depletion (if any) when compared to the corresponding surface areas in the 2014 photograph, which net depletion shall require replacement. Opposers shall have sixty-three (63) days to serve comments to the Applicant and the Division Engineer.

20.6.3. Frequency/Timing: In the event Holcim chooses to submit aerial photography, such photography will be provided as follows: (1) to reduce the open water surface area to an amount less than 12.5 acres for any period from September through April, Holcim shall provide aerial photography from the month of September no later than September 15, which shall set the acreage of the open water surface until the following May; (2) to reduce open water area to an amount less than 12.5 acres for each month from May through August (when river levels are highest), Holcim shall provide aerial photography during each month of May, June, July, and August no later than the 10^{th} day of the month in which the aerial photograph was taken.

20.6.4. If Holcim chooses to submit aerial photography to reduce the open water surface area for which Holcim must replace evaporation depletions to an amount less than 12.5 acres as described in subparagraphs 20.6.2 and 20.6.3, Holcim shall be required to serve an additional aerial photograph on the Division Engineer and the Opposers in this case at least once every five (5) years thereafter to confirm that the open water area has not increased. Holcim will also

provide a calculation of the area of the open water surface and the evaporation depletions. Opposers shall have sixty-three (63) days to serve comments to the Applicant and the Division Engineer regarding the open water surface area and the depletions to be replaced. In the event the open water surface area has increased from the prior photograph, Holcim will replace depletions of such increased surface area up to 12.5 acres. Holcim is not required to replace depletions from an open water surface area greater than 12.5 acres. Pursuant to C.R.S. § 37-92-305(12)(a) and paragraph 20.3.2 herein, Holcim may continue to deduct *pro rata* ET due to historical native phreatophytes in the calculation of depletions requiring replacement, which makes the net depletion 0.84 acre-feet per acre. No reduction in depletions from a reduction in the surface area shall be allowed unless and until it is approved by the Division Engineer.

20.7. Emergent Wetland Area Adjustment: Pursuant to the wetland delineation contained in the Wetland and Riparian Resources Status Report for the Hardscrabble Creek Mitigation Site prepared for the U.S. Army Corps of Engineers and Holcim dated December 12, 2014, the total constructed area of the Wetlands was approximately 33 acres. Of this total, approximately 21.4 acres were emergent wetlands, with 13.79 acres in the East Wetland and 7.6 acres in the West Wetland. Of the 7.6 acres in the West Wetland, 4 acres were recently eliminated by natural changes in the river channel. Should the area of emergent wetlands in the Wetlands shrink further as the result of manmade or natural processes, Holcim may seek a reduction in the amount of depletions caused by the emergent Wetlands. In such case, Holcim shall serve on the Division Engineer and the Opposers in this case aerial photography of the area of the Wetlands and apply that updated acreage to calculate the corresponding depletions that Holcim must replace. Opposers shall have 63 days to submit comments to the Division Engineer and Applicant concerning the area of Wetlands and the proposed depletions to be replaced. No reduction in depletions from a reduction in the area of the originally constructed Wetlands described in this subparagraph shall be allowed unless and until it is approved by the Division Engineer.

20.8. At least once every five (5) years commencing with the date of this Decree, Holcim is required take and serve on the Division Engineer and the Opposers in this case an aerial photograph of the Wetlands to confirm that the emergent wetlands have not regrown in the areas they originally existed in the 2014 delineation. If the area of the emergent wetlands has increased, Holcim will also provide a calculation of the area of the emergent wetlands and the ET depletions. Opposers shall have sixty-three (63) days to serve comments to the Applicant and the Division Engineer regarding the area of emergent wetlands and the depletions to be replaced. Holcim shall increase its net replacement obligation (i.e., after subtracting for Bear Creek

wetland areas removed as described in paragraph 20.9 hereof) required for the constructed emergent wetlands up to 21.4 acres. Holcim will not be required to replace depletions from an emergent wetland surface area greater than 21.4 acres.

20.9. Future Reduction of Wetland Depletions Requiring Replacement due to Additional Bear Creek Wetlands Removal. Holcim has mined, and will continue to mine, through the Bear Creek Wetlands. Approximately 10.22 acres of the 19.68 acres of Bear Creek Wetlands have been removed through mining activities through October 2017. Holcim may seek to offset depletions from the Wetlands for each acre (or fraction thereof) of the 19.68 acres of Bear Creek Wetlands that is removed through mining activity. In order for Holcim to claim credit for additional removal of Bear Creek Wetlands and a corresponding reduction in depletions from the Wetlands that require replacement, Holcim shall serve notice of Bear Creek Wetlands removal on the Division Engineer and other Opposers. The notice shall include aerial photography taken via drone, or other method acceptable to the Division Engineer, and calculations of the credit for depletions. Opposers shall have 63 days to submit comments to the Division Engineer. After the comment period has expired, the Division Engineer may make a determination of the removal of Bear Creek Wetlands and reduction in depletions from the Wetlands. Holcim shall use the value from that determination until the next determination.

20.10. Replacement of Hayner Ditch Return Flows: Once Holcim has used the Hayner Ditch Water Rights for the Changed Uses, it will replace historical return flows if they would have historically accrued to the stream on a day when there is a call from a downstream water right or an intervening decreed exchange senior to December 30, 2016. During the irrigation season (April 1 to October 31), the consumptive use and irrigation season return flow components of historical diversions of the Hayner Ditch Water Right will be diverted in priority, measured and returned to the Arkansas River at the Ideal Pumping Plant as described in paragraph 16.3 above. During the non-irrigation season, historical return flows will be a replacement obligation in Holcim's augmentation plan if they would have historically accrued to the stream on a day when there is a call from a downstream water right or an intervening decreed exchange senior to December 30, 2016.

21. **Timing of Depletions.**

21.1. Quarry Ponds:

21.1.1. Water intercepted at the Quarry includes surface and shallow subsurface irrigation return flows, runoff from precipitation and minor recharge from surface water courses including Bear Creek.

21.1.2. In its approval of Holcim's 2016 Substitute Water Supply Plan ("SWSP"), the State Engineer required Holcim to install measuring devices at the

Quarry Ponds, as well as a rain gage, to provide readings of the water levels in the Quarry Ponds, as well as precipitation. Holcim began this additional monitoring on January 1, 2017. Based on the results of this monitoring of the Quarry Ponds and local ground water wells, Holcim's engineers determined that water intercepted at the North Pond and East Pond is derived primarily from irrigation return flows from land irrigated under the Beaver Park irrigation system that lie to the north and east and upgradient of the Quarry, not from any underlying aquifer. Return flows enter the Holcim property as either surface flows or shallow subsurface flow in permeable backfill placed at the surface after mining. A short lag is observed in water levels in the Quarry Ponds, with increasing water levels occurring after the initiation of irrigation for the season. Diversions under the Beaver Park system historically begin in late March or early April, and peak in July. The water levels in the North Pond typically begins to rise from irrigation return flows beginning in early June and peaks in mid- to late-September, while the water levels in the East Pond begin to rise in early August, and peak in mid- to late-October, resulting in observed lags of 2-6 months for the irrigation return flows to reach the River.

21.1.3. Pursuant to an agreement of the parties in this case, rather than lagging the Quarry Pond depletions using the observed 2-6 month lags, Holcim agreed to apply a lagging analysis with the same geologic parameters that were used to determine the timing of Hayner Ditch return flows in this case. The Hayner Ditch irrigated lands referenced above are located across the Arkansas River in close proximity to the Quarry. Holcim's engineers determined lagging from the Quarry Ponds using the following parameters:

21.1.3.1. Transmissivity of the alluvial aquifer = 40,000 gpd/ft
21.1.3.2. Specific yield = 0.2
21.1.3.3. Width of the alluvial aquifer = 3,000 ft (measured distance)
21.1.3.4. Distance from the North Pond to the Arkansas River = 2,100 ft (measured distance)
21.1.3.5. Distance from the East Pond to the Arkansas River = 1,700 ft (measured distance)

21.1.4. Using these parameters, the unit lag response for each of the Quarry Ponds is shown in Table 7. A composite URF is calculated as the average of the URFs for the North Pond and East Pond. Holcim will use the URFs to lag depletions from the North Pond and East Pond, and use the composite URF for the Sand Pit and/or any other smaller ponds that develop in the Quarry in the future.

Table 7 – Quarry Pond Unit Response Factors

Month	North Pond URF	East Pond URF	Composite URF (average of North Pond and East Pond)
1	0.0330	0.0730	0.0530
2	0.1660	0.2210	0.2465
3	0.1670	0.1590	0.4095
4	0.1360	0.1200	0.5375
5	0.1090	0.0960	0.6400
6	0.0870	0.0770	0.7220
7	0.0700	0.0610	0.7875
8	0.0550	0.0490	0.8395
9	0.0450	0.0390	0.8815
10	0.0360	0.0310	0.9150
11	0.0280	0.0250	0.9415
12	0.0230	0.0200	0.9630
13	0.0190	0.0160	0.9805
14	0.0140	0.0130	0.9940
15	0.0120		1.0060

21.2. Wetlands:

21.2.1. The Wetlands are located adjacent to the Arkansas River. Nonetheless, the ground water depletions caused by the Wetlands do not accrue to the Arkansas River entirely within 24 hours. The timing of the impact can be determined using a transmissivity of 40,000 gallons per day per foot (gpd/ft). This transmissivity factor is appropriate and is the same as the average transmissivity cited by the USGS for three aquifer tests in the alluvial-outwash aquifer of the Arkansas River upstream near Buena Vista.

