Attachment I

WATER SUPPLY PLAN REPORT
PINE CANYON
DOUGLAS COUNTY, COLORADO

Prepared for: Pine Canyon Water and Sanitation District
5975 East Jamison Place
Centennial, CO 80112

Prepared by: Jehn Water Consultants, Inc.
88 Inverness Circle, East
Suite K-102
Englewood, CO 80112
(303) 321-8335

April 22, 2020
Updated January 27, 2023
Updated May 29, 2024
Job No. 986.1

WATER SUPPLY PLAN REPORT
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DOUGLAS COUNTY, COLORADO

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Gina L. Burke
President

Jehn Water Consultants, Inc.

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Jehn Water Consultants, Inc.

EXECUTIVE SUMMARY

Pine Canyon is a proposed 1,800 home community in Douglas County. The development plans include approximately 173 acres of parks and open space available to the public to access, as well as adding a new school, office, retail and hotel space. The water demands for the development will be met by a central well system for potable demands and a reuse treatment facility to meet all irrigation demands. The estimated potable demands for the development are approximately 458.89 acre-feet per year (af/yr) and the irrigation demands are approximately 343.43 af/yr. The two-pipe system will provide for a more sustainable water use as it reduces the total water demands for the development by not utilizing potable water for irrigation.

The ground water underlying Pine Canyon has been quantified and decreed in Case Nos. 97CW097, 98CW403, 01CW82, 12CW15, and 17CW3000. The total water rights decreed equal 863.9 af/yr, based on a 100-year aquifer life. Pine Canyon is proposing to utilize its decreed nontributary and not-nontributary water rights, totaling 709.9 af/yr to meet development demands. This leaves approximately 35 **percent** of the ground water rights, available as decreed to the development of the Pine Canyon property, in the ground and unused as all irrigation demands will be met through the recycle system. The Pine Canyon Supply Plan, discussed in detail in this Report, provides proof of an adequate, dependable water supply and shows that Pine Canyon has a conscientious development plan protecting the water rights in Douglas County.

I. INTRODUCTION

The Pine Canyon development is proposed to be located in portions of Sections 34, 35 and 36, Township 7 South, Range 67 West, and in a portion of Section 1, Township 8 South, Range 67 West, all in the 6th P.M. (Figure 1) and is anticipated to include 1,800 single-family and multifamily homes, office and retail space, a 220 room hotel, parks, a school site and ancillary uses. This Report presents the studies and analyses to provide Douglas County with the necessary information regarding the quantity, quality, and dependability of the water supply for the proposed Pine Canyon development. Projected demands for Pine Canyon are estimated and the source of the water supply to meet the proposed demands is presented within this Water Supply Plan Report.

II. WATER DEMAND

Pine Canyon's water supply system will be a two-pipe system, and as such, the demands for Pine Canyon are split between potable and non-potable demands to maximize sustainability. The non-potable irrigation demands will be met through a reuse system, whereby the wastewater from in-house uses will be treated to a level acceptable for irrigation use around residences and schools. The potable demands will include in-house uses for the 1,800 homes, as well as a school, office and retail space, and a hotel. The non-potable supply system will meet all the irrigation demands within the proposed development including residential, parks and school fields, hotel, office, retail, and right-of-way spaces. Outside of the residential lots, commercial, office spaces, hotel and the school fields, the landscaping is planned to be mainly naturalistic consisting of drought tolerant sod, native grasses and vegetation, so the rural open character of the area will be preserved. Table 1 provides the estimated demands for the Pine Canyon Development.

The water demands for the residences and irrigation, including assumptions, are provided in Table 1. The potable water demands for office, retail, hotel and school, as listed in Table 1, meet the Douglas County Zoning Resolution (DCZR) standards. Pine Canyon is requesting a variance from Standards 1805A.02.2 and 1805A.02.3 of the DCZR. Please see the attached Pine Canyon Water Appeal letter, dated May 29, 2024, which provides the background and basis for the residential potable and reuse irrigation demands for the Pine Canyon project.

