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## FW: East Rigden Pit 2019-2020 SWSP

1 message

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**Jeff Clark** <jclark@bbawater.com>

Wed, May 8, 2019 at 4:41 PM

To: "amy.eschberger@state.co.us" <amy.eschberger@state.co.us>

Cc: John Stokes <JStokes@fcgov.com>, Eric Potyondy <epotyondy@fcgov.com>, "Jennifer Shanahan (JShanahan@fcgov.com)" <JShanahan@fcgov.com>, John Shuler <jshuler@bbawater.com>

Amy –

On behalf of the City of Fort Collins, we submitted the attached SWSP renewal request today to the DWR for the East Rigden Pit (M-1979-097). We hope that this addresses the Corrective Actions identified in your March 11, 2019 Inspection Report for this pit. We will keep you apprised of any DWR action regarding this SWSP renewal request.

Should you have any remaining concerns or questions, please don't hesitate to contact me.

Thanks,

Jeff

Jeffrey A. Clark  
Principal - Hydrologist  
jclark@bbawater.com

Bishop-Brogden Associates, Inc.  
333 W. Hampden Ave., Suite 1050  
Englewood, CO 80110  
phone: 303.806.8952  
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**From:** John Shuler <jshuler@bbawater.com>

**Sent:** Wednesday, May 8, 2019 4:10 PM

**To:** [dwrpermitsonline@state.co.us](mailto:dwrpermitsonline@state.co.us); [sarah.brucker@state.co.us](mailto:sarah.brucker@state.co.us)

**Cc:** Jeff Clark <jclark@bbawater.com>; Eric Potyondy <epotyondy@fcgov.com>; Donnie Dustin

<[DDUSTIN@fcgov.com](mailto:DDUSTIN@fcgov.com)>; Jennifer Shanahan <[JShanahan@fcgov.com](mailto:JShanahan@fcgov.com)>; Susan Smolnik <[SSMOLNIK@fcgov.com](mailto:SSMOLNIK@fcgov.com)>;  
Tony Spencer <[tspencer@fcgov.com](mailto:tspencer@fcgov.com)>; John Stokes <[JStokes@fcgov.com](mailto:JStokes@fcgov.com)>  
**Subject:** East Rigden Pit 2019-2020 SWSP

Sarah,

I have attached the 2019-2020 SWSP request for City of Fort Collins' East Rigden Pit for your review. I will contact the Records Section to submit payment for the request shortly. Please let me know if you have any questions.

Best Regards,

John

John Shuler

Hydrologist I

[jshuler@bbawater.com](mailto:jshuler@bbawater.com)

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**9625.15 BBA Report - 2019-2020 Cottonwood SWSP 2019-05-08.pdf**  
1511K

May 8, 2019

Ms. Sarah Brucker, South Platte Team Leader  
State Engineer's Office  
Division of Water Resources  
1313 Sherman Street, Room 818  
Denver, CO 80203

Re: Substitute Water Supply Plan Renewal Request for East Rigden Pit (M-1979-097), Water  
Division 1, Water District 3

Dear Ms. Brucker:

On behalf of our client, the City of Fort Collins ("Fort Collins"), this letter provides a request for a renewal of a Substitute Water Supply Plan ("SWSP") for the East Rigden Pit (DRMS Permit M-1979-097) pursuant to C.R.S. Section 37-90-137 (11). The last SWSP for the East Rigden Pit was submitted by Applegate Group, Inc. in December 2015 for the period of March 1, 2015 through February 28, 2016. The period for this SWSP request is from July 1, 2019 through June 30, 2020.

### **PROJECT DESCRIPTION**

The East Rigden Pit is located along the Cache la Poudre River in Larimer County in Sections 21, 27, and 28 of Township 7 North, Range 68 West of the 6<sup>th</sup> P.M. as shown in Figure 1. Sand and gravel mining exposed groundwater at the pit site but the area has not been mined in many years according to a January 2019 inspection report from DRMS. Much of the exposed groundwater was previously determined to be pre-1981 and is exempt from augmentation requirements. The pre-1981 pond extents approved in the 2015-2016 East Rigden Pit SWSP are shown in Figure 1. However, since the prior SWSP, the exposed surface area at two of the pits has increased beyond the pre-1981 extent.

Fort Collins does not plan to conduct any mining activities during the term of this SWSP, therefore the only consumptive use of water at the East Rigden Pit will consist of evaporation from exposed groundwater. Colorado DRMS inspected the East Rigden Pit in January 2019. Through analysis of aerial imagery and their field visit, DRMS determined that the north and west ponds were expanded beyond the pre-1981 area by 18 and 0.67 acres, respectively. DRMS also indicated that the northwest pond was 0.38 acres larger than in 2015 and that the area of the southeast ponds decreased by 0.08 acres. DRMS provided us with their mapping, which we compared to the pre-1981 delineation and our own analysis of currently exposed areas shown on aerial imagery. We concur with DRMS's delineation of the expanded area of the north and west ponds. For the other ponds, we attribute the minor differences in surface area between DRMS and the prior mapping by Applegate to mapping accuracy discrepancies and propose to maintain the extents of both areas as were approved in the 2015-2016 SWSP.