21.2.2. Holcim will use aquifer parameters that were used in the IDS AWAS to model the monthly lagging pattern of the Wetlands. These aquifer parameters are:

21.2.2.1. Transmissivity = 40,000 gpd/ft
21.2.2.2. Specific Yield = 0.2
21.2.2.3. Aquifer Width = 2,500 feet (measurement of Arkansas Valley floor).
21.2.2.4. Average distance from wetland to river = 500 feet (based on measurement).

21.2.3. Table 8 below shows the monthly lagging pattern for the Wetlands using the IDS AWAS.

The majority of depletions accrue to the Arkansas River within the month the consumptive use occurs. Less than 1 percent of depletions accrue to the Arkansas River after one year; accordingly, Holcim will add the depletions from months 13 through 18 into month 12.

Table 8 – Wetlands AWAS Unit Lagging Factors

Timestep (Month)	Unit Lagging Factor	Timestep (Month)	Unit Lagging Factor
1	0.512	10	0.007
2	0.237	11	0.005
3	0.073	12	0.004
4	0.049	13*	0.003
5	0.035	14*	0.002
6	0.026	15*	0.001
7	0.019	16*	0.001
8	0.013	17*	0.001
9	0.010	18*	0.001

* Added to factor for Month 12.

21.3. Replacement of Hayner Ditch Return Flows: Once Holcim has used the Hayner Ditch Water Rights for the Changed Uses, it will replace historical return flows on a daily basis if they would have historically accrued to the stream on a day when there is a call from a downstream water right or an intervening decreed exchange senior to December 30, 2016, pursuant to the procedure described in paragraph 16.3.

22. **Water Rights to be used for Augmentation**

22.1. Changed Hayner Ditch Water Right described in paragraphs 10-17 hereof.

22.2. Fully consumable water leased to Holcim from the Board of Water Works of Pueblo ("Pueblo Water") pursuant to a Water Lease Agreement dated December 19, 2014, and amended on May 2, 2016, terminating December 31, 2018, and granting Holcim an option to extend the term of the Agreement through December 31, 2019, and as the same may be further amended or extended. This Agreement was amended and replaced by an Amended and Restated Water Lease Agreement ("Water Lease") dated August 14, 2018, which extended the initial term through December 31, 2019, and granted Holcim two additional options to extend the Agreement for two additional terms of 10 years each, the first commencing January 1, 2020, and terminating December 31, 2029, and the second commencing January

1, 2030, and terminating December 31, 2039, subject to the terms of the Water Lease.

22.3. Additional supplies added pursuant to paragraph 35.

23. **Location of Replacement.** Holcim will replace lagged depletions from the Wetlands (evaporation and wetland evapotranspiration) at the Arkansas River at or above the Portland Gage. Holcim will replace lagged depletions from the Quarry Ponds (both evaporation and dust suppression) at or below the Portland Gage on any day when the depletions accrue to the stream out-of-priority above a downstream calling water right, or within the reach of an intervening calling decreed exchange, with an appropriation date senior to December 30, 2016. If replacements are made upstream of the location of depletion, transit losses shall be assessed, as determined by the Division Engineer or the Water Commissioner, between the point of release and the location of depletion. The Water Commissioner shall convey the water released to the location of depletion.

24. **Mined Product**. In SWSPs approved in 2012 and 2013, Holcim was required to replace depletions due to moisture loss in the mined product because the Quarry was then regulated under rules for gravel pit SWSPs pursuant to C.R.S. § 37-90-137(11). Holcim's technical consultants conducted a study in 2013 which concluded that the limestone material mined at the Quarry is above the local water table, and therefore, no ground water was removed with the mined product. This study was submitted to the State Engineer in 2014, and the State Engineer released Holcim from any requirement to replace moisture loss in the mined product. Because the material mined at the Quarry is above the water table, Holcim is not required to replace depletions caused by any moisture lost through the mined product removed through Quarry mining activities.

25. **Operation of Plan for Augmentation:** Holcim's plan for augmentation, as approved herein, will replace out-of-priority lagged depletions associated with the Holcim Quarry, Quarry Ponds and Wetlands in amount, time, and location, if operated in accordance with in paragraphs 18-25 and 32-39 herein.

CONCLUSIONS OF LAW

26. The foregoing Findings of Fact are incorporated herein to the extent that they may constitute conclusions of law.

27. Timely and adequate notice of the pendency of this action was given in the manner provided by law. C.R.S. § 37-92-302(3).

28. This Court has jurisdiction over the subject matter of these proceedings and over all who may be affected thereby, irrespective of whether they have appeared. C.R.S. §§ 37-92-203(1), 37-92-302(1) and (3) and 37-90-137(6).

29. The change of water rights requested in the Application are contemplated by law, and Holcim has satisfied the requirements of C.R.S. § 37-92-101 *et seq.*, including but not limited to, C.R.S. §§ 37-92-103(3)(a), 103(5), 302, 304(6), and 305(3).

JUDGMENT AND DECREE

It is therefore, ordered, adjudged and decreed:

30. The foregoing Findings of Fact and Conclusions of Law are fully incorporated herein by this reference and made a part of the Judgment and Decree of the Court.

31. **Change of Water Rights Approved.** Subject to the terms and conditions of this Decree, the change of water rights for the Hayner Ditch Water Right described herein is hereby granted and approved. The changes of water rights will not injuriously affect the owner of or persons entitled to use water under a vested water right or a decreed conditional water right and are approved, subject to the terms of this Decree. By this Decree, Holcim does not appropriate or claim a right to use return flows. Holcim's obligation to replace historical Hayner Ditch return flows pursuant to this Decree is addressed in Paragraph 21.3.

32. **Plan for Augmentation Approved**. The plan for augmentation described herein is hereby approved. The plan, as described herein, will permit the uninterrupted consumptive use for augmented structures described herein without injuriously affecting any vested water right or decreed conditional water right, or the owners or persons entitled to use such water rights, provided the plan is operated and administered in accordance with the terms of this Decree.

32.1. The Wetlands were constructed from reclaimed gravel pits operated pursuant to Colorado Division of Reclamation, Mining and Safety ("DRMS") permit no. M-1999-035. Using historical aerial photography and information presented in the 1999 Gravel Mining Permit Application, Holcim's engineer determined that native cottonwood forest once covered approximately 7.17 acres of area now (or recently) covered by open water at the Wetlands. The historical natural depletion of the waters of the State caused by the preexisting natural vegetative cover in the Wetlands is 37.04 acre-feet. Pursuant to C.R.S. § 37-92-305(12), Holcim is not required to replace these historical natural depletions in this plan.

32.2. Because Holcim has established that the limestone removed from the Quarry through Holcim's mining activities is located above the local water table, Holcim is not required to make replacements as a result of the removal of the mined product.

33. **Terms and Conditions to Prevent Injury:**

33.1. Changed Hayner Ditch Water Right: To prevent injury to the vested water rights of others, once converted to the Changed Uses and alternate places of use, the future

use of the historical consumptive use of the Hayner Ditch Rights under this Decree shall be subject to the following terms and conditions:

33.1.1. Location of Diversions: All diversions of water attributable to the Hayner Ditch Water Right shall be made through the Ideal Pumping Plant. If the water is used in Holcim's plan for augmentation decreed herein, such water may be delivered back to the Arkansas River following its diversion and measurement at the Ideal Pumping Plant.

33.1.2. Diversion Season Limitation: Holcim's future diversions of the Hayner Ditch Water Right historical consumptive use shall be limited to the period of April 1 through October 31.

33.1.3. Quantity: Holcim's future diversions of the Hayner Ditch Water Right shall be subject to the volumetric limitations specified in subparagraphs 16.4.1 and 16.4.2 hereof.

33.1.4. Return Flow Obligations:

33.1.4.1. Quantity: When Holcim uses the Hayner Ditch Right for the Changed Uses, Holcim shall deliver water to the Arkansas River to replicate historical return flows in the amounts calculated using the return flow factors shown in Table 3.

33.1.4.2. Location of Replacements: Following measurement at the Ideal Pumping Plant, Holcim shall deliver water to satisfy its return flow obligations under this Decree at the Ideal Pumping Plant, or at a location downstream of such plant that is upstream of a downstream calling water right or upstream of an intervening decreed exchange as further described in paragraph 33.1.4.3 herein.

33.1.4.3. Time: Holcim shall deliver water to satisfy its return flow obligations on a daily basis only at times when there is a call from a downstream water right or an intervening decreed exchange senior to December 30, 2016.

