COLORADO
Division of Water Resources
Department of Natural Resources

May 12, 2023

Jared Dains, P.E.
Applegate Group, Inc.
490 West 121st Avenue, Suite 100
Denver, CO 80234

Re: DPG Gravel Pit Substitute Water Supply Plan (WDID 0302587, Plan ID 6243)
DRMS Permit No. M-2019-028 (WDID 0307924)
SE¼ Section 1 and NE¼ Section 12, T5N, R65W, 6th P.M.
Water Division 1, Water Districts 2 and 3, Weld County

Approval Period: May 1, 2023 through September 30, 2023 (December 31, 2023 if extended)
Contact Information for Mr. Dains: 303-452-6611; jareddains@applegategroup.com

Dear Mr. Dains:

We have reviewed your letter dated April 20, 2023 requesting renewal of the substitute water supply plan ("SWSP") for a sand and gravel pit known as the DPG Gravel Pit, Division of Reclamation Mining and Safety ("DRMS") Permit No. M-2019-028, in accordance with section 37-90-137(11), C.R.S. The SWSP request was submitted on behalf of Holcim - WCR, Inc. ("Applicant" or "Holcim"). The permittee for the site is J-2 Contracting Co. The Applicant shall be responsible for compliance with this SWSP, but the State Engineer's Office may also pursue the permittee and/or landowner for eventual compliance. The required fee of $257.00 for the renewal of this substitute water supply plan has been submitted (receipt no. 10028673). The term of the SWSP is requested through the end of 2023, after which this site will be incorporated into Holcim's combined SWSP starting January 1, 2024.

SWSP Operations

The DPG Gravel Pit is located in the SE¼ of Section 1 and NE¼ of Section 12, Township 5 North, Range 65 West of the 6th P.M. The site is located just upstream of the confluence of the South Platte River and the Cache la Poudre River, as shown on the attached Figure 2. The western portion of the site has been lined with a soil bentonite slurry wall, which was granted provisional approval by the State Engineer's Office on November 4, 2022 (Delta Water Storage Reservoir, WDID 0303544). The provisional approval does not classify the structure as a reservoir capable of water storage; however, water within the liner boundary is classified as trapped native groundwater that may be removed from within the lined area and returned to the stream system without the need for replacement so long as it is not put to beneficial use. All native trapped groundwater that is put to beneficial use, except for water removed with the mined product, must be replaced by the operator.

The depletions that will result from the mining operation over the period of this SWSP will consist of evaporation from exposed groundwater, dust suppression, dewatering, and water lost with the mined product. The proposed sources of replacement water for this site are the historical

consumptive use attributable to 3 shares of the Delta Irrigation Company, water leased from the Central Colorado Water Conservancy District or City of Aurora, and accretions from water delivered to onsite recharge ponds during free river conditions.

Depletions

Based on an aerial site survey performed on April 6, 2023, there are a total of 15.66 acres of exposed groundwater surface area at the site in settling ponds, recharge ponds, and dewatering trenches. The exposed surface area is not anticipated to increase during this plan period due to dewatering. For the purposes of this SWSP, you have rounded the exposed surface area to 16 acres. Gross evaporation at the gravel pit location was estimated to be 46.0 inches per year based upon evaporation atlases in NOAA Technical Report NWS 33, distributed monthly according to SEO guidelines for gravel pits at elevations below 6,500 feet. Effective precipitation was estimated based on the data from the Kersey CoAgMet weather station (record 1992-2013). Net evaporative losses at the DPG Gravel Pit are therefore estimated to total 44.44 acre-feet for the period of May 1, 2023 through December 31, 2023, as shown on the attached Table 1.

The Applicant has projected that 450,000 tons of sand and gravel will be mined during the period of May 1, 2023 through December 31, 2023. Of this amount, 340,800 tons are anticipated to be washed and 109,700 tons are anticipated to be not washed. All of the material will be mined below the groundwater table, but in a dewatered state. The water retained by the washed sand and gravel is considered to be 4% of the mined material by weight, all of which is considered to be a groundwater diversion, resulting in a groundwater loss of 10.03 acre-feet. The water retained by the unwashed sand and gravel is considered to be 2% of the mined material by weight, resulting in a groundwater loss of 1.61 acre-feet. The total amount of water expected to be lost with the mined material is 11.64 acre-feet. For the purposes of this SWSP request, you have conservatively assumed that all of the mined material will be washed, resulting in a total of 13.24 acre-feet of water lost with the mined product. Replacements are not required to be made for water removed with material mined within the lined portion of the site.

The amount of water required for dust suppression each month will vary depending on weather conditions, but was estimated based on the previous year's operations. For the period of May 1, 2023 through December 31, 2023, it is anticipated that a total of 2.18 acre-feet of water will be required for dust control purposes, obtained from an onsite groundwater pond. Water used for dust control purposes is considered to be 100% consumed.

Operational consumptive use is anticipated to total 15.43 acre-feet for the period of May 1, 2023 through December 31, 2023, as shown on the attached Table 2. Evaporative and operational consumptive use are anticipated to total 59.87 acre-feet during this period.

The IDS AWAS stream depletion model was used to determine the lagged depletions to the South Platte River from evaporation and operational use at the site, using the infinite aquifer option. The following aquifer characteristics were used in the model: a transmissivity (T) of 180,000 gallons per day per foot; a specific yield (S) of 0.2; and a distance (X) from the centroid of the exposed groundwater surface area to the river of 1,300 feet. The distance from the centroid of the exposed groundwater surface area to the river was measured using the USGS vicinity map. Transmissivity and specific yield values were developed using information and figures presented in the SB06-193 Underground Water Storage Study, (CWCB, 2007), and the Colorado Decision Support System ("CDSS") Map Viewer transmissivity contours. Lagged depletions resulting from operational and evaporative use at the site are estimated to total 55.30 acre-feet for the period of May 1, 2023 through

December 31, 2023. The lagged depletions reflect a revised exposed groundwater surface area of 16 acres back to May 2022, based on the actual area exposed.

Since the DPG Gravel Pit is located in the area just above the confluence of the South Platte River and the Cache la Poudre River, the point of depletion and location of replacement delivery will be the confluence itself. The nearest structure that could be affected by operations at the DPG Gravel Pit is the Empire Ditch (WDID 0100501), located on the South Platte River below the Kersey gaging station.

Dewatering

The mining areas outside of the slurry wall will continue to be dewatered during this plan period, with dewatering water pumped to recharge pond(s) located within the mining permit boundary. Accretions from recharge are assumed to return to the stream system at approximately the same timing as dewatering depletions impact the stream. However, in December of 2021 the existing recharge ponds began to overfill and spill back to the Cache la Poudre River just above the confluence. The operator notified the State and Division Engineer's Office and made revisions to their accounting to reflect this change in operations. The amount of water that spilled from the recharge ponds was reduced to zero after May 2022. The dewatering water that spilled to the river created an immediate credit to the river that was able to be claimed against operational, evaporative, and dewatering depletions at the site, but resulted in lagged depletions that will continue to impact the river during this plan period. The lagged depletions resulting from dewatering operations that were not offset by delivery of water to recharge will be calculated using the IDS AWAS model with the same transmissivity and specific yield as identified above, with a distance (X) of 600 feet from the recharge pond to the river. Based on past and projected operations, lagged dewatering depletions are estimated to total 15.13 acre-feet for the period of May 1, 2023 through December 31, 2023. All water pumped for dewatering purposes must be measured by totalizing flow meters that can accurately show the monthly volume of water delivered to recharge. Any water spilled to the river must be measured and recorded and available through real-time telemetry. All dewatering water placed into the recharge pond(s) must be allowed to accrete to the stream, without use by the operator, unless an amendment is made to this plan. **Should it be determined by the water commissioner or division engineer that water within the recharge pond(s) is being diverted for any purpose by the operator and accounting is not adequate to show that recharge of dewatering water is occurring, the Applicant will need to account for any additional lagged dewatering depletions at the site.**

Replacements

The Applicant proposes to provide replacement water for this site using the consumptive use associated with 8 out of 15 shares of the Delta Irrigation Company, the owner and operator of the Patterson Ditch, which were previously used for irrigation within the mining permit boundary. The fully consumable portion of the water associated with the shares will be delivered directly to the river for immediate credit, or delivered to a recharge pond for lagged recharge accretion credits. During the non-irrigation season and/or months with insufficient historical consumptive use credits available from the Delta Irrigation Company shares, depletions will be replaced using a lease of fully consumable water supplies from Central Colorado Water Conservancy District or the City of Aurora, and/or lagged accretions resulting from the delivery of water to the onsite recharge ponds under free river conditions with the knowledge and approval of the water commissioner.

Delta Irrigation Company Shares

The Patterson Ditch (WDID 0200836) diverts from the South Platte River approximately five miles upstream of the confluence with the Cache la Poudre River. The decreed point of diversion for the Patterson Ditch is on the north side of the South Platte River in the NE¼ of the NE¼ of Section 21, Township 5 North, Range 65 West of the 6th P.M., Weld County. The ditch was decreed in case no. CA6009 to divert at a rate of 19.92 cfs, with an appropriation date of May 1, 1871. There are no prior Water Court approved changes of use for this water right. The Delta Irrigation Company ("Company") owns and operates the Patterson Ditch. There are a total of 48 shares in the Company. DPG Farms owns 15 out of the total 48 shares in the Company (Certificate No. 392). For this plan period, 8 shares are proposed to be used for replacement purposes under this SWSP.

The Applicant submitted a historical consumptive use ("HCU") analysis with the 2021-2022 SWSP request, which was revised and updated in the 2022-2023 SWSP request. The analysis was performed for all 15 of the DPG Farms shares in the Patterson Ditch. The period of analysis selected was from 1990 through 2016. For this period, diversion records for the Patterson Ditch were downloaded from Hydrobase. DPG Farms' property contains several parcels of lands that were historically irrigated by the Patterson Ditch. For the period of 1990 through 2016, based on FSA records, an average of 202.9 acres were irrigated by the DPG Farms shares under the Patterson Ditch. The crops grown consisted of corn, alfalfa, pasture grass, small vegetables, small grains, beans, and sorghum. Beginning in 2006, portions of the DPG Farms properties were taken out of production. The Hydrobase records for the irrigated acreage under the ditch range from 641 acres to 659 acres since 1997. The DPG Farms shares represent 31 percent of the Company's shares (15/48) and the 202.9 irrigated acres from the FSA records are approximately 32 percent of the total irrigated acreage under the ditch. Therefore, the FSA records appear to be consistent with the Hydrobase data.

The DPG Farm is the last farm on the Patterson Ditch and all water returned to the ditch will flow back to the South Platte River via the Patterson Ditch wasteway located approximately 500 feet down-ditch. The HCU analysis performed for the use of the 15 shares on the DPG Farm indicated that the Patterson Ditch system was generally water-long. The 15 shares owned by DPG Farms yielded in excess of 6.5 acre-feet of water per irrigated acre. This "extra" water would have been available for other shareholders to divert, or would have been left in the ditch and turned back to the South Platte River at the end of the ditch wasteway. Due to this historical practice, a demand-based analysis was used to quantify historical consumptive use and historical return flow patterns for the shares. The modeled farm headgate delivery was determined as the lesser of the Patterson Ditch pro-rata farm headgate delivery and the calculated farm headgate delivery (calculated as the crop irrigation requirement divided by a 45 percent irrigation efficiency) for each month in the study period.

The HCU analysis was conducted used the following methods and assumptions:

- Modeling using the Integrated Decision Support Group Consumptive Use Model ("IDSCU") and the Modified Blaney-Criddle method with TR21 crop coefficients with ET adjustments available in the IDSCU.
- Soil Conservation Service methodology for calculation of effective precipitation.
- Assumed ditch loss of 20 percent since Patterson Ditch is earth lined.
- The HCU analysis was revised to use temperature and precipitation data from the Greeley 3 station 2.5 miles NE of Greeley (GLY03), filled first with data from the Greeley 4 station 1.5

miles north of the Greeley airport (GLY04), with any remaining missing data filled from Greeley UNC weather station.