In September 2014, the City of Fort Collins installed a liner around the 127-acre Rigden Reservoir. Since it no longer captures groundwater, Rigden Reservoir is considered exempt from augmentation under this SWSP.

Under the requested plan, all lagged depletions from the East Rigden Pit will be replaced using Fort Collins' augmentation water supplies. The replacement supplies requested for this SWSP are described in more detail in the Replacements section of this letter.

## **DEPLETIONS**

### ***Exposed Surface Area***

Depletions at the East Rigden Pit during the term of this SWSP will consist of evaporation from post-1980 exposed groundwater from 18.0 acres of the north pond and 0.67 acres of the west pond, shown on Figure 1, totaling 18.67 acres. Groundwater withdrawals by evaporation are currently permitted under Permit No. 76136-F.

### ***Gross and Net Evaporation***

Under this SWSP, Fort Collins will be required to replace only the net depletions to the Cache la Poudre River that result from net evaporation from the exposed areas. Net evaporation is equal to gross evaporation less effective precipitation, which is equal to 70% of the average monthly precipitation. A net evaporation rate of 2.37 feet per year was determined in the Fort Collins augmentation plan in Division 1 Case No. 14CW3167. According to Paragraph 11 in the SEO's Gravel Pit SWSP Guidelines, evaporation during ice cover periods does not need to be considered when calculating consumptive use. Based on information from the NOAA Fort Collins (USC00053005) climate station for the study period 1950-2018, the average monthly temperatures in December and January are 30.01°F and 29.14°F, respectively. Therefore, evaporation for the months of December and January is considered to be zero, as shown in Column 1 of Table 1.

Assuming no evaporation in December and January, net annual evaporation is 2.22 feet. A total of 18.67 acres will be exposed between July 2019 and June 2020. During this SWSP period, the resulting annual net evaporative depletion will be 41.52 ac-ft, as shown in Column 2 of Table 1.

### ***Lagged Depletions and Accretions***

Due to the distance from the East Rigden Pit to the Cache la Poudre River, there is a delayed effect of depletions to the river. Depletions were lagged from the centroid of post-1981 exposed ground water at the East Rigden Pit. Lagging of depletions was determined using the Glover method for alluvial aquifers provided by the Integrated Decision Support Alluvial Water Accounting System (IDS AWAS). The aquifer parameters are as follows:

- The specific yield of the aquifer is 0.20 based on Division 1 Case No. 14CW3176<sup>1</sup>.
- The distance from the Cache la Poudre River to the centroid of the exposed groundwater is equal to 674 feet.
- The aquifer width is 1,335 feet based on boundaries determined for Division 1 Case No. 14CW3176.
- Transmissivity is equal to 49,500 gallons per day per foot based on Division 1 Case No. 14CW3176.

### ***Total Plan Lagged Depletions***

Unit response factors derived from the AWAS analysis were normalized to 97% of depletions, which occurred after three months. The total lagged depletions from the East Rigden Pit during the SWSP period will be approximately 41.52 ac-ft as shown in Column 3 of Table 1. Lagged depletions from the three months previous to July 2019 were included to account for depletions occurring prior to the beginning of this SWSP period. Any lagged depletions that will affect the Cache la Poudre River after June 2020 will be carried over and included in subsequent SWSP renewals.

### **REPLACEMENT SOURCES**

Depletions from evaporation at the East Rigden Pit from July 2019 through June 2020 will be replaced using Fort Collins' augmentation water supplies listed in the attached Exhibit B. All replacements will be made based on lagged evaporative depletions as shown in Column 3 of Table 1. Replacements will be made directly to the Cache la Poudre River from the sources listed on Exhibit B or may be released from storage in Rigden Reservoir. Transit loss may be assessed by the Division Engineer pursuant to the sources listed in Exhibit B.

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<sup>1</sup> Case No. 14CW31 established specific yields, aquifer widths, and transmissivities for the Point of Entry Pond, near the exposed groundwater centroid used in this SWSP.

## **OPERATION OF PLAN**

### ***SWSP Operation***

Fort Collins will augment all out-of-priority depletions from the East Rigden Pit under this SWSP from July 2019 through June 2020. Total lagged depletions are estimated to equal approximately 41.52 ac-ft, as shown in Column 3 of Table 1. The total out-of-priority depletions will be replaced with Fort Collins' augmentation water sources listed in Exhibit B or released from water stored in Rigden Reservoir.