The overall water demands for the Pine Canyon development, as outlined in Table 1, are estimated to be 802.32 af/yr, of which approximately 458.89 af/yr is for potable in-house uses and 343.43 af/yr is to meet irrigation demands. Also shown in Table 1 (in **red**) is the calculated amount of return flows from the potable use, approximately 391.88 af/yr at full build-out, that will be available to meet the irrigation demand of 343.43 af/yr.

III. WATER SUPPLY

The Pine Canyon property, as shown on Figure 1, is underlain by four of the Denver Basin aquifers: Lower Dawson, Denver, Arapahoe and Laramie-Fox Hills aquifers. The water rights within each aquifer, underlying the property, were quantified and adjudicated in Case Nos. 97CW097, 98CW403, 01CW82, 12CW15, 17CW3000, Division 1 Water Court. Additionally, Pine Canyon has two augmentation plans under Case Nos. 11CW018 and 00CW068, which allow for the use of the not-nontributary Lower Dawson and Denver water by reserving a portion of the nontributary Arapahoe and Laramie-Fox Hills water for augmentation. Table 2 provides a summary of the decreed water rights by aquifer, totaling 863.9 af/yr, of which 709.9 af/yr is available for use. As noted in Table 2, the nontributary Denver Basin water is subject to a two percent replacement requirement that can be met through the return flows generated from potable use. Per the *Douglas County Zoning Resolution, Water Supply Overlay District, Section 18A* for the Central Basin Water Supply Zone, Pine Canyon may rely solely on ground water, not to exceed 100 percent of the total annual appropriable water contained in the Denver Basin aquifers. A total of 709.9 af/yr is available to meet demands within the Pine Canyon development and meets the County's 100-year aquifer life. With a total ground water demand of 458.89 af/yr, the Pine Canyon development has water sufficient to satisfy a 154-year supply.

Pine Canyon's water supply system will include central wells and a two-pipe delivery system. One system to deliver potable water for in-house demands and the second to deliver treated effluent to meet irrigation demands. Therefore, the only demands that need to be met by the Denver Basin central wells are the in-house potable demands.

As the Denver Basin aquifers, in the vicinity of Pine Canyon, are utilized by individual homeowners and Towns, including the Town of Castle Rock and Castle Pines North as examples, the quality of the water contained in the Denver Basin aquifers are not of issue to meet the demands within Pine Canyon.

IV. WELL INTERFERENCE

To meet the potable demands outlined in Table 1, Pine Canyon will construct wells to pump from the Lower Dawson, Denver and Arapahoe aquifers. The approximate location of two future well sites are shown on Figure 2. In order to determine the potential impact on neighboring wells within the Lower Dawson, Denver and Arapahoe aquifers, we reviewed the data available in the Division of Water Resource's well database (Hydrosource).

The full depth of the aquifers at Wellfield 1 are estimated to be 806 feet below ground surface (bgs) for the Lower Dawson aquifer, 1,693 feet bgs for the Denver aquifer and approximately 2,249 feet bgs for the Arapahoe aquifer. The closest Lower Dawson well is registered to Castle Oaks Corporation and is located approximately 2,834 feet from the future Pine Canyon Wellfield 1. The Town of Castle Rock operates the closest wells completed into the Denver and Arapahoe aquifers, approximately 2,573 feet and 2,624 feet, respectively, from Wellfield 1.