- The Applicant's HCU was based on 147.51 acres of corn, 2.86 acres of alfalfa, 17.80 acres of pasture grass, 9.33 acres of small vegetables, 14.51 acres of small grains, 0.37 acres of beans, and 2.02 acres of sorghum. The soil moisture water content applied in the HCU analysis is 0.14 inches of water per inch of soil.
- According to the Applicant, the DPG Farms property was flood and furrow irrigated. The Applicant initially proposed a 50 percent maximum irrigation efficiency for the flood irrigation (alfalfa and pasture grass) and 55 percent maximum efficiency for the furrow irrigation (corn, small grains, small veggies, small grains, beans and sorghum). According to the Applicant the efficiency was based on review of aerial photos of the farm, lengths of the irrigated land fields, field slopes, layout of the irrigated fields, the type of irrigation practice and soil type. The soils consist mostly of Aquolls and Aquents and are classified as having slopes of 0 to 3 percent. Due to the presumed water-long nature of the ditch, and the lack of measurement records for the ditch wasteway, the Applicant has revised the irrigation efficiency used in the HCU analysis to 45 percent to ensure that historical return flows are maintained.
- Irrigation return flows were distributed with 50 percent attributed to deep percolation (subsurface) and 50 percent to surface runoff based upon review of other studies and change cases within the basin. The surface runoff (tailwater) return flows are assumed to return to the South Platte River during the same month of diversion and thus they were not lagged to the river. The deep percolation return flows were lagged to the river using the same AWAS software. The aquifer characteristics used in the model are: transmissivity (T) = 112,000 gallons per day per foot, specific yield (SY) = 0.2, the distance from the centroid of the exposed surface area to the stream (X) =1,300 feet. Return flows associated with ditch loss were not included in this analysis since these losses will continue as water is conveyed through the ditch to the pit.
- Monitoring wells were installed at nine different locations on the DPG Farms property and water level readings were taken for the 2019 irrigation season. Using this information, a composite depth to groundwater of 6.22 feet was determined for the property. Based upon this depth, a portion of the irrigation water requirement of the crops grown on the farm was met by groundwater. Therefore, the initial IDSCU results were adjusted by applying the adjustments adapted from the *"EVAPOTRANSPIRATION AND AGRONOMIC RESPONSES IN FORMERLY IRRIGATED MOUNTAIN MEADOWS, South Park, Colorado, March 1, 1990; Revised September 1, 1991"*. For a depth to groundwater of 6.22 feet, the HCU of Native Grass was reduced by 5 percent and Alfalfa was reduced by 15 percent to account for subirrigation.

The HCU analysis results for DPG Farms' 15 shares are summarized in Table A below:

Table A - Summary of Historical Consumptive Use Analysis for 15 DPG Farms Shares (acre-feet)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Pro-rata River Headgate Diversion (15 shares)	---	---	---	52.6	211.6	247.7	352.5	356.8	252.9	139.7	5.0	---	1618.8
Pro-rata Farm Headgate Delivery (15 shares)	---	---	---	42.1	169.3	198.2	282.0	285.4	202.4	111.7	4.0	---	1295.0
Irrigation Water Requirement	---	---	---	2.3	18.4	50.8	88.1	75.5	37.2	2.6	0	---	280.8
Calculated Farm Headgate Delivery (15 shares)	---	---	---	5.2	40.9	116.5	203.7	168.7	83.3	5.8	0	---	624.1
Modeled Farm Headgate Delivery (15 shares)	---	---	---	4.9	40.9	112.9	195.9	167.8	82.6	5.8	0	---	610.8

The resulting farm headgate delivery limits and return flow obligations for the 8 shares proposed to be utilized in this SWSP are summarized in Table B below:

Table B - Summary of Historical Consumptive Use Analysis for 8 DPG Farms Shares (acre-feet)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Modeled Farm Headgate Delivery (8 shares)	---	---	---	2.63	21.80	60.19	104.46	89.48	44.07	3.10	---	---	325.7
Adjusted Consumptive Use	---	---	---	1.1	9.6	26.8	46.6	39.9	19.6	1.3	---	---	145.2
Surface Return Flows	---	---	---	0.72	6.08	16.72	28.88	24.72	12.24	0.88	---	---	90.3
Subsurface Return Flows	---	---	---	0.72	6.08	16.72	28.88	24.72	12.24	0.88	---	---	90.3
Lagged Subsurface Return Flows	2.63	1.97	1.89	1.92	3.84	8.88	16.80	19.76	15.52	9.04	4.68	3.37	90.3
Total Return Flow Obligation	2.63	1.97	1.89	2.64	9.95	25.56	45.74	44.54	27.73	9.91	4.68	3.37	180.6
Return Flow Factors	0.81%	0.60%	0.58%	0.81%	45.63%	42.47%	43.79%	49.78%	62.91%	3.04%	1.44%	1.03%	---
Depletion(-)/Accretion (+) to the River	-2.63	-1.97	-1.89	-0.01	+11.85	+34.63	+58.72	+44.93	+16.35	-6.81	-4.67	-3.37	+145.2

It has been conveyed to the Water Commissioner by a representative of the Patterson Ditch that diversions recorded at the river headgate measuring structure, which may operate submerged at times, are fairly accurate and there is an acceptable amount of tail water returning to the river. These items will continue to be monitored by the Water Commissioner over the course of the 2023 irrigation season, but it appears the historical diversion records for this ditch are accurate. Should the Applicant wish to use a higher irrigation efficiency to reduce their return flow obligation based on the assertion that the Patterson Ditch is water long and typically turns back a significant portion of diversions to the South Platte River at the end of the ditch, the Applicant must measure and record the tail water flow returned, unused, to the river. This amount could then be subtracted from the river headgate diversion.

The average farm headgate delivery amount associated with the 8 shares in the Patterson Ditch for the plan period of May 1, 2023 through December 31, 2023 is 323.1 acre-feet with a consumptive use of 143.8 acre-feet and a return flow obligation of 171.5 acre-feet. The Applicant's deliveries under this SWSP are limited to the period of May through October. In addition, the Applicant's diversions will be limited to the monthly and annual average farm headgate delivery amounts shown in Table B.

The historical return flow obligations associated with the 8 shares must be maintained under this SWSP. For the months of May through September, the daily return flow obligation will be determined by multiplying the applicable monthly return flow factor by the daily farm headgate delivery associated with the subject shares. For the months of October through December, the daily return flow obligation will be determined by multiplying the applicable monthly return flow factor by the previous year's (April through October) total deliveries associated with the subject shares, and then divided by the number of days in the month.

Any SWSP renewal request may require additional terms and conditions to assure that an expansion of use of the Applicant's shares will not result if the Applicant reaches their volumetric limits and ceases diverting water.

The required dry-up associated with the change of use of the 8 shares is 108.2 acres (8/15 × 202.9 acres). According to the map provided with the 2022-2023 SWSP request, 108.3 acres have been dried up as a result of mining operations. Verification of dry-up for the 2023 irrigation season must be provided to the Division Office at the end of the irrigation season.

Deliveries of the 8 shares for replacement purposes will be measured at a ditch turn-out, and then returned back to the Patterson Ditch. The Applicant has installed a measurement structure and recorder at the ditch turn-out for the 8 shares of the Patterson Ditch water, and the water commissioner has access to that data. As the DPG Farm is the last farm on the Patterson Ditch, all water returned to the ditch will flow back to the South Platte River via the Patterson Ditch wasteway, located approximately 500 feet down-ditch. During times of excess yield, a portion of the yield of the subject shares may be diverted into the onsite recharge ponds instead.

Recharge

Prior to delivering Delta Ditch Company share water or water diverted under free river conditions into the recharge ponds, additional metering and infrastructure will need to be installed and inspected, and monthly accounting must be updated to reflect the operation. **No credit will be given for Delta Ditch Company share water or water diverted under free river conditions placed into recharge until the water commissioner has inspected the site and approved the operation.** The amount of water recharged to the alluvial aquifer from water delivered to recharge shall be determined by measuring the inflow to the recharge facility by use of a continuous recording measuring device at the inlet and then by subtracting: (1) the amount of water that flowed out of or was discharged from the site, if any; (2) the amount of water lost to evaporation from the site; (3) the amount of water lost to evapotranspiration if vegetation is present; and (4) the amount of water retained in the site that has not yet percolated into the ground. Deliveries to two or more recharge ponds will only be allowed if recharge deliveries are recorded by separate flow meters at the inlet to each recharge pond. Each recharge pond must have a staff gage installed such that the gage registers the lowest water level in the pond. Daily evaporative losses will be calculated by multiplying the surface area for each pond in acres by the rate of evaporation. So long as the delivery of water to recharge in the ponds does not increase the surface area of the ponds or create additional evaporative depletions beyond those attributable to the groundwater exposed to the atmosphere in the ponds in connection with the extraction of sand and gravel by open mining, net evaporation may be used in calculating the volume of water lost to evaporation from the recharge ponds instead of gross evaporation. Evaporation losses will be calculated for a recharge pond for each day during which water is delivered to the recharge pond and for the number of "days to dry" following delivery of water to the pond. The timing of the recharge accretions from deliveries of water to the recharge ponds will be determined using the AWAS model with the alluvial aquifer boundary condition option, using the previously identified aquifer parameters (X = 600 ft, T = 180,000 gal/day/ft, S = 0.2).

Leased Water

Additional replacement water will need to be leased to replace depletions during the months of October, November, and December. The Applicant is working to arrange a water lease with either the Central Colorado Water Conservancy District or the City of Aurora. **This SWSP will only be extended through December 31, 2023 if a copy of an executed lease from an acceptable source is provided to this office on or before September 30, 2023.**

Previous SWSPs have utilized a lease of wholly consumable water supplies from Central Colorado Water Conservancy District ("Central"). However, Central is unsure if they will be able to provide water for this plan period. Water leased from Central will be released from the Nissen Reservoir, located on the lower South Platte River across from the DPG Gravel Pit. Alternatively, Central will release water from the Geisert Pit, located along the Cache la Poudre River near Greeley approximately 6.3 miles upstream from the DPG Gravel Pit. The only intervening ditch between the Geisert Pit and the confluence of the South Platte River with the Cache la Poudre River is the Ogilvy Ditch. Central has a bypass structure at the Ogilvy Ditch headgate to pass augmentation flows by the Ogilvy at times when the Ogilvy is diverting the entire flow of the Cache la Poudre River. The Applicant must coordinate the bypass of water with Central and also notify the District 3 Water Commissioner. Central must include in their accounting the amount of water delivered through Central's bypass structure for use in this SWSP.

If Central is unable to provide replacement water for this site, it is anticipated that water will be leased from the City of Aurora instead. The releases will be made from the Metro Waste Reclamation Facility (aka Robert W. Hite Treatment Facility, WDID 0200700) located in Denver on the South Platte River approximately 66 miles upstream from the Cache la Poudre confluence. A 16.5% (0.25% per mile) river transit loss will be assessed on all deliveries, unless otherwise determined by the Water Commissioner for District 2. During the months of November and December, it is possible for a call to be placed at the Evans Number 2 Ditch headgate for Milton Reservoir, or a call at the Western Ditch, or the Union Ditch to fill Lower Latham Reservoir, any of which could potentially sweep the river. In the event that the Evans No. 2 Ditch is sweeping the river while there is a downstream call on the South Platte River that depletions from the DPG Gravel Pit must be replaced to, replacement water from Aurora would be unable to reach the confluence with the Cache la Poudre River and unable to replace depletions from the DPG Gravel Pit to the calling right. **Therefore, depending on river conditions, leased water from Aurora may not be accepted as an adequate source of replacement supply.**

The Applicant may use for replacement purposes water available from any other source legally available for augmentation and which can be provided in the amount, at the time, and at the location required to replace out of priority depletions from the DPG Gravel Pit.

All deliveries of replacement water shall be measured in a manner acceptable to the division engineer and the water commissioner.

The attached Table 4 provides the total projected lagged depletions and replacements to the South Platte River associated with the DPG Gravel Pit.

Long Term Augmentation

All sand and gravel mining operators must comply with the requirements of the Colorado Reclamation Act and the Mineral Rules and Regulations for the protection of water resources. The Colorado Division of Reclamation, Mining, and Safety ("DRMS") requires that you provide information to demonstrate you can replace long term injurious stream depletions that result from mining-related exposure of groundwater. The final reclamation of the site will consist of two lined reservoirs through the construction of slurry walls around the Cell 1 and Cell 2 mining areas. The surface area of the reservoirs at the completion of mining is expected to be approximately 165 acres. As previously stated, the western portion of the site has been lined with a soil bentonite slurry wall which was granted provisional approval by the State Engineer's Office. A bond has been obtained for $984,566 through the DRMS to complete the lining of this site to assure that depletions from

groundwater evaporation do not occur in the unforeseen event, or events, that would lead to the abandonment of the DPG Gravel Pit.

Conditions of Approval

I hereby approve the proposed SWSP in accordance with section 37-90-137(11), C.R.S., subject to the following conditions:

1. This SWSP shall be valid for the period of May 1, 2023 through September 30, 2023, unless otherwise revoked or superseded. This SWSP may be extended through December 31, 2023 if a lease for replacement water through December 31, 2023 is obtained as described in Condition of Approval No. 9. If groundwater depletions associated with this sand and gravel mining operation will extend beyond the expiration date of this SWSP, a renewal request must be submitted to this office with the statutory fee (currently $257) no later than August 1, 2023 (October 1, 2023 if extended). If a renewal request is received after the expiration date of this plan, it may be considered a request for a new SWSP, in which case a $1,593 filing fee will apply.

2. Well permit no. 85654-F was obtained in accordance with sections 37-90-137(2) and (11), C.R.S., in conjunction with this plan, for the proposed uses of groundwater at the site, being evaporation of a maximum of 24 acres of exposed groundwater, dewatering, water lost with the mined product, dust control, concrete batching and slurry wall construction. Should additional uses of groundwater be required, a new well permit must be obtained.

3. The total surface area of the groundwater exposed at the DPG Gravel Pit site during this plan period must not exceed 16 acres, which results in a maximum evaporative loss of 44.44 acre-feet.

4. The amount of water used for operational purposes at the DPG Gravel Pit site during this plan period must not exceed 15.43 acre-feet, estimated as 13.24 acre-feet lost with the production of 450,000 tons of mined aggregate and 2.18 acre-feet for dust control purposes.