33.1.4.4. Sources: Return flow obligations may be satisfied by delivering water from any of the sources identified as replacement sources in Holcim's plan for augmentation approved herein, including without limitation water diverted on the Hayner Ditch Water Right priority that is attributable to irrigation season return flow components of historical diversions on such priority as further described in

subparagraph 16.3 hereof.

33.2. Quality and Continuity of Substitute Supply/Satisfaction of Senior Water Rights. The water used by Holcim as the sources of replacement supply for the augmentation plan decreed herein shall be of a quality and continuity so as to meet the requirements for which the water of senior appropriators, and such substituted supplies shall be accepted by senior appropriators in substitution for water derived by the exercise of their decreed water rights.

34. **Replacement of Out-of-Priority Depletions.**

34.1. The sources of water identified in paragraph 22 above may be used as an augmentation supply to replace the depletions described herein.

34.2. The amount of consumptive use credits derived from the changed Hayner Ditch Water Right that are available for use as an augmentation source shall be determined in accordance with the terms and conditions of this decree.

34.3. Holcim shall only make a single use of the historical consumptive use component of the changed Hayner Ditch Water Right under this decree.

34.4. Replacement of out-of-priority lagged depletions and return flows as described herein may not deprive decreed exchanges senior to December 30, 2016 of water to which they are legally entitled under their decrees.

35. Available replacement credits under the plan for augmentation decreed herein shall equal or exceed all out-of-priority depletions on a daily basis as calculated hereunder. In addition to the replacement sources authorized herein, Holcim shall be entitled to use supplies of augmentation water of limited duration, and additional and alternative sources for replacement in this augmentation plan if such sources are decreed or lawfully available for such use, or are part of a substitute water supply plan approved by the State Engineer pursuant to C.R.S. § 37-92-308, or an interruptible supply agreement approved under C.R.S. § 37-92-309. This paragraph sets forth the procedure under which these sources may be used in this plan. These procedures are adequate to prevent injury to other water rights that might otherwise result from the addition of these sources to this plan.

35.1. Additional Water Rights Separately Decreed or Lawfully Available for Augmentation Use: If a water right is decreed or lawfully available for augmentation use and not already approved for such use under this decree, Holcim shall give at least 30 days advance written Notice of Use of Water Right for Augmentation to the Court, the Division Engineer, and all parties to this action, which shall describe: 1) the water right by name and decree, if any; 2) the annual and monthly amount of water available to Holcim from the water right; 3) the location or locations at which the water will be delivered to the stream; 4) evidence

that that claimed amount of water will not be used by another person; and 5) the manner in which Holcim will account for use of the augmentation credits.

35.2. Additional Water Right – Temporary Administrative Approval: If a water right is not decreed or otherwise lawfully available for augmentation use, and Colorado statutes or other governing authority provide a mechanism for using such water right without the need of a decree or well permit, Holcim shall provide written notice to all parties to this action of its request for approval of the State Engineer pursuant to C.R.S. §§ 37-92-308, -309, or other applicable statute.

35.3. Any party may submit comments on Applicant's proposed use of other sources to the Division Engineer or State Engineer, as applicable, within 35 days of the date notice is provided to all parties in this case. If, after review of any comments received the Division Engineer or State Engineer objects to the use of such sources, the Division Engineer shall, within 10 days of the end of the 35-day period, propose terms and conditions that will ensure that such sources are suitable to satisfy Applicant's augmentation obligations or inform Applicant that such sources are not suitable to satisfy such obligations. If Applicant disputes the proposed terms and conditions or the decision of the Division Engineer that such sources are not suitable for use by Applicant to satisfy its augmentation obligations, then Applicant may initiate proceedings under this Court case to resolve the dispute. If a proceeding is so initiated, then the Court shall grant an expedited hearing and promptly decide the disputed issues and/or impose necessary terms and conditions to ensure that such sources are appropriate to satisfy Applicant's augmentation obligations. Applicant shall have the burden of proof, and neither the approval nor the denial by the Division Engineer shall create any presumptions, shift the burden of proof, or serve as a defense in this case. Sources that are in dispute may not be used to satisfy Applicant's augmentation obligations until the parties agree on appropriate terms and conditions of such usage or until such usage is authorized by the Court. Upon completion of the steps required in this paragraph for a specific source, including any court proceeding, such source can be used to satisfy Applicant's augmentation obligations under this Decree.

36. **Measurement and Accounting.**

36.1. Holcim shall account for the plan for augmentation on a daily basis and submit accounting forms to the Division Engineer and water commissioner on a monthly basis. Depletions will be calculated on a monthly basis, as evaporation and ET rates are calculated using monthly factors, and then will be divided by the days of the monthly to develop a daily basis. The initial accounting form, attached as **Exhibit G**, is not decreed and may be modified from time to time so long as the information contained in such form and required by this Decree is included in the form, 35 days advance notice is provided to the Opposers and Division Engineer, and such changes are approved by the Division Engineer.

36.2. All well pumping and deliveries from pumped water will be measured and recorded on a daily basis. If required by the Division Engineer, Holcim shall install and maintain suitable and proper measuring or other devices to ensure proper administration of this Decree.

36.3. Subject to the requirements of the Division Engineer, the accounting forms will include at a minimum: (1) the names, administrative numbers, and locations of any downstream calling water rights; (2) data needed to calculate the monthly out-of-priority depletions associated with the Quarry and Wetlands; (3) daily amount of water pumped from the Quarry Ponds for dust suppression; (4) total open pond areas for the Quarry Ponds; (5) the monthly consumptive use credits available from and any return flow obligations incurred for use of the Hayner Ditch Water Right for augmentation of depletions; (6) any water released pursuant to Holcim's lease with Pueblo Water; (7) any water released from additional supplies added pursuant to paragraph 35; and (8) daily net effect to the River.

37. **Annual Projection.** Holcim shall submit projected estimates to the Division Engineer for the consumptive use and depletions of water at both the Holcim Quarry and Wetlands, by January 31 each year for the ensuing 12-month (February through January) period, and may submit updated projections thereto. The projection will be used to assure that full augmentation will occur during the projection period, and will assume that all such projected depletions will require replacement due to a continuous call from a downstream water right or intervening exchange senior to December 30, 2016. The additional assumptions for the projection are described in paragraphs 37.1 – 37.3 below. An initial sample form of projection is attached to this Decree as **Exhibit H**. The projection may be changed from time-to-time so long as all information in **Exhibit H** and required by this Decree is included therein.

37.1. Quarry Depletions:

37.1.1. Pond surface areas for the North Pond and East Pond at the Quarry will be projected based on pond surface elevations recorded by Holcim as of June 1 of the previous year. If pond surface areas increase by 10% during the year, the projection will be modified to adjust for the increased surface area.

37.1.2. Total pond surface areas at the Quarry will be estimated at 8 acres, or the highest recorded total surface area recorded since the date of this decree, if no aerial photography can be obtained.

37.1.3. Net evaporation from the Quarry Ponds will be calculated as described in subparagraph 20.1 and Table 4.

37.1.4. Depletions from Quarry Pond evaporation and dust suppression will be lagged as described in paragraphs 20.1.3-20.1.4.

37.1.5. Water to be pumped from Quarry Ponds for dust suppression purposes will be projected for the coming 12 months by Holcim staff.

37.2. Wetlands:

37.2.1. Total surface area for open water at the Wetlands will be 12.5 acres, subject to potential reduction, and potential later increase to up to 12.5 acres pursuant to subparagraph 20.6 hereof. Gross evaporation from open water surfaces will be calculated as described in subparagraph 20.3.1 hereof, with a reduction of up to 37.04 ac-ft for historical phreatophytes that were removed when the wetlands were constructed to calculate net evaporation.

37.2.2. Total surface area for emergent wetland will be assumed to be 17.4 acres, subject to potential reduction, and potential increase to up to 21.4 acres, pursuant to subparagraphs 20.3.2 hereof. Net acreage of emergent wetland for ET/depletion calculations will be further reduced by the total acreage of Bear Creek wetlands that have been removed, as determined by paragraph 20.9.

37.2.3. ET from net emergent wetlands areas will be calculated as described in subparagraph 20.4 hereof.

37.2.4. Consumptive use from wetland evaporation and ET will be lagged using the AWAS method and Glover parameters described in subparagraph 21.2.2 hereof.

37.3. Return Flow Obligations. If consumptive use credits available from the changed Hayner Ditch Water Right are included as replacement supplies in the projection, non-irrigation season return flow obligations attributable to augmentation use of that right will also be included on the depletion side of the projection.

37.4. Replacement Supplies:

37.4.1. Monthly consumptive use credits available from the changed Hayner Ditch Water Right will be projected based on a dry-year yield of the water right (1984) and the monthly amounts described in subparagraph 15.1.4 hereof.

37.4.2. Any leased water needed to replace projected depletions must be obtained and any source added pursuant to paragraph 35 must be approved prior to their inclusion in the projection (or any updated projection) described in this subparagraph. For purposes of determining water availability under this decree, Holcim may assume augmentation water is available whenever there is a renewal period in the Water Lease. Nothing herein changes the

rights and obligations of Holcim and Pueblo under the Water Lease, or any extensions or amendments thereto. In the event Holcim decides not to exercise any option to renew any such lease, it shall notify the Court and Opposers within 30 days of making such decision, and in no event later than 21 days after the expiration of the option/renewal deadline.