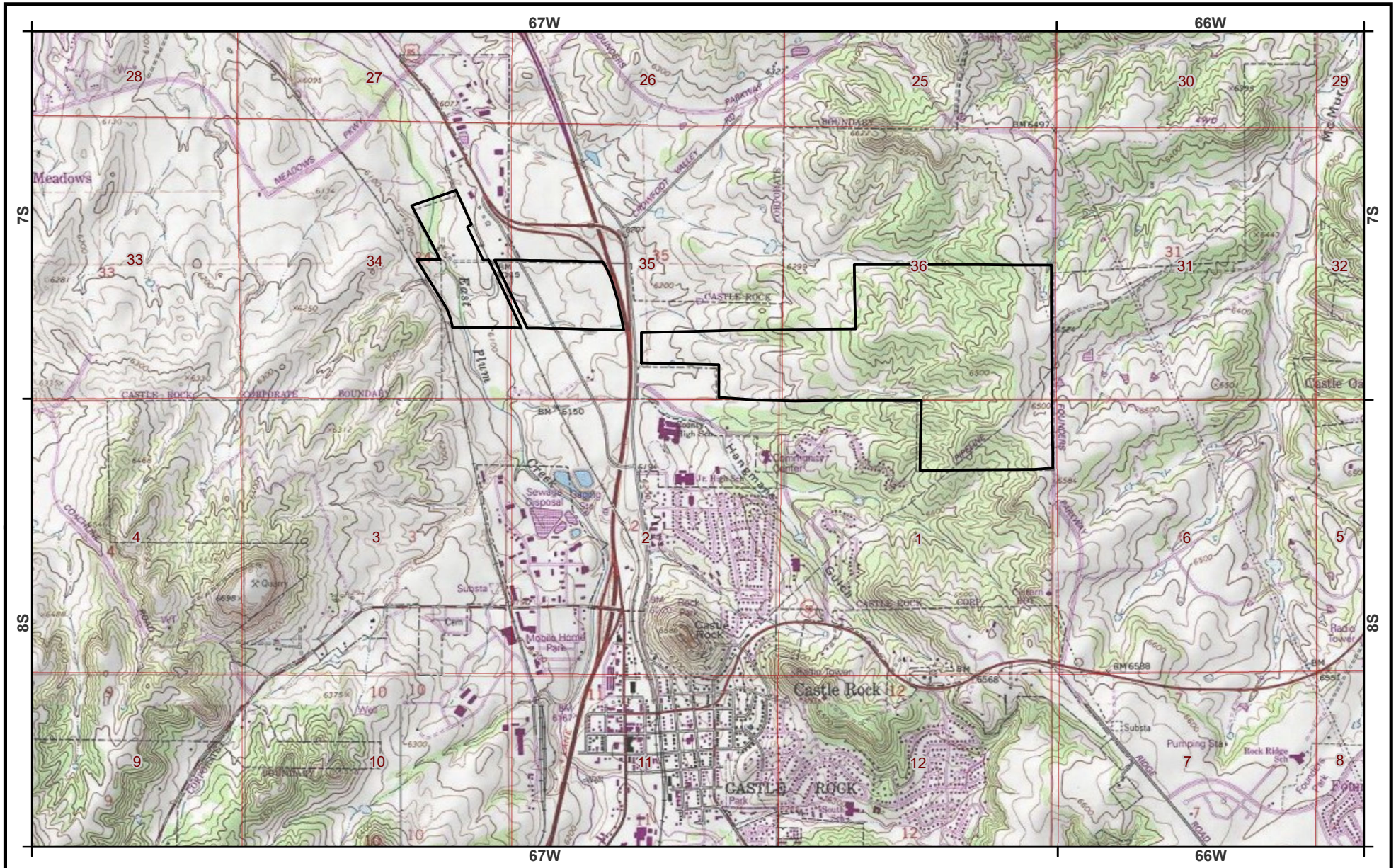
The full depth of the aquifers at Wellfield 2 are estimated to be 495 feet bgs for the Lower Dawson aquifer, 1,290 feet bgs for the Denver aquifer and approximately 1,871 feet bgs for the Arapahoe aquifer. The closest Lower Dawson well is a domestic well registered to Walter Scott and is located approximately 1,315 feet from the future Pine Canyon Wellfield 2. The Douglas County School District operates the closest Denver aquifer well, located approximately 2,476 feet away. The Town of Castle Rock operates the closest well completed into the Arapahoe aquifer, approximately 3,609 feet from Wellfield 2. Figure 2 shows the location of the wellfields and neighboring wells in relation to Pine Canyon.