5. This Applicant must first obtain written approval from this office before exceeding these aforementioned amounts.

6. Approval of this SWSP is for the purposes as stated herein. This office must first approve any additional uses for the water. Any future historical consumptive use credit given (e.g., agricultural water transfer) for this site must consider all previous credits given.

7. All diversions, deliveries to recharge, and any water spilled from recharge shall be measured in a manner acceptable to the division engineer. The Applicant shall install and maintain measuring devices as required by the division engineer for operation of this SWSP.

8. The replacement water that is the subject of this SWSP cannot be sold or leased to any other entity. As a condition of subsequent renewals of this SWSP, the replacement water must be appurtenant to this site unless a plan for augmentation is obtained.

9. The current supply of replacement water will be insufficient to fully replace depletions after September 30, 2023. Subject to approval by the Division Engineer, if the Applicant leases or purchases replacement water which can be provided in the amount, at the time, and at the location required to replace out of priority depletions from the DPG Gravel Pit for the time period after September 30, 2023, this SWSP may be extended until December 31, 2023 or the expiration of the lease, whichever occurs first. The Applicant must provide a copy of a lease/purchase agreement to the State Engineer's Office and the Division Engineer for use of such additional replacement water not later than September 30, 2023. A new replacement source that requires

a historical consumptive use analysis would require a new SWSP request and approval. Additional sources of replacement water in this SWSP may only be used if the Applicant complies with the attached Division One Administration Protocol "*Use of Replacement Sources Not Specifically Identified in an SWSP or Augmentation Plan*".

10. The Applicant shall provide daily accounting (including, but not limited to diversions, depletions, replacement sources, and river calls) on a monthly basis. The accounting must be uploaded to the CDSS Online Reporting Tool within 30 days of the end of the month for which the accounting applies (https://dwr.state.co.us/Tools/reporting). Instructions for using the tool are available on the Division of Water Resources website on the "Services" → "Data & Information" page under the heading of Online Data Submittal. Accounting and reporting procedures are subject to approval and modification by the division engineer. Accounting forms need to identify the WDID number for each structure operating under this SWSP. Additional information regarding accounting requirements can be found in the attached Augmentation Plan Accounting Protocol. **NOTE:** Monthly accounting, even during the winter non-irrigation season, is required.

    In addition, **the Applicant** shall verify that the entity making replacements has included the Applicant on their accounting and submitted their accounting to the division office and the water commissioner.

11. Conveyance loss for delivery of replacement water to the point of depletion on the South Platte River is subject to assessment and modification as determined by the division engineer.

12. In order to prevent injury to other water rights, the division engineer and water commissioner must be able to administer Applicant's replacement water past headgates on the river at times when those headgates would otherwise be legally entitled to divert all available flow in or "sweep" the South Platte River or its tributaries. Applicant shall not receive credit for replacement of depletions to the South Platte River below such diversion structures unless bypass and measurement structures are in place to allow the division engineer and water commissioner to confirm that Applicant's replacement water is delivered past the headgates. In the event that delivery past dry-up points requires the use of a structure for which a carriage or use agreement with a third party is required, Applicant shall be responsible for securing such agreement. Until such time as the Applicant provides a copy of the carriage or use agreement to the division engineer and water commissioner, no credit will be allowed for replacement of depletions to the South Platte River below such diversion structure.

13. The Division of Water Resources will not be responsible for any enforcement or administration of third party agreements that are not included in a decree of the water court.

14. The name, mailing address, and phone number of the contact person who will be responsible for operation and accounting of this plan must be provided on the accounting forms to the division engineer and water commissioner.

15. The Applicant shall perform an inspection of the required 108.2 acres of dry-up area, submit a certification of that inspection, and provide a zipped GIS shapefile of the dried-up land as follows:

    - The Applicant's inspection of dry-up must be submitted on the Dry-Up Report - Verified Statement to Division Engineer form at the beginning of the irrigation season indicating planned dry-up and then again in the fall after the irrigation season confirming the planned dry-up was accomplished. A pdf map may be attached to that report. The Dry-Up Report form is available for download from the Division of Water Resources' website at: https://drive.google.com/drive/folders/1TF0alNt6f5fla0Xz_n1_iAGCg4xusRN2

(Water Administration → eForms Dashboard → South Platte: Dry up Certification). The Dry-Up Report must be signed by an individual with personal knowledge of the dry-up for the entire irrigation season for each parcel of land associated with the change of water rights in this SWSP.

- GIS shapefiles in a file format *.zip outlining the dry-up shall also be submitted at the same time as the Dry-Up Report. The GIS files must include any accompanying attribute data and the datum must be NAD83 and the UTM projection must be Zone 13N.
- Submittals shall be made by May 31, 2023 for planned dry-up and by October 31, 2023 for dry-up confirmation. Submittals shall be made through the CDSS Online Reporting Tool (https://dwr.state.co.us/Tools/reporting). Two new Reporting Submittal Tool elements will be created for this SWSP: (1) Dry-up shapefile and (2) Dry-Up Report - Verified Statement. For additional assistance with Online Reporting Submittals, contact Dawn Ewing in the Division 1 office at dnr_div1accounting@state.co.us.

16. The historical consumptive use attributed to the changed surface water rights under this SWSP shall not include groundwater contributions. The Applicant has reduced the historical consumptive use ("HCU") credit calculated for the subject water rights changed by this SWSP to account for sub-irrigation of grass and alfalfa on the historically irrigated lands from groundwater. Therefore, ongoing monitoring of the depth to groundwater is not required under this SWSP.

17. The Division of Water Resources will not acknowledge any recharge activity conducted without the knowledge of the water commissioner. The flow into the recharge site(s) must be metered and equipped with a continuous flow recorder unless the water commissioner, in conjunction with the division engineer, determines adequate records may be kept without such equipment. **The water commissioner must first inspect and approve the use of the recharge structures before any credit will be given for Delta Ditch Company share water or water diverted under free river conditions placed into recharge.**

18. Water may be delivered to recharge only if the net impact of this plan is not negative. Water must first be delivered or exchanged to offset negative impacts of this plan before it may be diverted for recharge.

19. **Should it be determined by the water commissioner or division engineer that water within the recharge pond is being diverted for any purpose by the operator and accounting is not adequate to show the recharge of dewatering is occurring the Applicant will need to account for any lagged dewatering depletions at the site.**

20. The Applicant shall follow the attached Division 1 Recharge Protocol for the operation of this SWSP, except that evaporative losses from the recharge ponds may be calculated based on net evaporation instead of gross evaporation so long as the surface area of the recharge ponds does not increase or create additional evaporative depletions beyond those attributable to the groundwater exposed to the atmosphere in connection with the extraction of sand and gravel by open mining.

21. All releases of replacement water must be sufficient to cover all out-of-priority depletions in time, place, and amount and must be made under the direction and/or the approval of the water commissioner. Notice must be provided and approval made by the water commissioner at least 48 hours prior to the release of replacement water, or as required by the water commissioner.

22. Replacement of lagged depletions, including those lagged depletions that occur to the stream after the expiration date of this SWSP, must continue until there is no longer an effect on stream flow.

23. Dewatering at this site will produce delayed depletions to the stream system. The Applicant must balance the amount of dewatering water delivered to recharge, the amount of dewatering water spilled from recharge, any water diverted under free river conditions and delivered to recharge, and available replacement water from the Delta Ditch Company shares and leased supplies to ensure that all lagged dewatering depletions are fully replaced.

24. The approval of this SWSP does not relieve the Applicant and/or landowner of the requirement to obtain a Water Court decree approving a permanent plan for augmentation or mitigation to ensure the permanent replacement of all depletions, including long-term evaporation losses and lagged depletions after gravel mining operations have ceased. If reclamation of the mine site will produce a permanent water surface exposing groundwater to evaporation, an application for a plan for augmentation must be filed with the Division 1 Water Court at least three (3) years prior to the completion of mining to include, but not be limited to, long-term evaporation losses and lagged depletions. If a lined pond results after reclamation, replacement of lagged depletions shall continue until there is no longer an effect on stream flow.

25. To assure that depletions from groundwater evaporation do not occur in the unforeseen event, or events, which would lead to the abandonment of the pit, the Applicant has obtained a bond in the amount of $984,566 through the DRMS for the lining of this site.

26. The state engineer may revoke this SWSP or add additional restrictions to its operation if at any time the state engineer determines that injury to other vested water rights has occurred or will occur as a result of the operation of this SWSP. Should this SWSP expire without renewal or be revoked prior to adjudication of a permanent plan for augmentation, all excavation of the product from below the water table, and all other use of water at the pit, must cease immediately.

27. In accordance with amendments to section 25-8-202(7), C.R.S. and “Senate Bill 89-181 Rules and Regulations” adopted on February 4, 1992, the state engineer shall determine if this substitute supply of replacement water is of a quality to meet requirements of use to which the senior appropriation receiving the substitute supply has normally been put. As such, water quality data or analyses may be requested at any time to determine if the requirement of use of the senior appropriator is met.

28. The decision of the state engineer shall have no precedential or evidentiary force, shall not create any presumptions, shift the burden of proof, or serve as a defense in any water court case or any other legal action that may be initiated concerning the SWSP. This decision shall not bind the state engineer to act in a similar manner in any other applications involving other plans or in any proposed renewal of this plan, and shall not imply concurrence with any findings of fact or conclusions of law contained herein, or with the engineering methodologies used by the Applicant.

If you have any questions concerning this approval, please contact Sarah Brucker in Denver at (303) 866-3581 ext. 8249 or Michael Hein in Greeley at (970) 352-8712.

Sincerely,

for Jeff Deatherage, P.E.
Chief of Water Supply

Attachments: Figure 2 - Site Map
Tables 1, 2 & 4
Augmentation Plan Accounting Protocol
Recharge Protocol
Use of Unnamed Sources Protocol

Cc: Michael Hein, Assistant Division Engineer, Michael.Hein@state.co.us
1809 56th Avenue, Greeley, CO 80634

Brent Schantz, River Operations & Compact Coordinator, Brent.Schantz@state.co.us

Louis Flink, Tabulation/Diversion Records Coordinator, Louis.Flink@state.co.us

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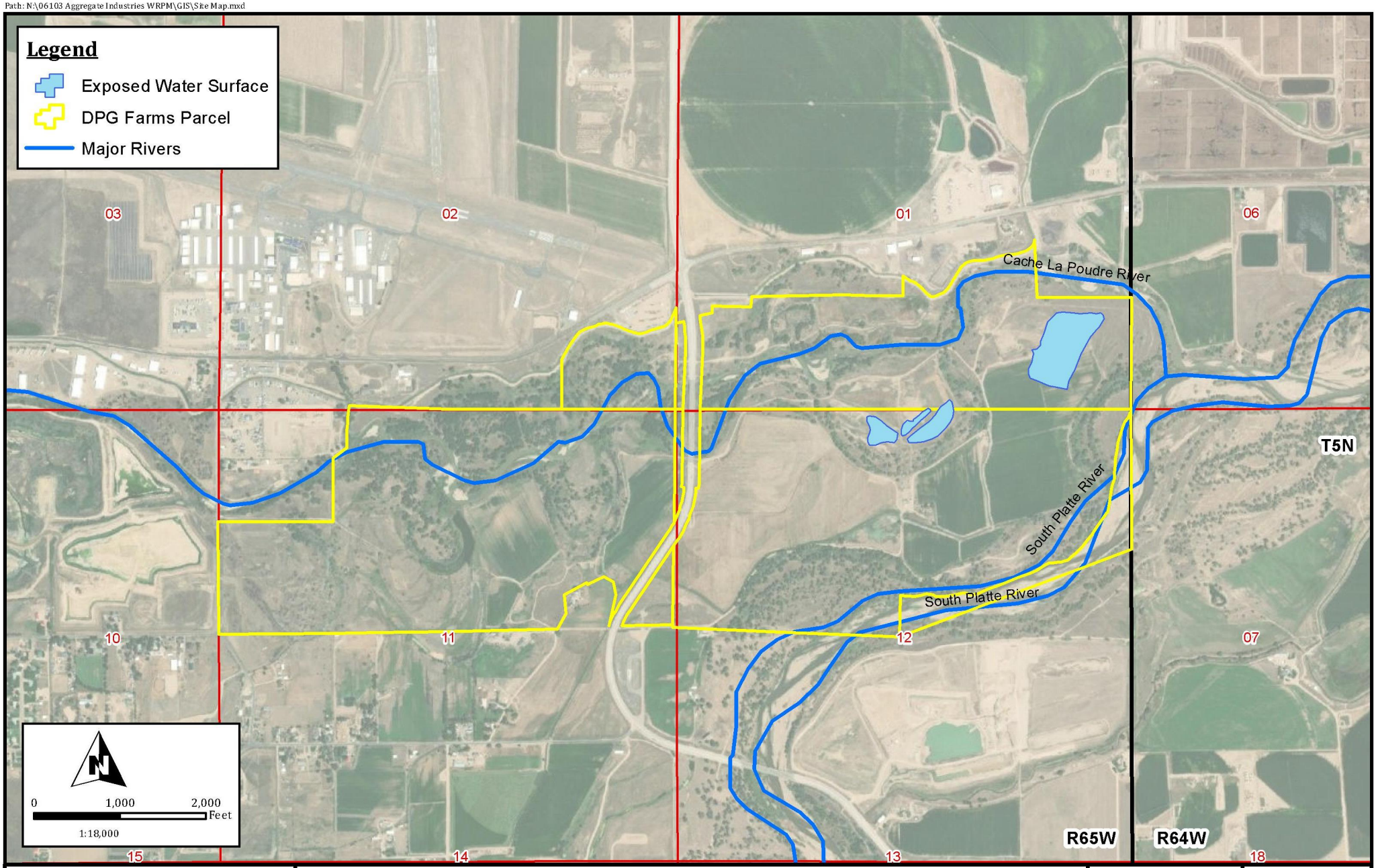
Jorge Vidal, Water Commissioner, Districts 1 & 2, Jorge.Vidal@state.co.us