37.4.3. If the plan for augmentation is unable to replace all out of priority depletions from the Quarry, Wetlands, or historical return flows from the Hayner Ditch Water Right once it is used for the Changed Uses, or any projection required by this paragraph 37 indicates that a deficiency is likely, the Applicant promptly shall seek additional replacement supplies pursuant to Paragraph 35, above, and/or initiate steps to reduce out of priority depletions. If such additional replacement supplies are not obtained, the Division Engineer shall curtail any out-of-priority diversions, the depletions of which cannot be replaced utilizing Holcim's existing augmentation sources.

38. **Releases of Augmentation Water.** Holcim shall make available for release to the Arkansas River a sufficient quantity of water to replace lagged depletions on a daily basis caused by the Quarry Ponds and Wetlands, and, once Holcim has used the Hayner Ditch Water Right for the Changed Uses, the Hayner Ditch historical return flows. The volume of augmentation water required to be released on a daily basis shall be limited to out-of-priority lagged depletions that accrue to the river on that day directly attributable to the Quarry Ponds and Wetlands as further described herein. Holcim will replace lagged depletions from the Wetlands (evaporation and wetland evapotranspiration) at the Arkansas River at or above the Portland Gage. Holcim will replace lagged depletions from the Quarry Ponds (both evaporation and dust suppression) and the Hayner Ditch historical return flows (after Holcim has used the Hayner Ditch Water Right for the Changed Uses) at or below the Portland Gage and above any downstream calling water right, including a decreed exchange. Pursuant to C.R.S. § 37-92-305(8), the State Engineer shall curtail all out-of-priority diversions, the depletions from which are not so replaced as to prevent injury to vested water rights as such statute may be revised and/or superseded by law.

39. **Administration.** Upon entry by the Water Court, this Decree will be administrable by the Division Engineer for Water Division 2 and can be operated without adversely affecting the owners or users of vested water rights or decreed conditional water rights.

40. **Retained Jurisdiction – Augmentation Plan and Change of Water Rights.** Pursuant to the provisions of C.R.S. § 37-92-304(6), the Court shall retain jurisdiction over the plan for augmentation and change of water rights decreed herein for reconsideration of the question of whether the provisions of this Decree are necessary or sufficient to prevent material injury to vested water rights. The Court's retained jurisdiction shall commence upon entry of this Decree and shall automatically terminate: (A) for reconsideration related to the change of water right approved herein, five years after Holcim serves written notice

on all Opposers that seventy-five percent (75%) of the water attributable to the Hayner Ditch Water Right has been used for the changed uses as decreed herein; and (B) for reconsideration related to the plan for augmentation approved herein, five years after Holcim serves written notice on all Opposers that it has operated the plan for augmentation for five consecutive years. During the retained jurisdiction period, the Court's retained jurisdiction may be invoked by any party to this case by petition, with notice to all parties. Any petition to invoke the retained jurisdiction shall set forth with particularity the factual basis and the alleged injury or violation of this Decree upon which the requested reconsideration is premised, together with proposed decree language modifications offered by the petitioning party or relief requested to remedy the alleged injury or violation. The petitioning party shall have the burden of going forward to establish a prima facie showing of the existence of the injury or violation alleged in the petition, then Holcim shall have the burden of proof to show either that the alleged injury or violation has not occurred or will not occur, or to propose additional terms and conditions which will prevent injury or violation from occurring.

41. **No Precedent**. There was no trial in this matter and no issues were litigated. The Findings of Fact, Conclusions of Law, and Decree of the Water Court were completed as the result of substantial discussions, negotiations and compromises by, between and among the Applicant and the several objectors pertaining to all parts of the findings, conclusions, and decree and are based on the specific characteristics of the water rights that are the subject of this Decree. The parties hereto specifically understand and agree, and the Court finds and concludes the following:

41.1. The acquiescence of the parties to a stipulated decree under the specific factual and legal circumstances of this contested matter and upon the numerous and interrelated compromises reached by the parties shall never give rise to any argument, claim, defense or theory of acquiescence, waiver, bar, merger, stare decisis, res judicata, estoppel, laches, or otherwise, nor to any engineering, administrative or judicial practice or precedent, by or against any of the parties hereto in any other matter, case or dispute, nor shall testimony concerning such acquiescence of any party to a stipulated decree herein be allowed in any other matter, case or dispute.

41.2. This Findings of Fact, Conclusions of Law, and Decree of the Water Court shall not have the effect of precedent or preclusion on any factual or legal issue in any other matter. The parties hereto reserve the right to propose or to challenge any legal or factual position in any other change of water rights, plan for augmentation or other matter filed in this or any other court without limitation by these findings, conclusions, and decree.

42. **Filing of Copies.** A copy of this Judgment and Decree shall be filed with the Water Clerk for Water Division 2, and this Decree shall become effective upon such filing.

Dated: April 29, 2019

BY THE COURT:

LARRY C. SCHWARTZ, WATER JUDGE
WATER DIVISION 2

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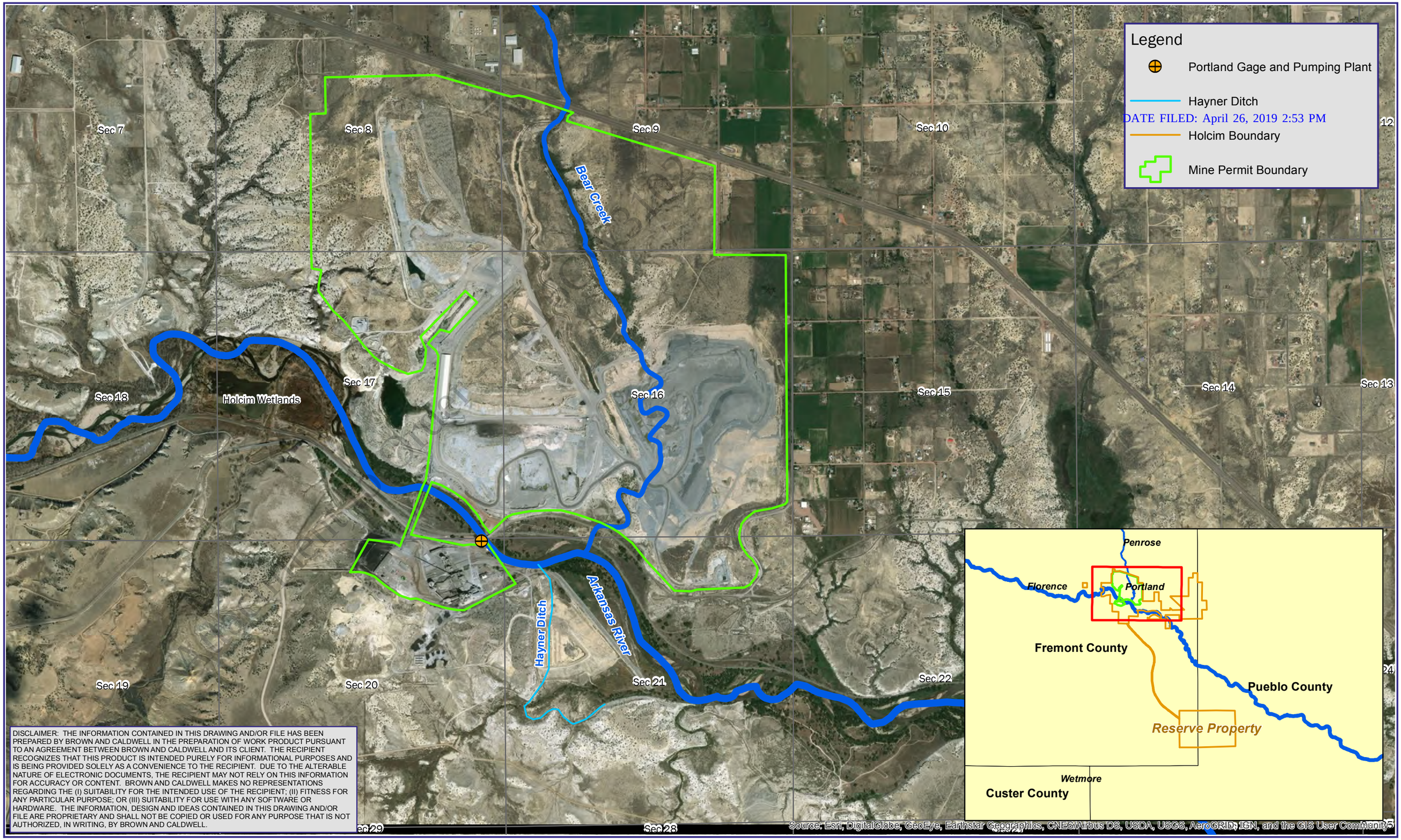


Note: Township 19 South, Range 86 West of the 6th P.M.