To address concerns of impacts of pumping at Pine Canyon on the closest wells, a worst-case pumping scenario was modeled. The Pine Canyon – Updated Wellfield Interference Analysis Memorandum, dated January 12, 2024 and attached as reference, was completed and provided to the County for review. This Updated Wellfield Analysis has been completed to satisfy Douglas County Zoning Resolution requirements and finds that under potentially changing aquifer conditions, any potential drawdown from Pine Canyon's wells is immeasurable and non-injurious.

V. CONCLUSIONS

The proposed Pine Canyon Development has a sufficient and abundant water supply from the Denver Basin aquifers underlying the property to meet the proposed demands. This includes meeting Douglas County's 100-year aquifer life regulation as well as constructing a two-pipe water supply system that will allow Pine Canyon to use the Denver Basin aquifer water rights pumped from the Lower Dawson, Denver and Arapahoe aquifers twice, first for potable supply, then once treated, for irrigation, thus increasing the sustainability of their Denver Basin water. Total potable demands to be met by Denver Basin ground water are estimated to be 458.89 af/yr. In addition, approximately 343.43 af/yr of irrigation demands will be met from the reuse facility. The pumping of 458.89 af/yr will be utilized to meet 802.32 af/yr of total demands within the Pine Canyon development while leaving approximately 35% of the total ground water decreed underlying the property in the ground.

The Pine Canyon Water Supply Plan analyses discussed in this Report provide proof of an adequate and dependable water supply. It is my professional opinion that this Water Supply Plan provides the evidence required by Douglas County as proof that an adequate water supply in regard to quantity, quality and dependability is available to meet the demands at Pine Canyon for the next 100 years.



Jehn Water Consultants, Inc. **88 Inverness Circle East,** **Suite K-102** **Englewood, CO 80112** **(303) 321-8335** **www.jehnwater.com**	**FIGURE 1** **Pine Canyon** ***Property Location***	1 inch = 0.5 miles 0 — 0.5 Miles N Job No. 986.1 Prepared By: HLB 09/25/2019 Checked By: GLB 09/25/2019 Projection: UTM NAD83 Sources: Esri USA Topo Map