Alec Hernandez, Water Commissioner, District 2, Alec.Hernandez@state.co.us

Mark Simpson, Water Commissioner, District 3, Mark.Simpson@state.co.us

Robert D. Zuber, Division of Reclamation Mining and Safety, Rob.Zuber@state.co.us

Date Saved: 4/20/2023 3:21:57 PM
Path: N:\06103 Aggregate Industries WRPM\GIS\Site Map.mxd



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DPG Pit

Site Map

Date: 20 Apr 2023

Job #: 06-103

Drawn By: WWH

Figure: 2

Of: 2

DPG Pit
May-Dec 2023 Projected Evaporative Losses
Table 1

		May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Total Exposted Water Surface Area[1]	acres	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
Distribution of Annual Evaporation[2]		0.12	0.15	0.15	0.14	0.10	0.07	0.04	0.03	0.79
Pond Evaporation[3]	inches	5.52	6.67	6.90	6.21	4.60	3.22	1.84	1.38	46.0
Effective Precipitation[4]	inches	0.71	0.58	0.20	0.07	0.07	0.10	0.29	1.00	3.0
Net Pond Evap	af/acre	0.40	0.51	0.56	0.51	0.38	0.26	0.13	0.03	2.78
Net Evaporation	**acre-feet**	**6.41**	**8.13**	**8.93**	**8.19**	**6.05**	**4.16**	**2.07**	**0.50**	**44.44**

Notes:
[1]Sum of exposed water surface areas estimated from aerial survey performed on 4/6/23 equal to 15.66 acres.
[2]Distribution of Annual Evaporation per DWR Guidelines for gravel pits at elevations below 6,500 feet.
[3]Annual evaporation rate are taken from NOAA Technical Report NWS 33.
[4]Effecitive Precipitation = 0.7 * Avg. Precip.. Monthly Precip. (Kersey Weather Station (1992 - 2013) from CoAgMet)

DPG Pit
May-Dec 2023 Projected Operational Losses
Table 2

Month	Washed Aggregate Production (tons)	Not Washed Aggregate Production (tons)	Water Retained in Product (ac-ft)	Water Used for Dust Control (ac-ft)	Water Pumped for Batch Plant (ac-ft)	Total Operational Consumptive Use (ac-ft)
May-23	50,050.00	14,950.00	1.91	0.56	0.00	2.47
Jun-23	50,050.00	14,950.00	1.91	0.14	0.00	2.05
Jul-23	50,050.00	14,950.00	1.91	0.65	0.00	2.56
Aug-23	50,050.00	14,950.00	1.91	0.41	0.00	2.32
Sep-23	50,050.00	14,950.00	1.91	0.29	0.00	2.20
Oct-23	50,050.00	14,950.00	1.91	0.11	0.00	2.02
Nov-23	20,000.00	10,000.00	0.88	0.03	0.00	0.92
Dec-23	20,000.00	10,000.00	0.88	0.00	0.00	0.88
Year 1 Total	340,300.00	109,700.00	13.24	2.18	0.00	15.43

Month	Dewatering (ac-ft)	Water Spilled from Recharge (ac-ft)	Lagged Depletions from Spill (ac-ft)	Available Credit from Spill (ac-ft)
May-23	390.07	0.00	2.58	(2.58)
Jun-23	27.01	0.00	2.25	(2.25)
Jul-23	38.14	0.00	2.12	(2.12)
Aug-23	82.39	0.00	1.93	(1.93)
Sep-23	42.75	0.00	1.72	(1.72)
Oct-23	4.24	0.00	1.64	(1.64)
Nov-23	11.33	0.00	1.47	(1.47)
Dec-23	11.33	0.00	1.42	(1.42)
Year 1 Total	607.26	0.00	15.13	-15.13

[1]Lagged Depletions calculated with AWAS; infinite aquifer, x=1,300 ft, T=180,000 gpd/ft, S=0.20

DPG Pit
May-Dec 2023 Projected Summary of Operational Losses and Lagged Depletions
Table 4

Month	Operational Losses (ac-ft)	Evaporative Losses (ac-ft)	Total Losses (ac-ft)	Lagged Depletions[1] (ac-ft)	Percent of Month Under Call Conditions	Total Depletions & Obligations (ac-ft)
May-23	2.47	6.41	8.88	6.19	100%	16.14
Jun-23	2.05	8.13	10.18	7.71	100%	33.27
Jul-23	2.56	8.93	11.49	9.14	100%	54.88
Aug-23	2.32	8.19	10.51	9.25	100%	53.79
Sep-23	2.20	6.05	8.25	8.11	100%	35.83
Oct-23	2.02	4.16	6.18	6.92	100%	16.82
Nov-23	0.92	2.07	2.99	4.77	100%	9.46
Dec-23	0.88	0.50	1.39	3.21	100%	6.57
Total	15.43	44.44	59.87	55.30		226.77

Month	Patterson Ditch to River (ac-ft)	Required Substitute Releases (ac-ft)	Substitute Losses[2] (ac-ft)	Substitute Credits (ac-ft)	River Net Balance (ac-ft)	Available Credit from Spill (ac-ft)	Final River Net Balance (ac-ft)
May-23	21.80	0.00	0.00	0.00	5.66	(2.58)	3.08
Jun-23	60.19	0.00	0.00	0.00	26.92	(2.25)	24.67
Jul-23	104.46	0.00	0.00	0.00	49.58	(2.12)	47.46
Aug-23	89.48	0.00	0.00	0.00	35.69	(1.93)	33.76
Sep-23	44.07	0.00	0.00	0.00	8.24	(1.72)	6.52
Oct-23	3.10	19.00	3.09	15.91	2.19	(1.64)	0.55
Nov-23	0.01	14.00	2.28	11.73	2.27	(1.47)	0.80
Dec-23	0.00	10.00	1.63	8.38	1.81	(1.42)	0.39
Total	323.11	43.00	6.99	36.01	132.35	-15.13	117.22

[1]Lagged Depletions calculated with AWAS; infinite aquifer, x=1,300 ft, T=180,000 gpd/ft, S=0.20
[2]Transit Losses are calculated as 1/4% per mile. The distrance from the Aurora Water release point to the DPG Pit is about 65 miles.

COLORADO
Division of Water Resources
Department of Natural Resources

Augmentation Plan Accounting Protocol
June 2022

Accounting is an administrative tool to confirm water use is in accordance with a decree or other approval including that any required replacement is made to the stream system at the correct time, location, and amount. This guideline is subordinate to any decree language or Division Engineer specific accounting requirements. It describes basic augmentation plan accounting scenarios. Accounting for more complex scenarios can build on the fundamentals described herein.

Contents

1. Background and definitions

A thorough description of augmentation plans for well pumping is available in the Beginners Guide to Augmentation Plans for Wells. The following terms are used in this document:

- **Diversions** are withdrawals from a well, stream, or pond/reservoir.
- **Depletions** are the volume of reduced streamflow caused by a diversion. Lagged depletions are those that occur at a later time than when water is diverted by well pumping or groundwater pond evaporation due to the timing of water movement through the subsurface between the well/groundwater pond and the stream.
- **Hydrobase** is DWR's database of water information.
- **Colorado's Decision Support Systems ("CDSS")** is a State of Colorado website (https://cdss.colorado.gov/) providing access to water data and tools.
- **Replacement water** is a volume of water provided to the stream system to replace depletions and satisfy the unmet needs of senior water rights. Replacement water is typically provided from a reservoir release or another source that has been contracted for the purpose of replacing depletions. Replacement water may also be provided in the form of historic consumptive use ("HCU") credits derived from a change of water right where the use of a water right was changed to augmentation.
- **Transit loss** is the diminishment of the amount of water in a stream as water travels from upstream to the downstream location.
- **Priority Admin Number** indicates the seniority of a water right; equal to the number of days between a water right's priority date and the earliest decreed priority, December 31, 1849. For example, the Priority Admin Number for a water right with a priority date of May 5, 1950 is 36650.00000. The lower the Priority Admin Number, the more senior the water right. The five digits to the right of the period are used when the postponement doctrine applies to a water right due to a delay in decreeing the water right in the court (read more about this in the Administrative Call Standard, Appendix A).
- **Administrative Call** is a term that indicates there are unfulfilled downstream water rights "calling" for curtailment of upstream junior water rights to fulfill their need. In accounting, when the downstream Administrative Call is from a senior water right (with a lower Priority Admin Number), diversions/depletions are out-of-priority and replacement water must be provided.
- **Balance** is the amount of replacement water minus the depletions and obligations, not considering the Administrative Call. The balance may be negative when the diversions resulting in the depletions are in priority.
- **Net Effect** is the amount of replacement water minus the depletions and obligations, considering the Administrative Call. When the net effect is zero or positive, it shows that the Augmentation Plan prevented injury by replacing all out-of-priority diversions/depletions.

2. Methods to submit accounting

a. Accounting and Reporting Uploader (preferred)

The preferred method to submit accounting is through the use of the CDSS Accounting and Reporting Uploader tool. To set up an online account, call or email the Division contacts for the appropriate Water Division as shown in Table 1. Additional information is available on DWR's website under Data and Information/Online Data Submittal.

b. Email

Submit via email to the Water Commissioner and the Division Accounting email shown in Table 1. File names for accounting sheets should include the 7 digit Augmentation Plan WDID assigned by the Division Engineer's office.

3. Timing of accounting submittal

Accounting must be submitted as specified by your decree, DWR administrative approval (SWSP, Replacement Plan, etc.), or as requested by the Division Engineer or designated representative(s). If timing is not specified, submit accounting with the timing shown in Table 1.[1]

Table 1. Accounting Submittal Emails and Phone Number by Division

Division	Accounting Question & Submittal Email	Contact Phone Number	Standard Submittal Timing
1 - South Platte	Div1Accounting@state.co.us	970-352-8712	30 days after the end of the reporting month
2 - Arkansas	water.reporting@state.co.us	719-542-3368	10 days after the end of the reporting month*
3 - Rio Grande	kevin.boyle@state.co.us	719-589-6683	10 days after the end of the reporting month
4 - Gunnison	gregory.powers@state.co.us	970-249-6622	10 days after the end of the reporting month
5 - Colorado	dnr_div5acct@state.co.us	970-945-5665	10 days after the end of the reporting month
6 - Yampa/White	brian.romig@state.co.us	970-846-0036	Annually by November 15 or as needed upon request
7 - San Juan/ Dolores	dnr_div7acct@state.co.us	970-247-1845	10 days after the end of the reporting month**
Designated Ground Water Basins	chris.grimes@state.co.us	303-866-3851 ext. 8253	Annually by February 15 for the prior year

*for approvals deemed critical for administration; all others (including simple subdivisions) bi-annual readings before and after the irrigation season

**for approvals deemed critical for administration; annual submittals for others

[1] For proper administration, Water Commissioners may request regular and direct submission of water data in addition to accounting submittals described herein.

4. Overall organization of accounting spreadsheet and required information per tab

a. Overall organization

The following are typical spreadsheet tab names in accounting. See the example and screenshots section for an overview of what this might look like:

i. Contact/Plan Information tab
ii. Input tab(s)
iii. Depletions & Obligations tab
iv. Replacement tab
v. Summary tab
vi. DWR tab
vii. DWR Meters tab
viii. Version/Notes tab

Fewer or additional tabs as necessary for more simple or complex accounting, subject to approval by the Division Engineer

b. Contact/Plan Information Tab

The accounting must provide the contact information including name and email address for:

i. The party(s) responsible for submitting the accounting
ii. The plan administrator and/or the plan attorney
iii. Water court case number (format of YYCWXXXX), SWSP name and 4-digit Plan ID, or Ground Water Commission Order represented in the accounting.
iv. The 7-digit overall WDID(s) associated with the augmentation plan (not the individual structure WDIDs).[2]

c. Input Tab(s)

When possible, all cells showing diversion of water (well pumping and stream diversions) should be located on one or multiple input tabs as shown below. Cells with regular input, such as meter readings and reservoir releases, should be shaded a specifically identified color to distinguish them from cells that use formulas to convert or summarize the input.

Depending on the specific operation, the following may be included on Input tabs:

i. Estimated water use or evaporation:

When meters or measurement structures are not required, water consumption is estimated based on counts (number of homes, number of domestic animals, acreage of pond surface area, etc.) multiplied by a factor. Include a column or row for each of the following that are relevant to the augmentation plan:

1. Type of use: single family dwellings, domestic animals, area of lawn and garden (include units - square feet or acres), area of pond evaporation (include units - square feet or acres), etc.
2. Count or area input value for each type: the number of homes or domestic animals or the area (square footage or acres of home lawn and garden irrigation or pond surface evaporation). [this is the "Input" that could change regularly]

[2] Colorado Decision Support System Tools (https://dwr.state.co.us/Tools) can be used to find WDIDs (see Structures), court case numbers (see Water Rights), and other supporting information.