### ***Measurement and Accounting***

The total area of exposed ground water at the East Rigden Pit is expected to remain constant throughout the SWSP period. All deliveries will be made directly to the Cache la Poudre River and will be included in the Fort Collins' monthly SWSP and augmentation plan accounting submitted to the Division 1 office and to the Poudre River Water Commissioner.

### ***Well Permit***

Groundwater withdrawals occurring from evaporation at East Rigden Pit are currently permitted for up to 100 acres under Permit No. 76136-F.

## **TERMS AND CONDITIONS**

1. The SWSP shall be valid for the period July 1, 2019 through June 30, 2020.
2. The post-1980 total surface area of the ground water exposed at the East Rigden Pit will not exceed 18.67 acres during the requested SWSP period.
3. The total lagged out-of-priority depletions at the East Rigden Pit for the SWSP period are projected to be 41.52 ac-ft and will not exceed replacement supplies at the site.
4. All lagged depletions to the Cache la Poudre River will be replaced on a monthly basis anytime a valid downstream call exists using augmentation water stored in Rigden Reservoir.
5. Fort Collins will submit accounting for the East Rigden Pit to the Division Engineer on a monthly basis as part of the current Rigden Reservoir accounting.
6. For matters related to this SWSP please contact:

Jeff Clark or John Shuler  
Bishop-Brogden Associates  
333 West Hampden Avenue, Suite 1050  
Englewood, CO 80110  
303-806-8952  
jclark@bbawater.com  
jshuler@bbawater.com

Ms. Sarah Brucker

May 8, 2019

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### **Opinion of Non-Injury**

It is our opinion that so long as the terms and conditions in this SWSP request are followed, no injury to other water rights will result.

Pursuant to 37-90-137(11) payment information for the \$257 fee associated with an SWSP renewal application for the East Rigden Pit will be made to the Records Section shortly after submittal of this request application.

Please feel free to give us a call if you have any questions or need any additional information.

Very truly yours,

BISHOP-BROGDEN ASSOCIATES, INC.



John Shuler  
Hydrologist

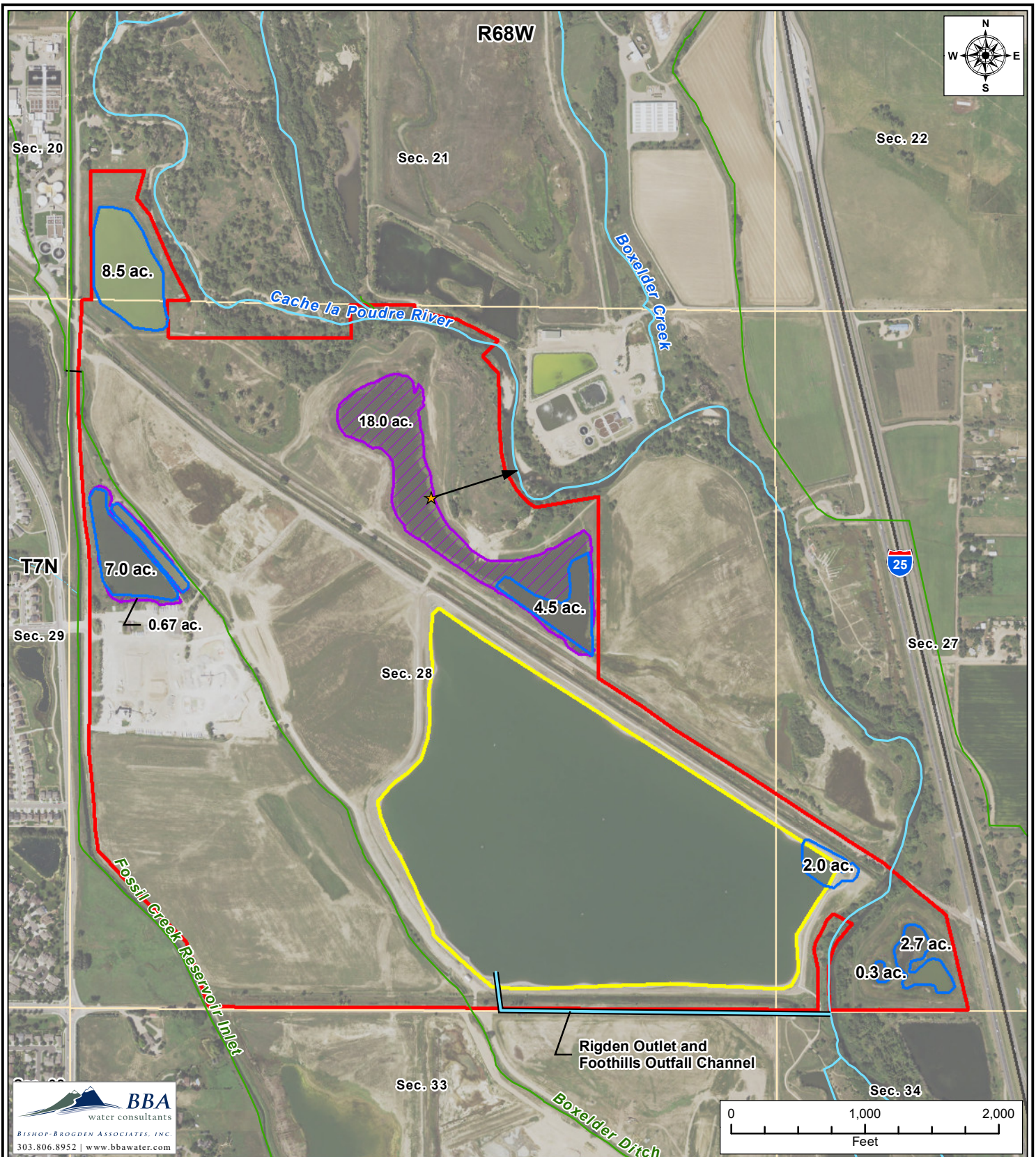
Reviewed by:



Jeffery A. Clark  
Principal - Hydrologist

JS/JAC/jeb  
Enclosures  
9625.15







**Table 1**  
**City of Fort Collins**  
**2019-2020 East Rigden Pit SWSP**  
**Total Depletions**

Month	Net Evaporation (feet)	Net Evaporation (ac-ft)	Total Lagged Depletions (ac-ft)
	[1]	[2]	[3]
Jul-19	0.40	7.39	6.86
Aug-19	0.35	6.57	6.92
Sep-19	0.25	4.65	5.67
Oct-19	0.16	2.99	3.98
Nov-19	0.09	1.75	2.52
Dec-19	0.00	0.00	0.98
Jan-20	0.00	0.00	0.17
Feb-20	0.09	1.59	0.81
Mar-20	0.11	2.05	1.67
Apr-20	0.18	3.40	2.69
May-20	0.23	4.37	3.77
Jun-20	0.36	6.76	5.49
Total	2.22	41.52	41.52

Notes:

[1] Net annual evaporation rate (2.37 feet) is based upon values determined in the Fort Collins augmentation plan, Division 1 Case No. 14CW3167. Annual net evaporation is distributed according to SEO Senate Bill 89-120 criteria. There is assumed to be no evaporation in December and January due to below-freezing average monthly temperatures.

[2] Equal to [1] \* 18.67 acres of ground water exposed post-1980.

[3] Equal to values from [2] lagged based on the following lagging parameters: Distance from stream = 674 ft, Transmissivity = 49,500 gpd/ft, Specific Yield = 0.2, Aquifer Width = 1,335 ft. Lagged depletions from three months prior to July 2019 were included to account for depletions occurring before the beginning of this SWSP period.

**EXHIBIT B**  
**(City Water Interests)**

The City Fully Consumable Water delivered under this Agreement will be attributable to the City Water Interests that are lawfully available for the Renter's use as defined above including, but not necessarily limited to, the following:

<b><u>Water Interest Name</u></b>	<b><u>Decree References<sup>1</sup> and Notes</u></b>
Arthur Irrigation Company Shares or Effluent	Case No. 1992CW129; Case No. 2005CW323
Colorado-Big Thompson Project Water	Attributable to North Poudre Irrigation Company Shares and allotment contracts with the Northern Colorado Water Conservancy District
Halligan Reservoir Enlargement Water Right	Case No. 2013CW3185
Joe Wright Reservoir Water Rights	Case No. W-9322-78
Larimer County Irrigating Canal No. 2 Company Shares and Effluent	Case No. 1992CW129; Case No. 2005CW323
Michigan Ditch Water Rights and Effluent	Case No. W-1424; Case No. 1988CW206
New Mercer Ditch Company Shares and Effluent	Case No. 1992CW129; Case No. 2005CW323
North Poudre Irrigation Company Shares	Multiple Use Portion
Rigden Reservoir and Effluent	Case No. 2014CW3158
Warren Lake Reservoir Company Shares and Effluent	Case No. 1992CW129; Case No. 2005CW323
Water Supply Storage Company Shares and Effluent	Case No. 1992CW129; Case No. 2005CW323
Windy Gap Units and Effluent	Case No. W-9322-78

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<sup>1</sup> The decrees identified in the table are for reference purposes only and are not intended to be a comprehensive list of all relevant decrees.