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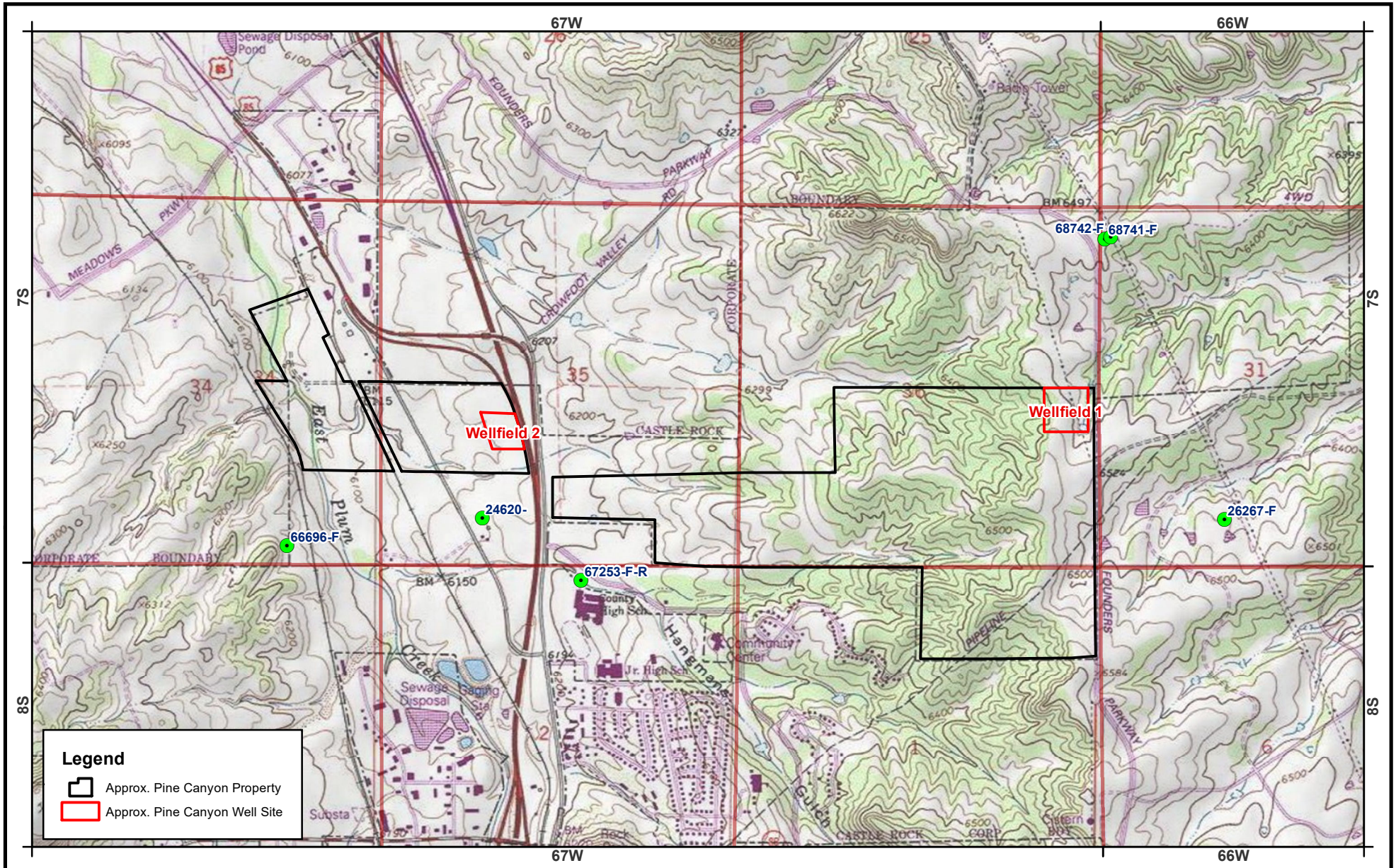
Every effort has been made to ensure the accuracy of the data provided. This should be used for mapping purposes only and should not be considered a survey instrument.



Jehn Water Consultants, Inc.
88 Inverness Circle East,
Suite K-102
Englewood, CO 80112
(303) 321-8335
www.jehnwater.com

FIGURE 2

Pine Canyon
Wellfields

1 inch = 2,000 feet
0 1,000 2,000 Feet
N

Job No. 986.1
Prepared By: HLB 10/16/2019
Checked By: GLB 10/16/2019
Projection: UTM NAD83