3. Factor to convert input to consumption in acre-feet.
4. Acre-feet of consumption.

ii. Well diversion data using flow meters:

Enter raw readings or measurements (e.g., from totalizing flow meters) and how those raw readings or measurements are converted to volumes of water. There should be one row or column for each well with a meter as described below. Once the spreadsheet formulas have been established, generally only the meter reading is entered with every submittal. The well and meter information may be located in a separate well & meter information tab (see example and screenshots section).

1. Well WDID
2. Well Permit Number
3. Priority Admin Number
4. Flow Meter Serial Number
5. Reading Date
6. Reading[3] [this is the "Input" that will change regularly]
   Enter reading exactly as shown on the face of the meter as a non-negative integer.
7. Comment
   a. When a meter rolls over (such as from 999 to 000), is replaced or reset[4] , add a comment stating the old meter serial number, the maximum number before the rollover or replacement and then enter the number on the face of the meter at the end of the reporting period. Update the meter information section with the new meter's serial number.
8. Meter information:
   a. Make
   b. Model
   c. The units represented by the digits on the meter (such as gallons or acre-feet)
   d. Multiplier for meter reading (if applicable)
      i. Residential well meters typically have a multiplier of 1.0 with units of gallons. Readings should generally report all numbers on the face of the meter (including non-rotating digits) with a multiplier of 1.0.
      ii. Larger agricultural or commercial wells typically read in acre-feet and typically have a decimal multiplier. For instance, with a multiplier of 0.001, a meter reading of 123456 represents 123.456 acre-feet.
   e. Correction factor
      i. This is a multiplier used when a meter test shows a need to correct the installed meter to an accurate reading. This will be 1.0 when there is not a test showing a need for correction.
9. Acre-feet pumped
   Use a formula to convert from the meter reading to acre-feet using the multiplier and correction factor. To convert meter readings in gallons to acre-feet, divide by 325,851.

iii. Well diversion data using Electricity Consumption

For wells approved to use power records and a Power Conversion Coefficient (PCC) to estimate water pumped, the accounting information is similar to well diversion data using flow meters (section 4.c.ii) above with the following replacements (instead of 6. "Reading" and 8. "Meter information):

[3] A comment on the Meter Reading cell is used to note "Actual, Estimated, Corrected, or Calculated" for all wells subject to measurement rules when the entry is not based on a reading taken on the actual date specified.
[4] Resetting a meter may be prohibited by local well measurement rules.

6. Power meter reading [this is the “Input” that will change regularly]
8. Power Meter Information
    a. PCC

iv. Surface diversion data

Include a column or row for each surface diversion with the following information:

1. Diversion structure name or a.k.a.
2. Structure WDID
3. Measured flow through the measurement structure and units
    a. If more than one water right is diverted through the structure, there should be adjacent columns for each. Each source should have a designated column or row and labeling should include the measuring structure WDID and the source of the water (e.g. case number).
    b. If there is a multiplier that adjusts the standard measurement-flow relationship to reflect the actual measurement-flow relationship of the specific structure (“shift”), the adjusted value should be reflected in a separate column.
4. Priority Admin Number
5. Storage and release

If the diversion is to storage, which will be followed by a release of water, follow the instructions in the Reservoir Accounting Guideline.

v. Administrative Call (are diversions in-priority?)

In portions of Colorado, there may be times when depletions are in-priority, and do not require replacement. Depletions are in-priority when water rights on the stream system that are senior to the diversion have enough water and are not “calling” for more water.

1. **Simplified (percent of month administrative call)**
   For certain basic accounting, such as subdivision well depletions, the Division Engineer may allow or apply an estimate of the days of expected administrative call each month. Typically, replacement water is provided based on projected call days, which is later compared to actual administrative call data to ensure that adequate replacement was provided. In this case, the accounting should have an input field either for the number of call days or the percentage of days in the month with a call.
2. **Daily record of administrative call**
   Provide a column that shows whether depletions are either “IN” or “OUT” of priority each day.
    - Locations with minimal call variation: In areas with minimal variation in the call, the Division Office may not require a formula comparing Priority Admin Numbers, but will accept manual entries of “IN” or “OUT” of priority each day.
    - All other locations: “IN” or “OUT” of priority is determined daily using formulas comparing the Priority Admin Number of depletions to the Priority Admin Number of the calling water right in each depleted stream reach. Include a column for each of the following:
        - The Priority Admin Number of the calling water right. Calling structure information can be obtained programmatically from:
            - CDSS REST services - insert a link that pulls the required information directly from DWR’s database.
            - CDSS Administrative Calls tool.

          DWR accounting staff can provide guidance on incorporating this information within an accounting spreadsheet.

- The Name of the calling water right
- "In" or "Out"-of-priority either for all structures covered by the accounting or for each structure in its own column. Use a formula to compare the Priority Admin Number of the calling structure to the Priority Admin Number of the structure(s) in the accounting.

d. Depletion & Obligation tab

Used to (1) convert well pumping (and groundwater pond evaporation) to lagged depletions impacting the stream and (2) show lagged depletions that are out-of-priority, and (3) include any additional water obligations of the plan for augmentation.

i. Calculate lagged depletions - Although well pumping and modeling may use a monthly step function to determine the depletions from pumping, the monthly result may, if requested by the Division Office or required by decree, then be divided by the number of days in the month in order to calculate a daily impact for daily water administration.
   1. Well Pumping (or groundwater pond evaporation) - Reference back to the Input tab for the acre-feet of water pumped or evaporated.
   2. Consumption factor (%) - If the decree or approval describes that a percentage of the water pumped is consumed and only the consumed amount is replaced.
   3. Acre-feet consumed - Multiply the acre-feet pumped by the consumption factor.
   4. Delay Factors - show factors that convert pumping in one month to depletions in future months. These may be percentages per month, that total 100 percent over an extended period of time.
   5. Depletions - a formula that combines previous months and present month pumping with the delay factors to determine depletions impacting the stream this month and in future months.

ii. Out-of-priority depletions are combined into one column for each reach considering the administrative call information included on the Input tab.

iii. Return flow obligations (if applicable): Replacement water sources changed from a historical irrigation use usually have a return flow obligation that must also be tracked in accounting. Return flow obligations are similar to depletions because they must be replaced in time, place, and amount. Depending on decree language and preference, return flow obligations may be included under the replacement tab in section 4.e. below. For each replacement source with return flow obligations, include the following:
   - the basis and volume of the return flow obligation,
   - the location of the return flow obligation,
   - replacement of the return flow obligation.

e. Replacement tab

List each structure providing replacement water, transit loss information, and volumes released:

i. Structure providing replacement water: name of reservoir, ditch, well, leased or other replacement water, its WDID, and the water court decree allowing its use for augmentation or replacement. For instructions on accounting for replacement using recharge accretions, refer to specific recharge guidance.

ii. Replacement water travel distance (miles)
the distance from the point of release to the location of the out-of-priority depletion where replacement is owed

iii. Transit loss percent per mile (%)

iv. Total transit loss (%)
v. Volume released (acre-feet)
vi. Transit loss volume (acre-feet)
vii. Volume delivered (acre-feet) - equal to volume released minus transit loss volume
viii. Return flow obligations (acre-feet): Depending on decree language as described above, these may be included here instead of in the depletion tab. See description under section 4.d. above.

f. Summary Tab

The Summary Tab is used to calculate the Net Effect of the Plan on each impacted stream reach. The summary should reference back to information and formulas in the other spreadsheet tabs. The summary tab compares obligations, replacements and that replacements equal or exceed obligations in time, place, and amount. The Summary tab should only summarize data and calculations located in other tabs of the accounting. It should not contain manual entries, input data, or make calculations that are used in other tabs.

The Summary Tab should contain the following for each impacted stream reach (typically on a daily basis or as required by the division office):

i. Total depletions and obligations
ii. Total replacement
iii. Balance - Total replacement minus total depletions and obligations, which may be negative when the diversions resulting in the depletions are in priority.
iv. Net Effect - Total replacement minus out-of-priority depletions and obligations. If the net effect is negative, the Plan resulted in injury.

g. DWR tab for Diversion Record Data Import

A tab titled **"DWR"** can be used to convert data input or numbers calculated in other tabs into rows that represent diversion record water classes, which DWR staff can upload to create official diversion records. When appropriate, DWR staff will develop this tab or work with plan owners to develop this tab, ensure it follows DWR's standard format and utilizes water classes according to the Diversion Records Standard. This format is necessary to allow the records to be imported directly into Hydrobase.

h. DWR Meters tab for Meter Reading Data Import

A tab titled **"DWR Meters"** can be included for use in bulk uploading meter readings. This calculates pumping totals in compliance with well rules or to meet other Division-specific requirements. In order for this tab to be bulk uploaded into Hydrobase, the columns in this tab must be formatted as shown in the "User Guide - How to Bulk Upload Meter Readings".

i. Version/Notes tab

A tab to document changes in accounting formulas and the date of those changes.

5. Requirements and recommendations for all tabs

a. Accounting should show how raw input data is manipulated using formulas to determine the resulting impact on the river. Accounting must therefore include a functional spreadsheet (ie no pdfs) showing all operations, formulas, etc. to clearly show calculations.

b. The use of a water year of November 1 through October 31 is required unless specifically decreed otherwise. When a different water year is required by decree, DWR may request additional months of data in the accounting to include the November 1 through October 31

time period, resulting in more than 12 months of data being reported.

c. For all tabs other than the Summary tab, include running accounting for the entire water year without monthly subtotals. Monthly subtotals commonly result in errors in the spreadsheet. The Summary tab can be used as a place to show monthly totals.

d. Date fields should be complete dates (month, day, and year, recognized as a date value by the spreadsheet software) but may be formatted to display as desired.

e. Use consistent cell color shading to clearly identify the different types of information, such as manual input cells and formula cells (provide a legend for data types, see example below)

f. Enter "0" in cells to document no diversion or use, rather than blanks, hyphens, or another character.

g. When a formula is overwritten with a manual entry, the cell should be highlighted and a comment added for the reasoning.

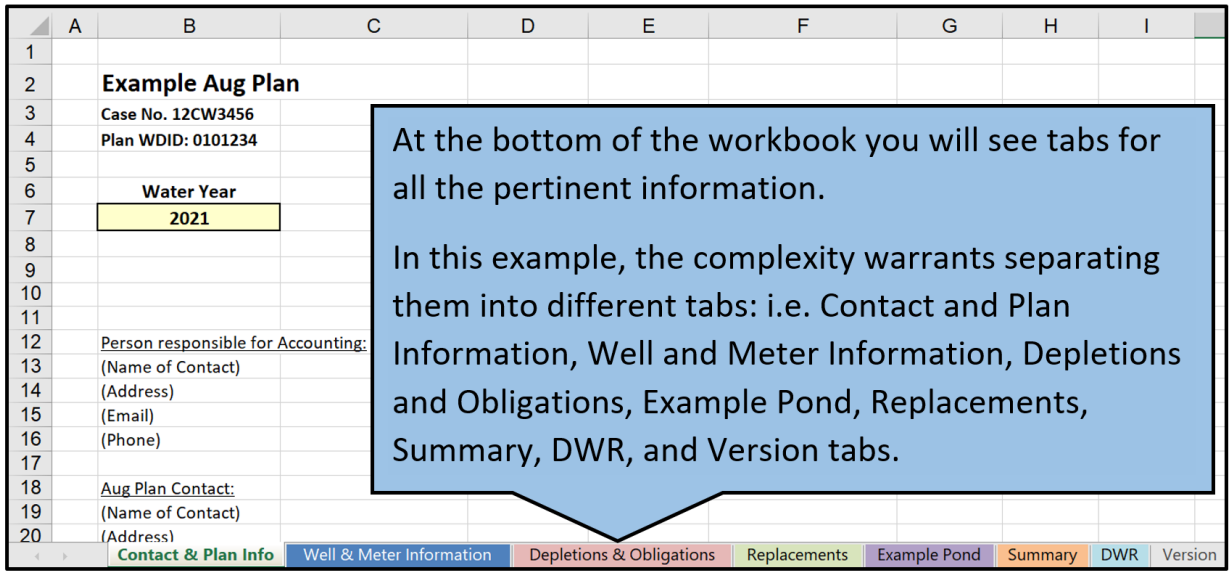
h. When there are multiple stream reaches involved, organize accounting from upstream to downstream.

i. Footnotes should be utilized, as necessary, to describe the basis for formulas, calculations imposed on the raw input data, and column descriptions.