Quarry Site Overview
Holcim Portland Plant
Florence, Colorado

EXHIBIT A

N

0 1,000 2,000
Feet

07 08 09 10 11 12 07

18 17 16 15 14 13 18

T 19S 68W

T 19S 67W

19 20 21 22 23 24 19

30 29 28 27 26 25 30

P:\Data\GEN\Holcim\Holcim Portland, CO 2016 Nontributary GW FS\GIS\MXDs\ReportFigures\Fig2_SitePropertyBoundary.mxd

LEGEND

- Applicable Holcim Property Boundary
- Township Boundary
- PLSS Sections

EXHIBIT B

N

0 2,000

Feet

Notes:

1. Aerial photography from 2015 National Agricultural Imagery Program (9/9/2015).

SITE

TITLE

Applicable Site Property Boundary

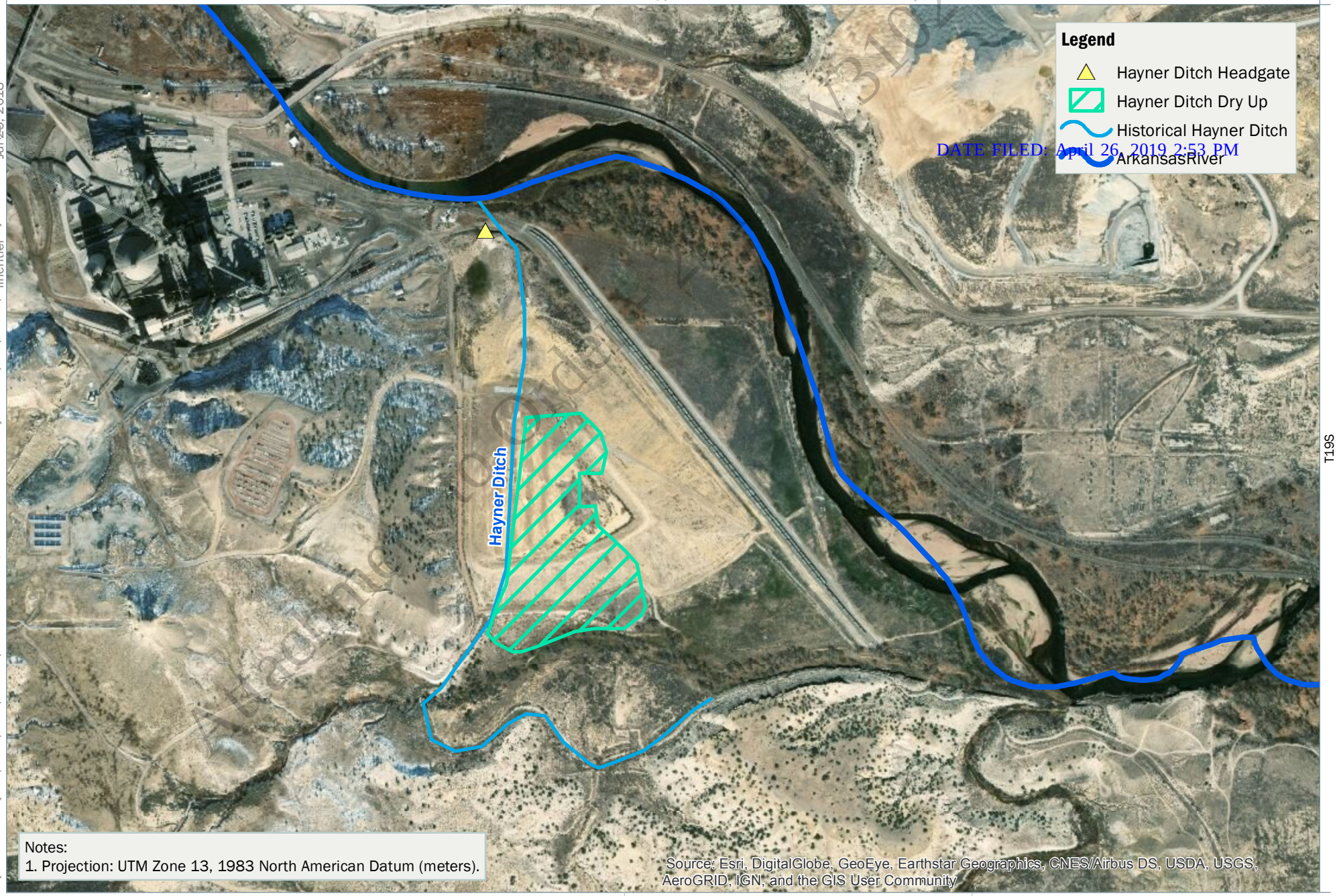
Brown AND Caldwell

PROJECT 149477-004

DATE 04/14/2017

R68W

T19S



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Brown AND Caldwell

Holcim

Hayner Ditch

Date: July 2018
Project: 149099

Note: Hayner Ditch Dry Up - 13.9 acres

N

0 500 1,000 Feet

EXHIBIT C

Hayner Ditch Dry Up

Path: P:\Data\GEN\Holcim\Holcim Portland, CO 2016 Nontributary GW FS\GIS\MXDs\FigA2_Holcim_SurfaceWaterAreas_Apr2018.mxd 4/9/2018

ilheritier

Sec 8

Sec 9

North Pond

Sec 17

Sec 16

Sec 15

Sand Pit

ARKANSAS RIVER

120

Portland Gage

Portland Pumping Plant

Hayner Ditch Headgate

Sec 21

East Pond

Sec 22

Legend

- Portland Pumping Plant
- Portland Gage
- Hayner Ditch Headgate
- Approximate Waterbody Boundaries

N

Brown AND Caldwell

Surface Water Areas
Holcim Portland Plant
Florence, Colorado

EXHIBIT D

0 500 1,000
Feet

Wetland Acres	
Wetland	**Acres**
Wetland 1- East Wetland Parcel	13.79
Wetland 2- West Wetland Parcel	7.6
Wetland 2 Open Water	12.48
Total Wetlands and Open Water	33.87

Brown AND Caldwell

Date: 2/15/2017

Project No: 146035

Client: Holcim

Basemap: Aerial Photo August 8, 2014

0 100 200 Feet

1 in = 200 ft

EXHIBIT E

N

Delineated Wetlands
Holcim Wetland and Riparian Resources Status Report

Path: Bcboi02\G:\PROJECTS\Holcim Wetlands\Maps\Figure_5_Wetlands_20170215_11x17L.mxd

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ilheritier

Wetlands 2015
Holcim Portland Plant
Florence, Colorado

N

NAIP Imagery date: 2015

0 200 400

Feet

Path: P:\Data\GEN\Holcim\Holcim Portland, CO 2016 Nontributary GW FS\GIS\MXDs\FigA6_Holcim_Wetlands_Oct2017.mxd 11/2/2017