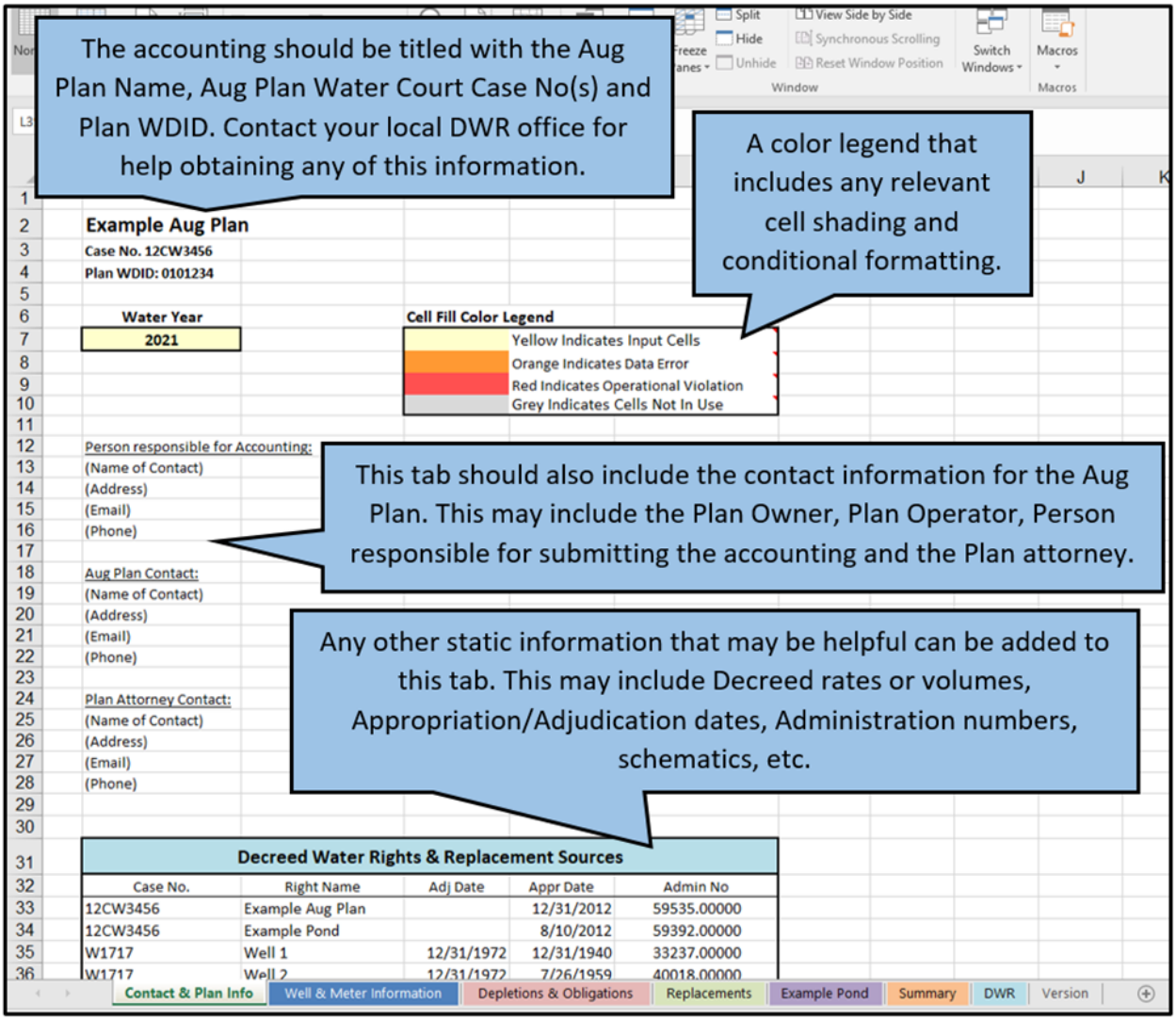
6. Example, Screenshots, and Spreadsheet Templates

Water users may request spreadsheet templates from their local division office for use as examples of how accounting may be assembled, but are responsible for developing their own functional accounting customized for their own Plan requirements. Note that example and actual accounting may have slightly different organization than what is described above.

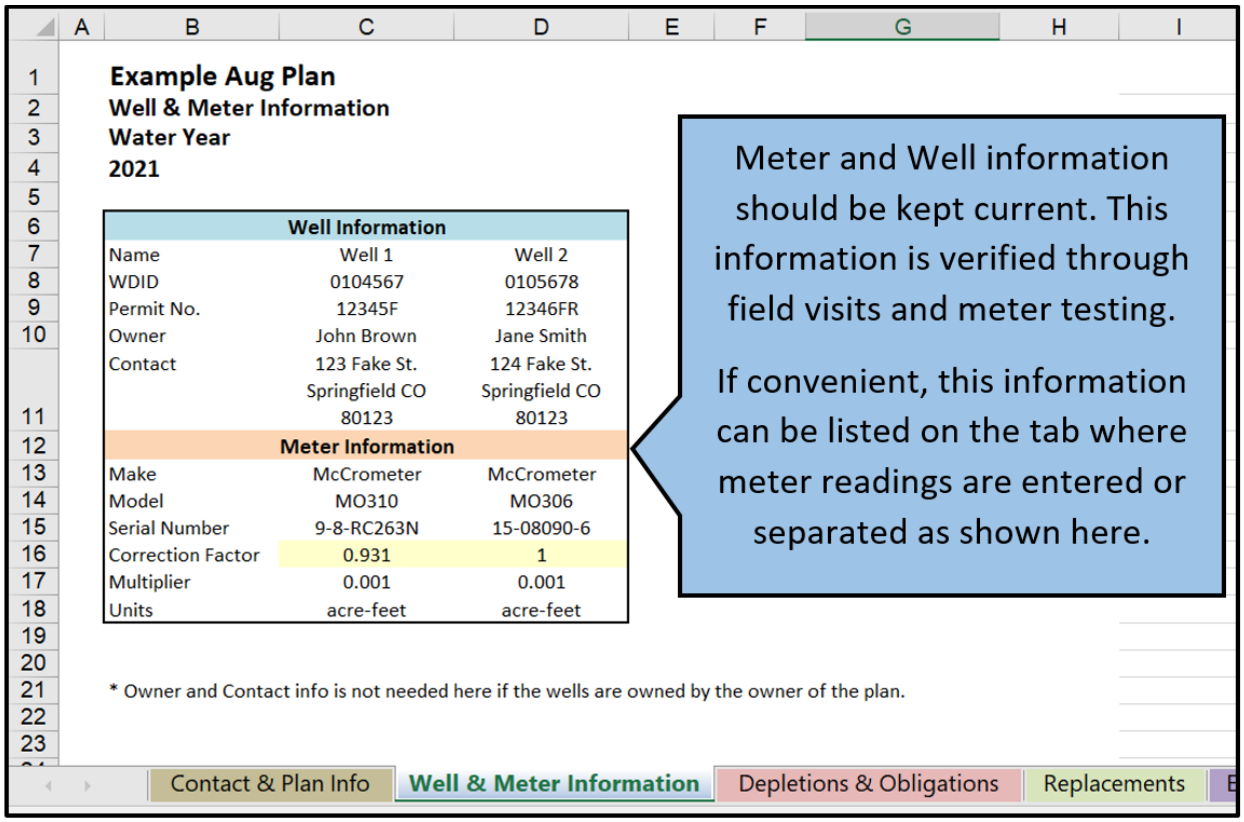
a. (List of relevant tabs)



b. (Contact & Plan Information)



c. (Well & Meter Information)



Example Aug Plan
Well & Meter Information
Water Year
2021

Well Information		
Name	Well 1	Well 2
WDID	0104567	0105678
Permit No.	12345F	12346FR
Owner	John Brown	Jane Smith
Contact	123 Fake St. Springfield CO 80123	124 Fake St. Springfield CO 80123
Meter Information		
Make	McCrometer	McCrometer
Model	MO310	MO306
Serial Number	9-8-RC263N	15-08090-6
Correction Factor	0.931	1
Multiplier	0.001	0.001
Units	acre-feet	acre-feet

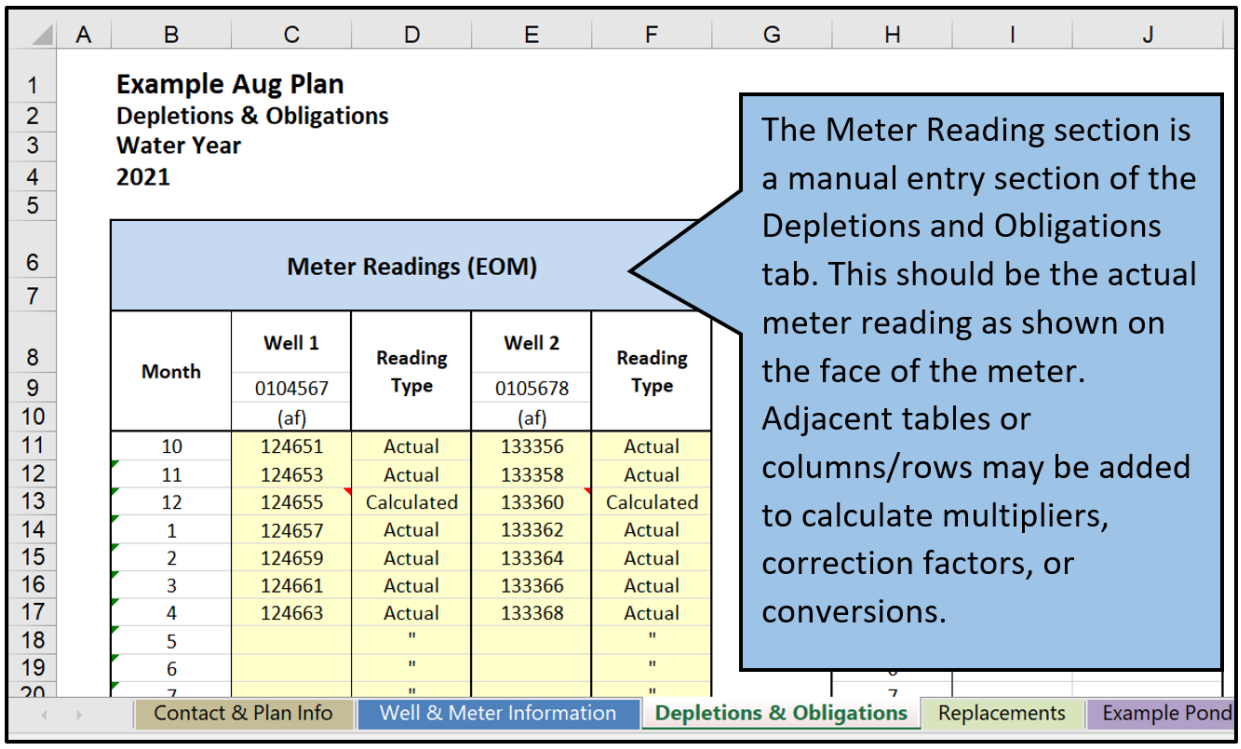
Meter and Well information should be kept current. This information is verified through field visits and meter testing.

If convenient, this information can be listed on the tab where meter readings are entered or separated as shown here.

* Owner and Contact info is not needed here if the wells are owned by the owner of the plan.

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | Replacements

d. (Depletions & Obligations) - in this example, the Depletions & Obligations tab includes cells for entering meter readings, calculating well pumping over the period, and converting that to lagged depetions.



Example Aug Plan
Depletions & Obligations
Water Year
2021

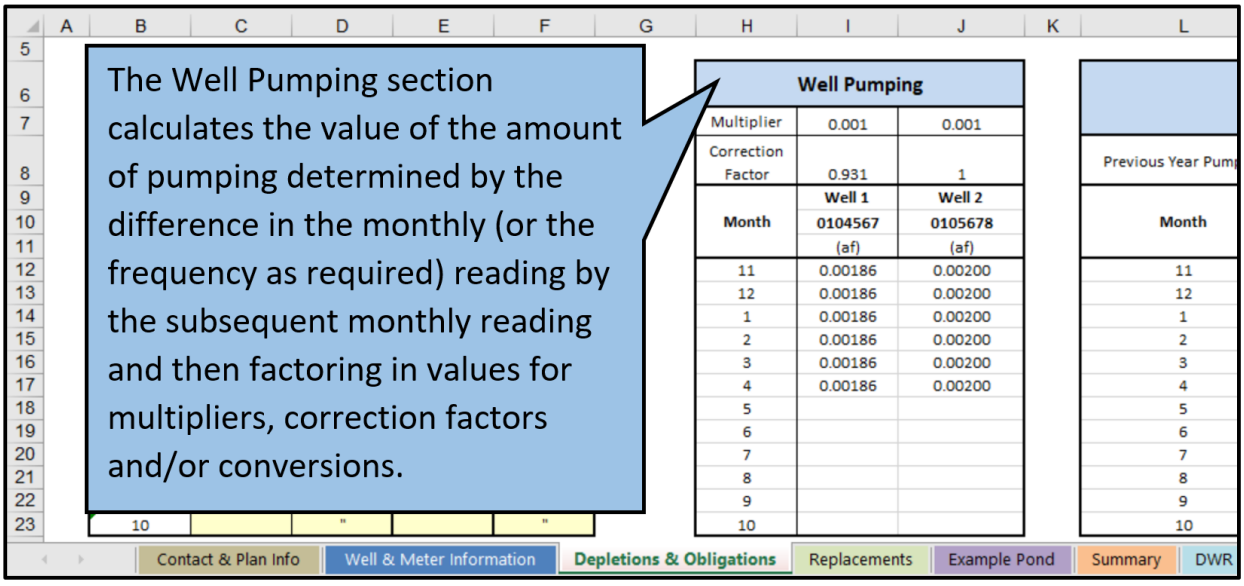
Meter Readings (EOM)

Month	Well 1 0104567 (af)	Reading Type	Well 2 0105678 (af)	Reading Type
10	124651	Actual	133356	Actual
11	124653	Actual	133358	Actual
12	124655	Calculated	133360	Calculated
1	124657	Actual	133362	Actual
2	124659	Actual	133364	Actual
3	124661	Actual	133366	Actual
4	124663	Actual	133368	Actual
5		"		"
6		"		"

The Meter Reading section is a manual entry section of the Depletions and Obligations tab. This should be the actual meter reading as shown on the face of the meter. Adjacent tables or columns/rows may be added to calculate multipliers, correction factors, or conversions.

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | Replacements | Example Pond

e. (Depletions & Obligations)



The Well Pumping section calculates the value of the amount of pumping determined by the difference in the monthly (or the frequency as required) reading by the subsequent monthly reading and then factoring in values for multipliers, correction factors and/or conversions.

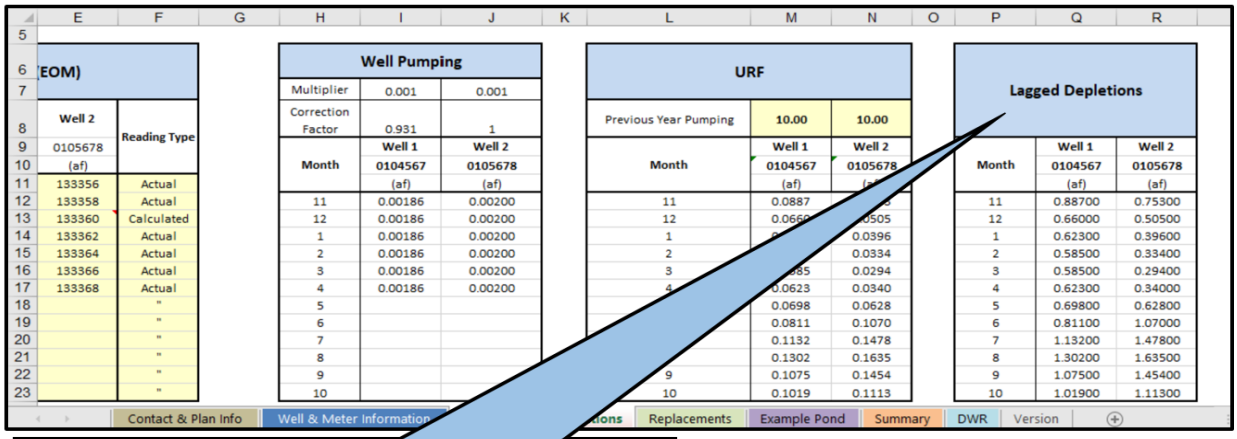
Well Pumping

Multiplier	0.001	0.001
Correction Factor	0.931	1
Month	Well 1 0104567 (af)	Well 2 0105678 (af)
11	0.00186	0.00200
12	0.00186	0.00200
1	0.00186	0.00200
2	0.00186	0.00200
3	0.00186	0.00200
4	0.00186	0.00200
5		
6		
7		
8		
9		
10		

Previous Year Pump
Month
11
12
1
2
3
4
5
6
7
8
9
10

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | Replacements | Example Pond | Summary | DWR

f. (Depletions & Obligations) - calculate lagged depletions for the month



(EOM)	
Well 2 0105678 (af)	Reading Type
133356	Actual
133358	Actual
133360	Calculated
133362	Actual
133364	Actual
133366	Actual
133368	Actual

Well Pumping		
Multiplier	0.001	0.001
Correction Factor	0.931	1
Month	Well 1 0104567 (af)	Well 2 0105678 (af)
11	0.00186	0.00200
12	0.00186	0.00200
1	0.00186	0.00200
2	0.00186	0.00200
3	0.00186	0.00200
4	0.00186	0.00200
5		
6		
7		
8		
9		
10		

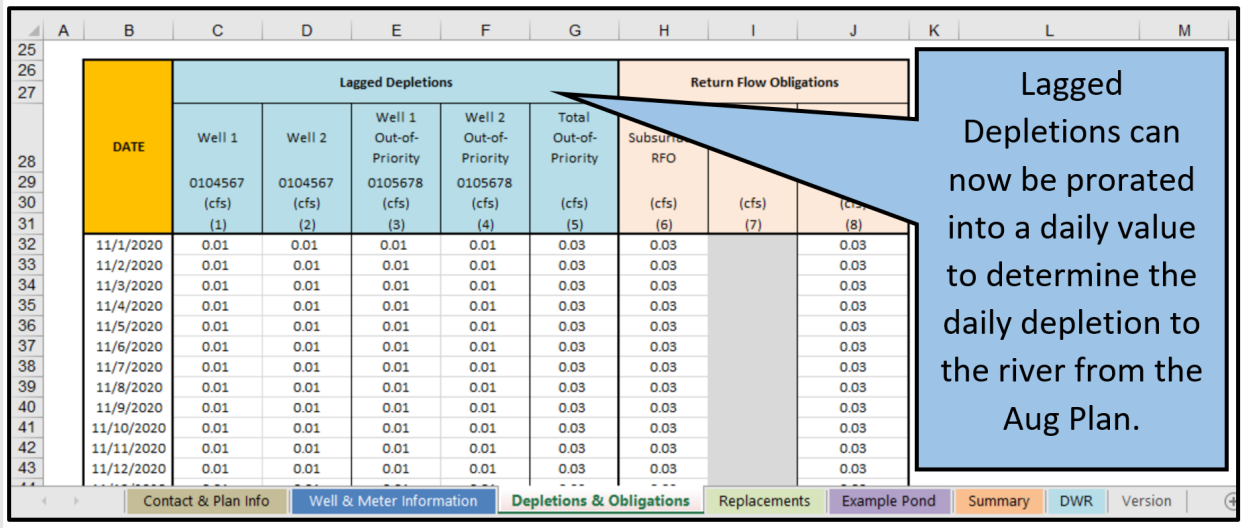
URF		
Previous Year Pumping	10.00	10.00
Month	Well 1 0104567 (af)	Well 2 0105678 (af)
11	0.0887	
12	0.0660	0505
1		0.0396
2		0.0334
3	585	0.0294
4	0.0623	0.0340
	0.0698	0.0628
	0.0811	0.1070
	0.1132	0.1478
	0.1302	0.1635
9	0.1075	0.1454
10	0.1019	0.1113

Lagged Depletions		
Month	Well 1 0104567 (af)	Well 2 0105678 (af)
11	0.88700	0.75300
12	0.66000	0.50500
1	0.62300	0.39600
2	0.58500	0.33400
3	0.58500	0.29400
4	0.62300	0.34000
5	0.69800	0.62800
6	0.81100	1.07000
7	1.13200	1.47800
8	1.30200	1.63500
9	1.07500	1.45400
10	1.01900	1.11300

Contact & Plan Info | Well & Meter Information | ...ions | Replacements | Example Pond | Summary | DWR | Version

Lagged Depletions should be calculated utilizing the Well Pumping data and the lagging method established by the relevant decree or SWSP (Stream depletion Factors or Glover Parameters).

g. (Depletions & Obligations) - convert monthly lagged depletions to daily

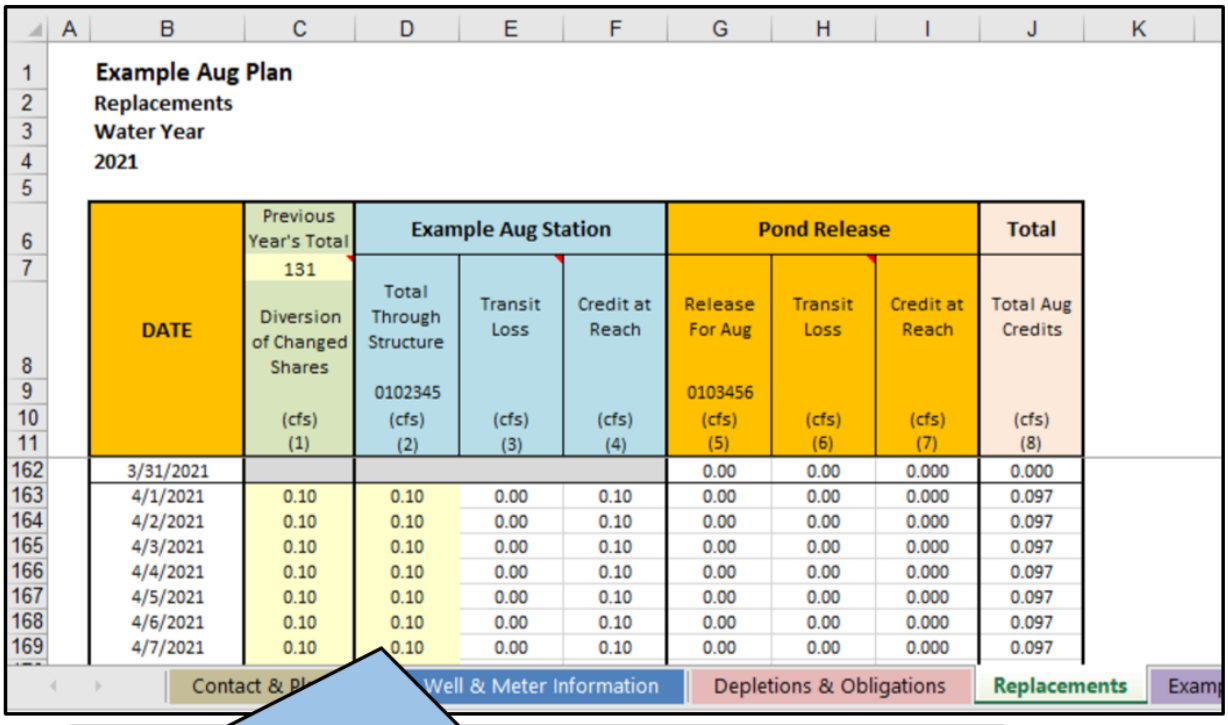


DATE	Lagged Depletions: Well 1 0104567 (cfs) (1)	Well 2 0104567 (cfs) (2)	Well 1 Out-of-Priority 0105678 (cfs) (3)	Well 2 Out-of-Priority 0105678 (cfs) (4)	Total Out-of-Priority (cfs) (5)	Return Flow Obligations: Subsurf... RFO (cfs) (6)	(cfs) (7)	(cfs) (8)
11/1/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/2/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/3/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/4/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/5/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/6/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/7/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/8/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/9/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/10/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/11/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03
11/12/2020	0.01	0.01	0.01	0.01	0.03	0.03		0.03

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | Replacements | Example Pond | Summary | DWR | Version

Lagged Depletions can now be prorated into a daily value to determine the daily depletion to the river from the Aug Plan.

h. (Replacements)



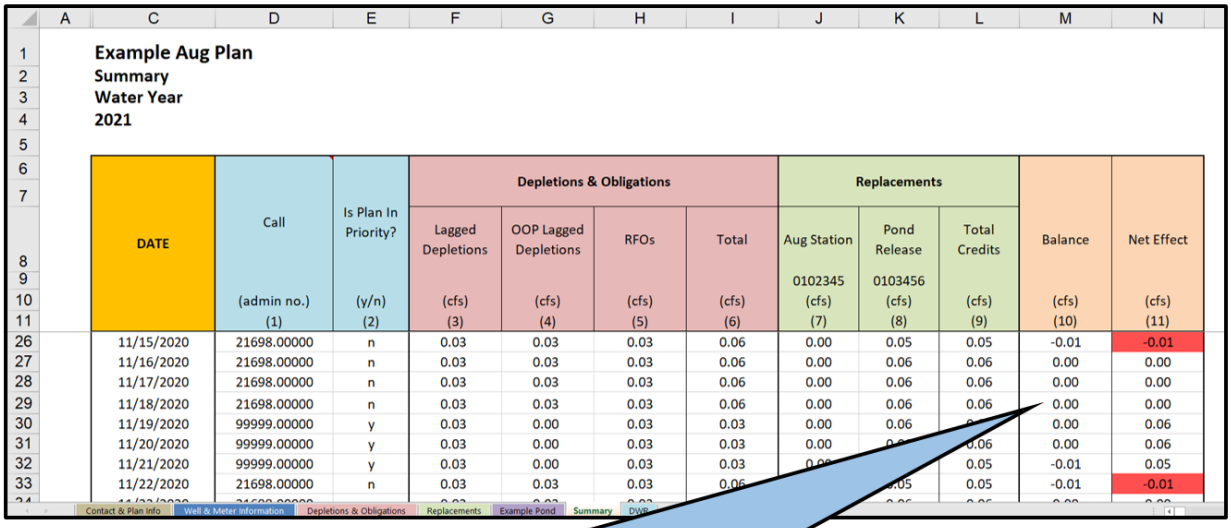
Example Aug Plan
Replacements
Water Year
2021

DATE	Previous Year's Total	Example Aug Station			Pond Release			Total
	131							
	Diversion of Changed Shares	Total Through Structure 0102345	Transit Loss	Credit at Reach	Release For Aug 0103456	Transit Loss	Credit at Reach	Total Aug Credits
	(cfs) (1)	(cfs) (2)	(cfs) (3)	(cfs) (4)	(cfs) (5)	(cfs) (6)	(cfs) (7)	(cfs) (8)
3/31/2021					0.00	0.00	0.000	0.000
4/1/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/2/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/3/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/4/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/5/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/6/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097
4/7/2021	0.10	0.10	0.00	0.10	0.00	0.00	0.000	0.097

Contact & Pl... | Well & Meter Information | Depletions & Obligations | Replacements | Exam...