Brown AND Caldwell

Wetlands 2017
Holcim Portland Plant
Florence, Colorado

N

Imagery date: September 2017

0 200 400

Feet

ilheritier

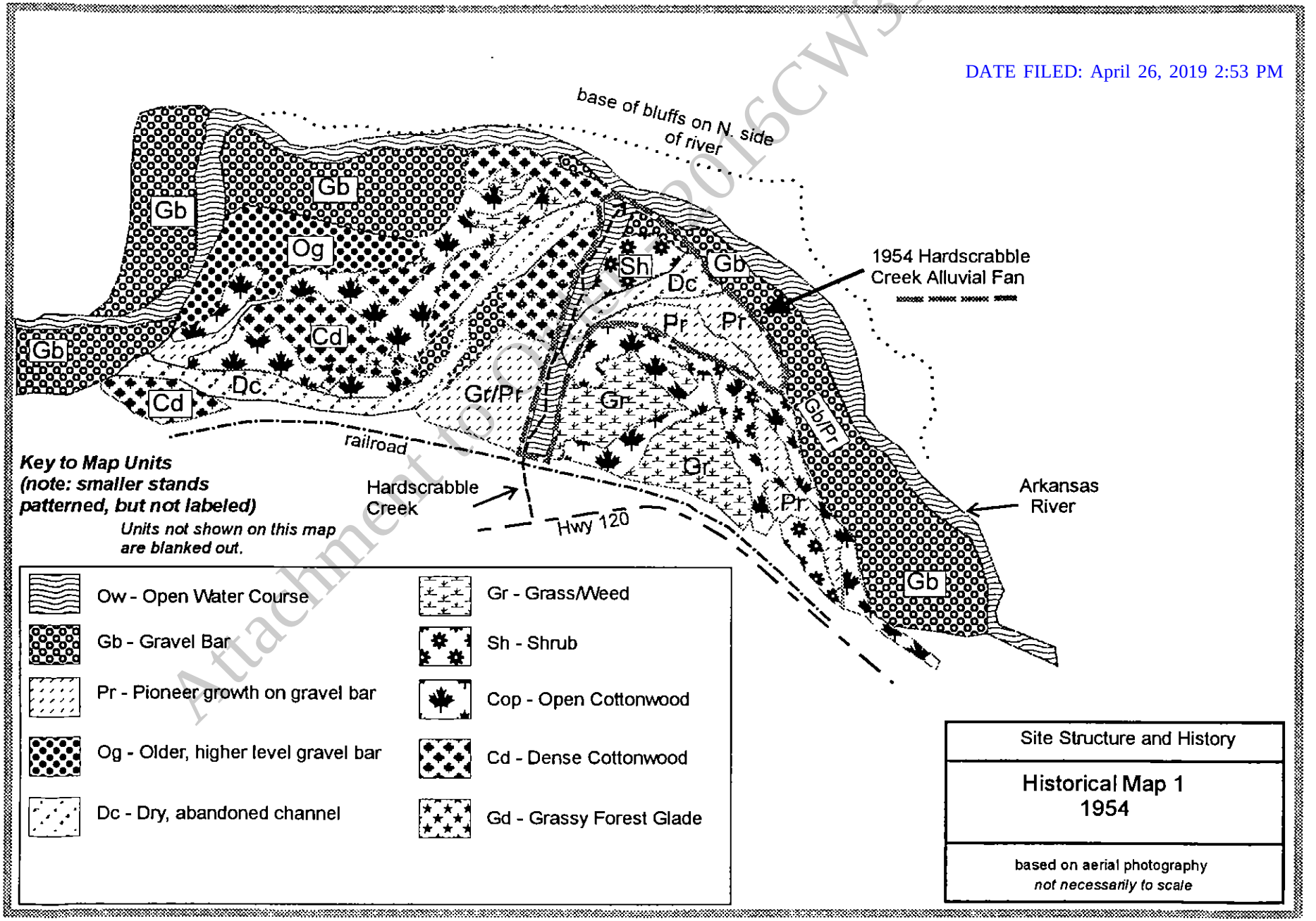
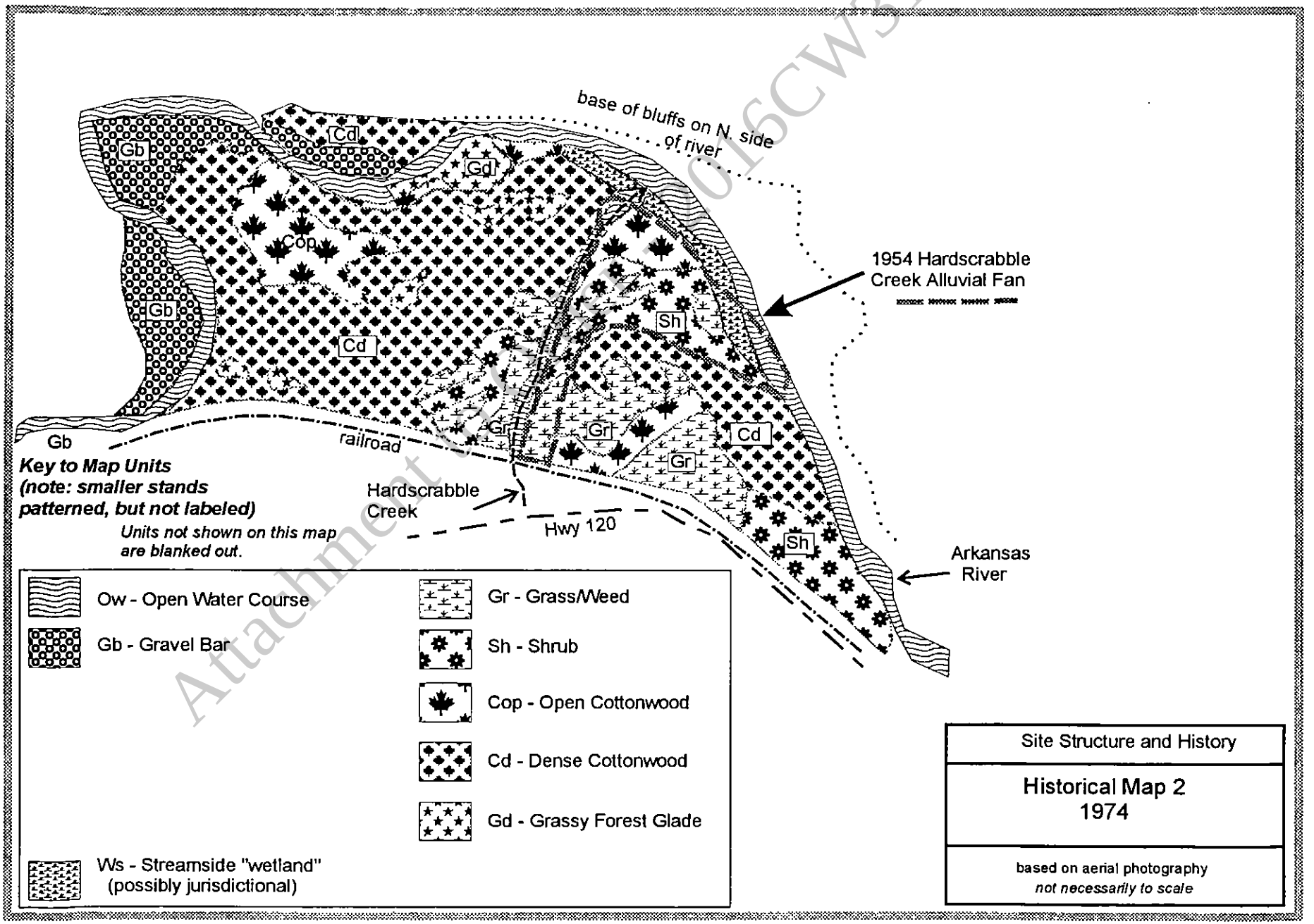
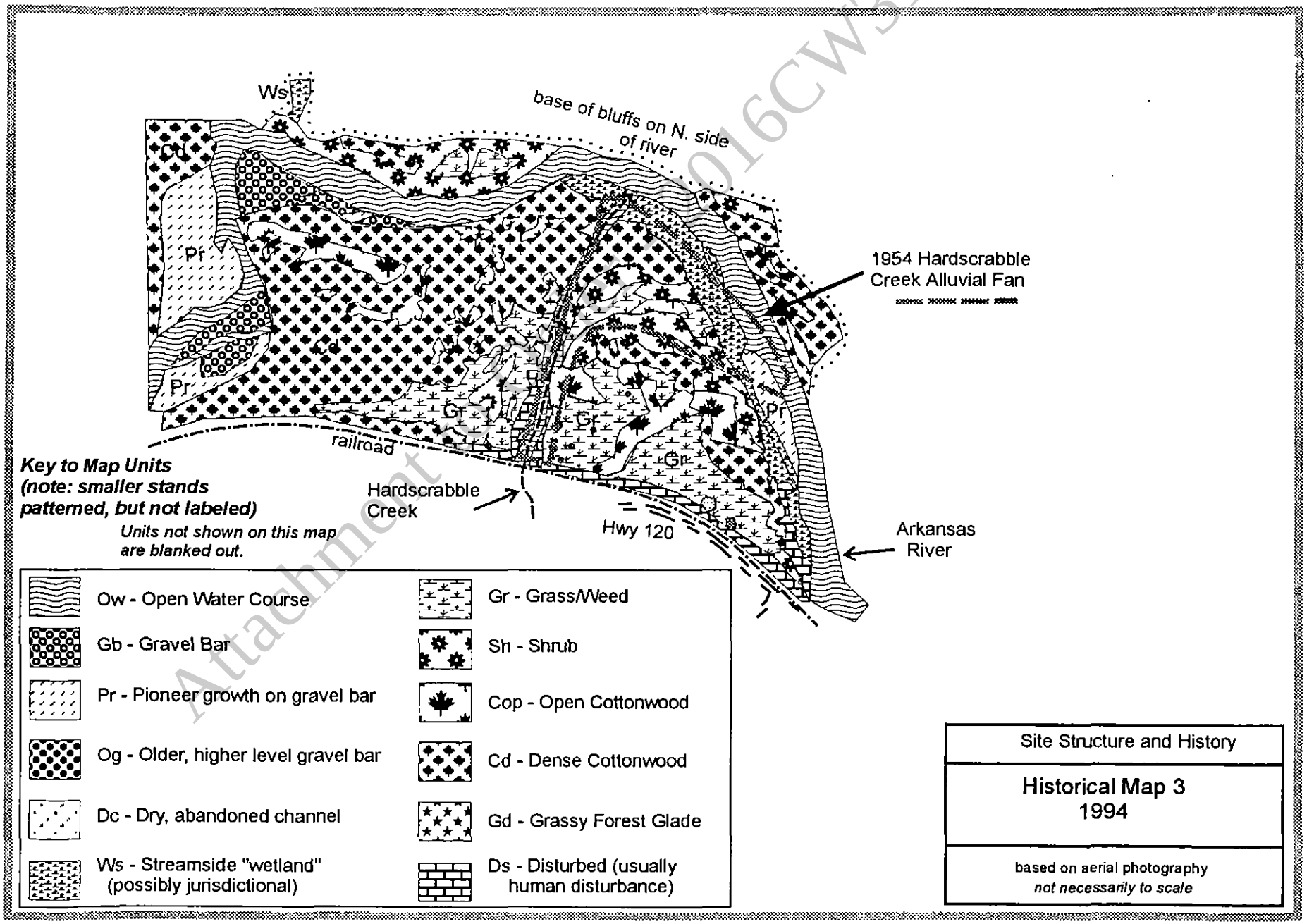
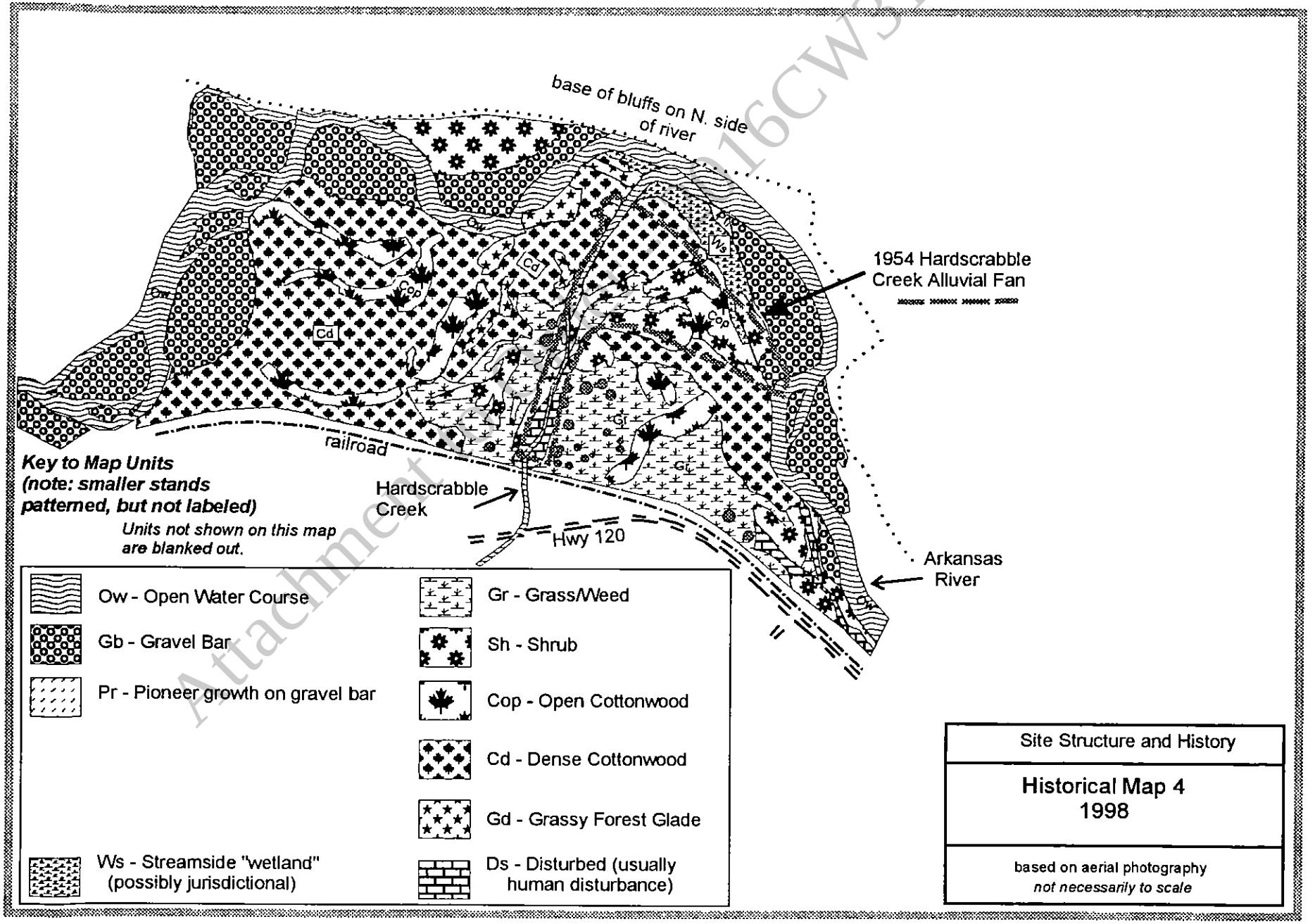