Input information should be shaded differently than the calculated (cells with formulas) cells. Please provide a legend with the color/shading scheme.

i. (Summary) - daily



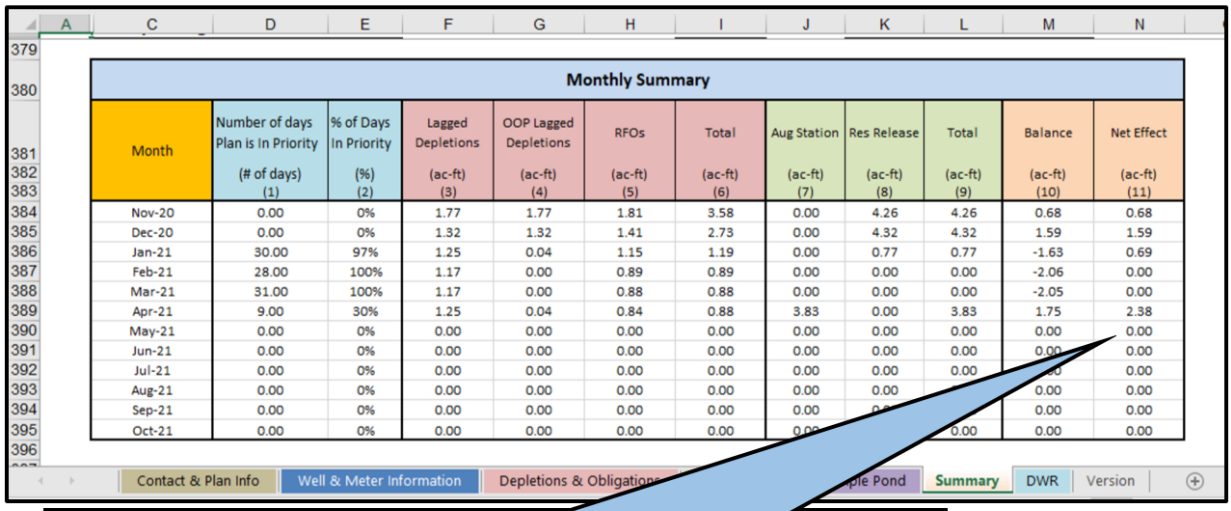
Example Aug Plan
Summary
Water Year
2021

DATE	Call (admin no.) (1)	Is Plan In Priority? (y/n) (2)	Depletions & Obligations: Lagged Depletions (cfs) (3)	Depletions & Obligations: OOP Lagged Depletions (cfs) (4)	Depletions & Obligations: RFOs (cfs) (5)	Depletions & Obligations: Total (cfs) (6)	Replacements: Aug Station 0102345 (cfs) (7)	Replacements: Pond Release 0103456 (cfs) (8)	Replacements: Total Credits (cfs) (9)	Balance (cfs) (10)	Net Effect (cfs) (11)
11/15/2020	21698.00000	n	0.03	0.03	0.03	0.06	0.00	0.05	0.05	-0.01	-0.01
11/16/2020	21698.00000	n	0.03	0.03	0.03	0.06	0.00	0.06	0.06	0.00	0.00
11/17/2020	21698.00000	n	0.03	0.03	0.03	0.06	0.00	0.06	0.06	0.00	0.00
11/18/2020	21698.00000	n	0.03	0.03	0.03	0.06	0.00	0.06	0.06	0.00	0.00
11/19/2020	99999.00000	y	0.03	0.00	0.03	0.03	0.00	0.06	[illegible]	0.00	0.06
11/20/2020	99999.00000	y	0.03	0.00	0.03	0.03	0.00	[illegible]	0.06	0.00	0.06
11/21/2020	99999.00000	y	0.03	0.00	0.03	0.03	[illegible]	[illegible]	0.05	-0.01	0.05
11/22/2020	21698.00000	n	0.03	0.03	0.03	0.06	[illegible]	[illegible]	0.05	-0.01	-0.01

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | Replacements | Example Pond | Summary | DWR

The Balance column is the balance of Replacements and actual Depletions/Obligations regardless of whether the plan is in or out of priority. It is calculated by subtracting Depletions and Obligations from Replacements.

j. (Summary) - a monthly summary table may be added at the bottom of the Summary tab below the daily summary



Monthly Summary

Month	Number of days Plan is In Priority (# of days) (1)	% of Days In Priority (%) (2)	Lagged Depletions (ac-ft) (3)	OOP Lagged Depletions (ac-ft) (4)	RFOs (ac-ft) (5)	Total (ac-ft) (6)	Aug Station (ac-ft) (7)	Res Release (ac-ft) (8)	Total (ac-ft) (9)	Balance (ac-ft) (10)	Net Effect (ac-ft) (11)
Nov-20	0.00	0%	1.77	1.77	1.81	3.58	0.00	4.26	4.26	0.68	0.68
Dec-20	0.00	0%	1.32	1.32	1.41	2.73	0.00	4.32	4.32	1.59	1.59
Jan-21	30.00	97%	1.25	0.04	1.15	1.19	0.00	0.77	0.77	-1.63	0.69
Feb-21	28.00	100%	1.17	0.00	0.89	0.89	0.00	0.00	0.00	-2.06	0.00
Mar-21	31.00	100%	1.17	0.00	0.88	0.88	0.00	0.00	0.00	-2.05	0.00
Apr-21	9.00	30%	1.25	0.04	0.84	0.88	3.83	0.00	3.83	1.75	2.38
May-21	0.00	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jun-21	0.00	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jul-21	0.00	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]	0.00
Aug-21	0.00	0%	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]	0.00	0.00
Sep-21	0.00	0%	0.00	0.00	0.00	0.00	0.00	[illegible]	[illegible]	0.00	0.00
Oct-21	0.00	0%	0.00	0.00	0.00	0.00	[illegible]	[illegible]	0.00	0.00	0.00

Contact & Plan Info | Well & Meter Information | Depletions & Obligations | [illegible]ple Pond | Summary | DWR | Version

Net Effect is the Balance or Net Impact value with the priority of the plan included. Plans considered in priority may not be required to replace depletions. This column represents whether the Aug plan shows injury to the river or has sufficiently replaced its uses.

COLORADO
Division of Water Resources
Department of Natural Resources

ADMINISTRATIVE PROTOCOL
Recharge
Division One - South Platte River Basin
Revised May, 2022

The purpose of recharge is to intentionally introduce water into a tributary aquifer through percolation from the surface. The introduction of water to the aquifer causes a like amount of groundwater to discharge at a surface stream in a specific location and time as "accretions" or "recharge credits" available for beneficial use. Recharge as used in this document does not include artificial recharge of the Denver Basin or nontributary aquifers. A Recharge Structure can be:

- A section of ditch, the infiltration from which can be reasonably modeled as a single source of water.
- A single pond or a group of ponds that receive water from the same delivery location and the infiltration from which can be reasonably modeled as a single source of water.

1. Recharge credits/accretion including timing, location, and amount are determined only in accordance with decrees of the court or written administrative approvals, including Substitute Water Supply Plans (SWSPs). SWSP or water court applications should include the following information about each Recharge Structure:
    a. map(s) showing the locations of:
        i. diversion point(s)
        ii. Recharge Structure
        iii. measurement structures (inflow, outflow, staff gage);
    b. listing of the court case number for the decree(s) authorizing the diversion of water into the Recharge Structure and use of the water in a plan for augmentation, if any
    c. the maximum water surface area of the structure or stage-area capacity curve developed for each Recharge Structure;
    d. for ditch structures, if the ditch is divided into more than one Recharge Structure, an explanation of how the volume delivered to an upstream reach will be allocated to downstream Recharge Structures in the ditch.
2. The division engineer will assign the Recharge Structure a WDID number. The WDID number is the identification number that will be used for the administration of the structure and must be included in all correspondence and accounting.

3. Prior to commencement of construction, the owner/operator of the Recharge Structure must obtain water commissioner's approval of proposed equipment, installation and construction. Prior to any diversion into the Recharge Structure, the owner/operator must obtain the water commissioner's written approval of the final construction and equipment installation, as further described below.

a. The flow into each Recharge Structure must be equipped with a measurement device and a continuous flow data recorder, unless the water commissioner in conjunction with the division engineer determines adequate records may be kept without such equipment. Refer to the Administrative Protocol and Functional Standards - Surface Water Headgates and Measuring Devices, for minimal suggested equipment installation and operation.
b. If the Recharge Structure is designed to discharge water via a surface outlet, such discharge must also be equipped with a measurement device and a continuous flow recorder.
c. Each Recharge Structure must have a staff gage, or other devices as required, installed to provide a reading of the surface water elevation in the Recharge Structure.[1] The gage installation should be such that the gage registers the lowest water level in the Recharge Structure. The staff gage must be readable from a readily accessible location. The gage shall have permanent demarcations of 0.01 feet, with the whole feet (1.00 feet) clearly and easily identifiable.

4. All Recharge Structures must be maintained in such a way as to minimize consumptive use of the water by vegetation. Existing vegetation shall be mowed or removed prior to and during the running of water into the Recharge Structure. Crops may not be planted in a Recharge Structure during the same irrigation year that it is used as a Recharge Structure without prior approval from the water commissioner or division engineer.

5. The timing and quantity of recharge credits/accretions is estimated by applying the lagging parameters (or Unit Response Functions "URFs") in the decree or SWSP to the volume of water infiltrated into the ground (*Infiltrated Volume* as calculated below). One common method for determining the volume of water infiltrated for any time period can be determined by using a daily mass balance calculation, in acre-feet, and solving for the residual volume (R) of unmeasured flows[2] as follows. Other methods for determining the volume of water infiltrated into the ground may be considered on a case-by-case basis:

[1] Unless an alternate method of measuring or estimating the change in storage has been approved by the Division Engineer.
[2] For more information on the mass-balance equation as it applies to ponds or reservoirs, please refer to Guideline 2019-3, Reservoir Accounting Guideline

$$R = \Delta Storage - Meas.\ Inflow + Meas.\ Outflow + Evaporation + ET$$

where,

a. R represents the net sum of all unmeasured flow. When R is positive, it represents the volume of unmeasured inflows (i.e., no recharge occurred) and when negative, it represents the volume of unmeasured outflow (i.e., recharge volume) that infiltrated into the ground and can be used, with the lagging parameters, to determine the amount of recharge credit.
b. $\Delta Storage$ is the change in storage volume compared to a previous measurement, typically based on staff gage readings and the stage-capacity table.
c. $Meas.\ Inflow$ is the volume of water delivered into the recharge structure,
d. $Meas.\ Outflow$ is the volume of water discharged from the recharge structure,
e. $Evaporation$ is the volume of water lost to evaporation (see item 6, below),
f. ET is the volume of water lost from the consumption by vegetation located within the recharge structure. Appropriate vegetative consumptive use values, based on publications of actual plant water use, should be used depending on the type of plants that are found to exist, subject to DWR approval.

6. Gross Evaporative losses from the Recharge Structure must be subtracted from the volume of water delivered to the Recharge Structure. Evaporative losses must be accounted for every day the Recharge Structure has a visible water surface. If the Recharge Structure does not have a stage-surface area curve approved by the water commissioner, the maximum surface area of the Recharge Structure must be used to determine the evaporative losses, unless a different method is approved. Gross evaporation should be estimated using the processes described for off-channel reservoirs in Guideline 2019-3 - Reservoir Accounting Guideline. Monthly evaporation estimates may be prorated for days when there is no visible water surface. A lack of visible water surface is determined from a field inspection. Days with no water surface may be entered from the date of field inspection until the next date of water delivery.

7. Any structure that intercepts groundwater must be permitted as a well and included in a plan for augmentation or SWSP approved by the State Engineer. The Division Engineer strongly recommends avoiding Recharge Structures that intercept groundwater, in order to simplify the accounting process.

ADMINISTRATION PROTOCOL
Use Of Replacement Sources Not Specifically Identified In An SWSP Or Augmentation Plan
Division One – South Platte River

This protocol addresses the minimum standards required for use of a source of replacement water not specifically described in an SWSP or augmentation plan.

- Request to the Division Engineer and Water Commissioner must be in writing and must include:
    - the augmentation plan or SWSP provision in the purchasers plan that allows an unnamed source to be added to the plan for credit
    - the decree provision or SWSP provision in the sellers plan that allows water to be sold for use in the purchasers plan
    - the annual and monthly amount of water available from the water right to be used for replacement
    - the location at which the water will be delivered to the stream
    - a lease agreement between the seller and purchaser of the replacement water
- Applicant shall have written approval from the Division Engineer or Water Commissioner before an unnamed source is added to an augmentation plan or SWSP.
- Applicant must comply with the Augmentation Plan Accounting Protocol and, if appropriate, the Delivery of Water Protocol.

This protocol is subordinate to any decreed language addressing specific situations.