EXHIBIT F







Holcim (US) Inc. - Portland Plant Augmentation Plan Accounting
Daily Accounting
Month:

Evap Factor:

Wetland ET:

Hayner Ditch RFF:

		Depletions									Replacements							Net to River		
		Water Pumped from Quarry Ponds for Dust Suppression		Lagged Depletion from Dust Suppression	Quarry Pond Evaporation	Lagged Depletion from Pond Evap	Wetland Evap	Phreatophyte Credit	Wetland ET	Lagged Depletion from Wetlands	Hayner Ditch Diversions		Hayner Ditch CU Credits		Leased Source	Nontrib well pumping		Total Depletions	Total Replacement	Net Effect to River
Day	River Call	gal	AF	AF	AF	AF	AF	AF	AF	AF	cfs	AF	Return Flow Obligations (AF)	CU Credit (AF)	AF	gal	AF	AF	AF	AF
1																				
2																				
3																				
4																				
5																				
6																				
7																				
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25																				
26																				
27																				
28																				
29																				
30																				
31																				
Total																				

EXHIBIT G

Holcim (US) Inc. - Portland Plant Augmentation Plan Accounting

Monthly Summary

2019	QUARRY								WETLANDS										REPLACEMENT OBLIGATION			REPLACEMENT SUPPLY			NET TO RIVER
	Dust Suppression	Evaporative Consumptive Use						Lagged	Wetland Evaporation					Wetland ET			Wetland	Wetland	Total	Hayner Ditch	Total	Hayner Ditch	Leased	Total	Depletions
	Water Pumped from							Quarry Depletions					Pre-Existing	Emergent			Consumptive Use	Depletions	Depletions	Return Flow Obligations		Consumptive Use	Sources	Replacement	+
	Quarry Ponds[b]	Total Open Pond	Percent of	Gross Evap[d]	Precip[e]	Net Evap	Net Evap		Total Open Pond	Percent of	Gross Evap[d]	Gross Evap	Phreatophyte ET[g]	Net Evap	Wetland	ET Rate[i]	Wetland ET		Lagged Depletion[j,k]	(Replacement Obligation)			Credits		Supply	Replacements
Month	(Ac-Ft)	Area[c] (Ac)	Annual Evap[d]	(in)	(in)	(ft)	(Ac-Ft)	(Ac-Ft)	Area[f] (Ac)	Annual Evap[d]	(in)	(AF)	(AF)	(Ac-Ft)	Area[f,h] (Ac)	(AF/Ac)	(AF)	(AF)	(AF)	(AF)	(AF)	Replacement Rate (cfs)	(AF)	(AF)	(AF)	(AF)
Jan-18		4.70	3.0%	1.35		0.11	**0.53**		1.2	3.0%	1.35	0.13	0.00	**0.13**	7.2	0.00	**0.00**	**0.13**		**0.00**		0.000			0.000	
Feb-18		4.70	3.5%	1.58		0.13	**0.62**		1.2	3.5%	1.58	0.15	0.00	**0.15**	7.2	0.00	**0.00**	**0.15**		**0.00**		0.000			0.000	
Mar-18		4.70	5.5%	2.48		0.21	**0.97**		1.2	5.5%	2.48	0.24	0.00	**0.24**	7.2	0.00	**0.00**	**0.24**		**0.00**		0.000			0.000	
Apr-18		4.70	9.0%	4.05		0.34	**1.59**		1.2	9.0%	4.05	0.39	4.00	**0.00**	7.2	0.07	**0.50**	**0.50**		**0.00**		0.000			0.000	
May-18		4.70	12.0%	5.40		0.45	**2.12**		9.0	12.0%	5.40	4.05	5.28	**0.00**	7.2	0.47	**3.37**	**3.37**		**0.00**		0.000			0.000	
Jun-18		4.70	14.5%	6.53		0.54	**2.56**		9.0	14.5%	6.53	4.89	6.17	**0.00**	7.2	1.03	**7.40**	**7.40**		**0.00**		0.000			0.000	
Jul-18		4.70	15.0%	6.75		0.56	**2.64**		9.0	15.0%	6.75	5.06	6.78	**0.00**	7.2	1.24	**8.90**	**8.90**		**0.00**		0.000			0.000	
Aug-18		4.70	13.5%	6.08		0.51	**2.38**		9.0	13.5%	6.08	4.56	6.16	**0.00**	7.2	1.08	**7.75**	**7.75**		**0.00**		0.000			0.000	
Sep-18		4.70	10.0%	4.50		0.38	**1.76**		1.2	10.0%	4.50	0.43	4.83	**0.00**	7.2	0.77	**5.53**	**5.53**		**0.00**		0.000			0.000	
Oct-18		4.70	7.0%	3.15		0.26	**1.23**		1.2	7.0%	3.15	0.30	3.81	**0.00**	7.2	0.19	**1.36**	**1.36**		**0.00**		0.000			0.000	
Nov-18		4.70	4.0%	1.80		0.15	**0.71**		1.2	4.0%	1.80	0.17	0.00	**0.17**	7.2	0.00	**0.00**	**0.17**		**0.00**		0.000			0.000	
Dec-18		4.70	3.0%	1.35		0.11	**0.53**		1.2	3.0%	1.35	0.13	0.00	**0.13**	7.2	0.00	**0.00**	**0.13**		**0.00**		0.000			0.000	
Total		**na**	**100.0%**	**45.00**	**0.00**	**3.75**	**17.63**		na	100.0%	45	20.50	37.04	**0.82**	7.2	4.85	**34.82**	**35.64**	**0.00**	**0.00**		NA	**0.00**	**0.00**	**0.00**	

[a] Water pumped from the Duck Pond for dust suppression (estimated at approx 1 AF/month) is covered under water rights decreed in Case No. 92CW35, which allow up to 55 AF annually, which is not the subject of Case No. 16CW3102.

[b] These diversions may result in out-of-priority depletions

[c] Open quarry pond areas estimated from aerial photo of Quarry in September 2018 (4.7 acres)

[d] Percent Monthly and Gross Annual Evaporation is taken from Table 3, NOAA Technical Report NWS 33
45.0

[e] Precip is measured at Penrose

[f] wetland areas delineated by aerial photography

[g] Cottonwood ET estimated from Rantz (1968), using K=1.48, and 7.17 acres of open water that used to be covered by dense Cottonwood Forest .

[h] Emergent wetland area 2018: 21.4 - 4 - 10.22 = 7.18 acres. Credit applied for 10.22 acres mitigation of Bear Creek wetlands and approved USACE 404 permit to construct Hardscrabble wetland area.

[i] Monthly wetland ET calculated using ASCE Standardized Method, Kc from Allen (1998) for cattails, and climate data from Penrose CoAgMet station (2011-2014).

[j] Lagging based on Glover analysis and W=2500ft, X=500ft, T=40,000 GPD/ft, S=0.20; values derived from SWSP for Grisenti Pit, BBA report dated Jan 5, 2010, and DWR comments

[k] Less than 1% of depletions will accrue to the Arkansas River after one year. This amount has been added to the month 12 depletion.

Holcim (US) Inc. - Portland Plant Augmentation Plan Projection

2018	QUARRY PROJECTION								
	Dust Suppression		Evaporative Consumptive Use						Quarry Depletions
	Total	Water Pumped from							
	Projected Usage[a]	Other Ponds[b]	Total Open Pond	Percent of	Gross Evap[d]	Precip[e]	Net Evap	Net Evap	
Month	(Ac-Ft)	(Ac-Ft)	Area[c] (Ac)	Annual Evap[d]	(in)	(in)	(ft)	(Ac-Ft)	(Ac-Ft)
Jan-18	3.50	2.50	4.70	5.5%	2.48	1.05	0.14	**0.68**	**-3.18**
Feb-18	3.50	2.50	4.70	9.0%	4.05	1.38	0.26	**1.21**	**-3.71**
Mar-18	4.50	3.50	4.70	12.0%	5.40	1.12	0.38	**1.81**	**-5.31**
Apr-18	5.50	4.50	4.70	14.5%	6.53	0.81	0.50	**2.33**	**-6.83**
May-18	6.00	5.00	4.70	15.0%	6.75	1.98	0.45	**2.10**	**-7.10**
Jun-18	8.50	7.50	4.70	13.5%	6.08	1.71	0.41	**1.91**	**-9.41**
Jul-18	8.50	7.50	4.70	10.0%	4.50	0.94	0.32	**1.50**	**-9.00**
Aug-18	8.50	7.50	4.70	7.0%	3.15	0.84	0.21	**1.00**	**-8.50**
Sep-18	7.00	6.00	4.70	4.0%	1.80	0.42	0.13	**0.59**	**-6.59**
Oct-18	6.50	5.50	4.70	3.0%	1.35	0.63	0.08	**0.36**	**-5.86**
Nov-18	5.50	4.50	4.70	3.0%	1.35	0.70	0.07	**0.34**	**-4.84**
Dec-18	2.50	1.50	4.70	3.5%	1.58	0.51	0.10	**0.48**	**-1.98**
Total	**70.00**	**58.00**	**na**	**100.0%**	**45.00**	**12.10**	**3.04**	**14.31**	**-72.31**

2018	WETLAND PROJECTION											
	Wetland Evaporation						Wetland ET				Wetland	Wetland
					Pre-Existing		Emergent				Consumptive Use	Depletions
	Total Open Pond	Percent of	Gross Evap[d]	Gross Evap	Phreatophyte ET[g]	Net Evap	Wetland	ET Rate[i]	Wetland ET			Lagged Depletion[j,k]
Month	Area[f] (Ac)	Annual Evap[d]	(in)	(AF)	(AF)	(Ac-Ft)	Area[f,h] (Ac)	(AF/Ac)	(AF)		(AF)	(AF)
Jan-18	0.0	5.5%	2.48	0.00	0.00	**0.00**	11.2	0.00	**0.00**		**0.00**	0.00
Feb-18	0.0	9.0%	4.05	0.00	3.61	**0.00**	11.2	0.00	**0.00**		**0.00**	0.00
Mar-18	0.0	12.0%	5.40	0.00	4.68	**0.00**	11.2	0.00	**0.00**		**0.00**	0.00
Apr-18	0.0	14.5%	6.53	0.00	5.71	**0.00**	11.2	0.07	**0.78**		**0.78**	-0.40
May-18	0.0	15.0%	6.75	0.00	6.20	**0.00**	11.2	0.47	**5.25**		**5.25**	-2.88
Jun-18	0.0	13.5%	6.08	0.00	5.66	**0.00**	11.2	1.03	**11.52**		**11.52**	-7.20
Jul-18	0.0	10.0%	4.50	0.00	4.44	**0.00**	11.2	1.24	**13.86**		**13.86**	-10.26
Aug-18	0.0	7.0%	3.15	0.00	3.27	**0.00**	11.2	1.08	**12.07**		**12.07**	-10.60
Sep-18	0.0	4.0%	1.80	0.00	0.00	**0.00**	11.2	0.77	**8.61**		**8.61**	-9.06
Oct-18	0.0	3.0%	1.35	0.00	0.00	**0.00**	11.2	0.19	**2.12**		**2.12**	-5.25
Nov-18	0.0	3.0%	1.35	0.00	0.00	**0.00**	11.2	0.00	**0.00**		**0.00**	-2.62
Dec-18	0.0	3.5%	1.58	0.00	0.00	**0.00**	11.2	0.00	**0.00**		**0.00**	**-5.95**
Total	na	100.0%	45.00	0.00	33.58	**0.00**		4.85	**54.22**		**54.22**	**-54.22**

2018	REPLACEMENT OBLIGATION	
	Total	Total
	Depletions	
	(Replacement Obligation)	Daily Average
Month	(AF)	Replacement Rate (cfs)
Jan-18	**-3.18**	0.052
Feb-18	**-3.71**	0.060
Mar-18	**-5.31**	0.086
Apr-18	**-7.23**	0.118
May-18	**-9.98**	0.162
Jun-18	**-16.61**	0.270
Jul-18	**-19.26**	0.313
Aug-18	**-19.10**	0.311
Sep-18	**-15.65**	0.255
Oct-18	**-11.11**	0.181
Nov-18	**-7.46**	0.121
Dec-18	**-7.93**	0.129
Total	**-126.53**	NA

[a]Water pumped from the Duck Pond for dust suppression (estimated at approx 1 AF/month) is covered under water rights decreed in Case No. 92CW35, which allow up to 55 AF annually, which is not the subject of Case No. 16CW3102.

[b]These diversions may result in out-of-prority depletions

[c]Open quarry pond areas estimated from max pond size observed in 2017.

[d]Percent Monthly and Gross Annual Evaporation is taken from Table 3, NOAA Technical Report NWS 33
45 in of Annual Evaporation

[e]Precip is avg of 2000-2012 values at NOAA climate station, Canon City

[f]wetland areas taken from aerial photo dated September 2017

[g]Cottonwood ET estimated from Rantz (1968), using K=1.48, and 7.17 acres of open water that used to be covered by dense Cottonwood Forest .

[h]Emergent wetland area 2018: 21.4 - 10.22 = 11.18 acres. Credit applied for 10.22 acres mitigation of Bear Creek wetlands and approved USACE 404 permit to construct Hardscrabble wetland area.

[i]Monthly wetland ET calculated using ASCE Standardized Method, Kc from Allen (1998) for cattails, and climate data from Penrose CoAgMet station (2011-2014).

[j]Lagging based on Glover analysis and W=2500ft, X=500ft, T=40,000 GPD/ft, S=0.20; values derived from SWSP for Grisenti Pit, BBA report dated Jan 5, 2010, and DWR comments

[k]Approx 4.3 acre-feet of depletion will accrue to the Arkansas River thru the months of Jan 2019 - June 2019. This amount has been added to the December 2018 depletion.