Sources: Esri USA Topo Map
DWR Constructed Wells

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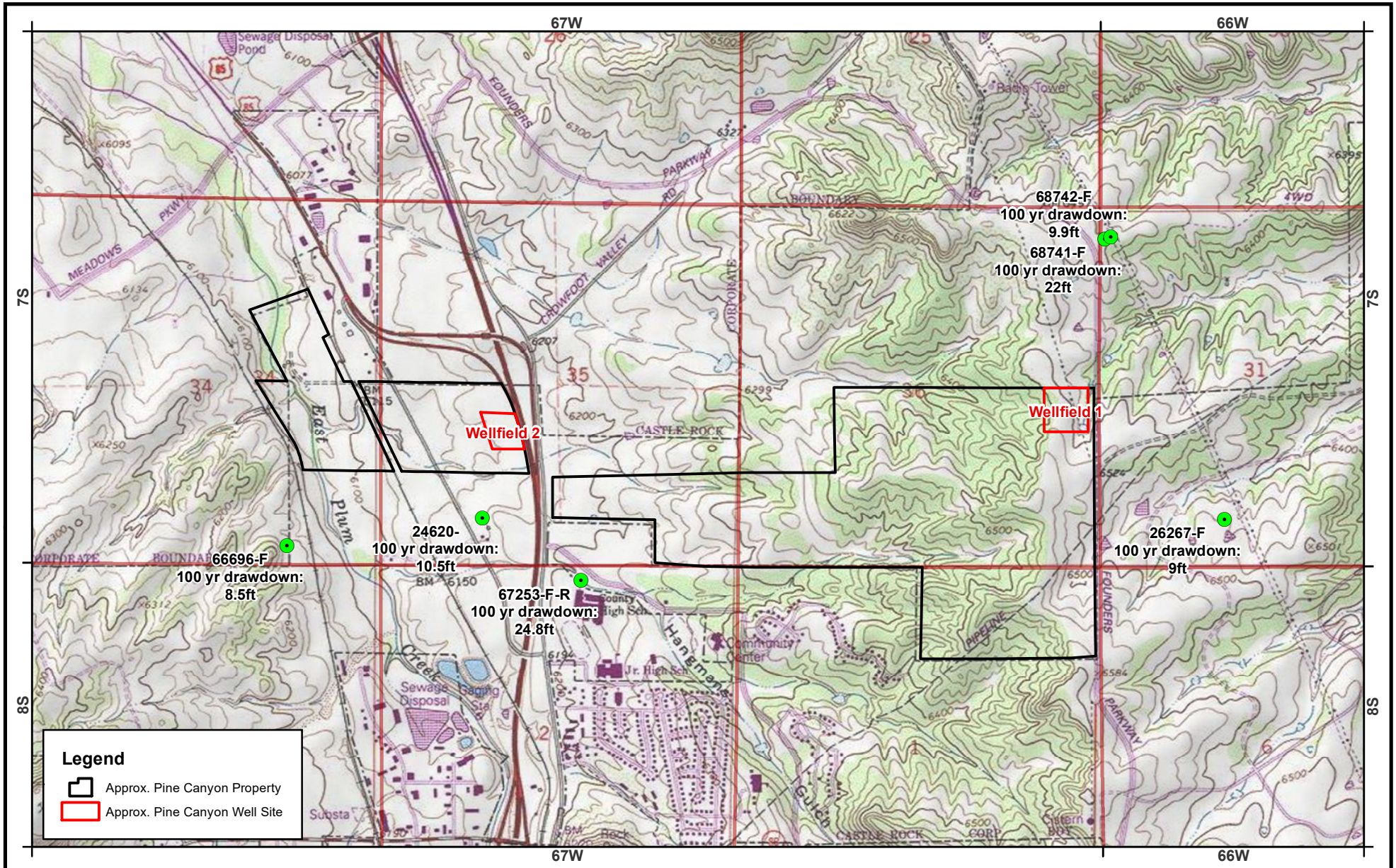

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88 Inverness Circle East,
Suite K-102
Englewood, CO 80112
(303) 321-8335
www.jehnwater.com

FIGURE 3

Pine Canyon
Wellfield Interference

N

1 inch = 2,000 feet

0 1,000 2,000 Feet

Job No. 986.1
Prepared By: HLB 10/16/2019
Checked By: GLB 10/16/2019
Projection: UTM NAD83

Sources: Esri USA Topo Map
DWR Constructed Wells

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TABLE 1
PINE CANYON
ESTIMATED DEMANDS AT FULL BUILD-OUT

Potable

	af/unit	No. Units	Total Demand af/yr
Residential	0.20	1800	360.00

	Sqft	af/yr/1,000 sqft	Total Demand af/yr
Office	550,000	0.11	61.61

	Sqft	af/yr/1,000 sqft	Total Demand af/yr
Retail	50,000	0.11	5.60

	No. Rooms	No. People	gpd/pers	gpd	Total Demand af/yr
Hotel	220	440	30	13200	14.80

	gpd/student	No. Students	Total Demand af/yr
School	25	800	16.88

Totals	**458.89**	**af/yr**

Non-Potable Irrigation
(Reuse System)

Residential	acres	ft/yr	Irrigation Efficiency %	Total Demand af/yr
Turf	50.60	1.79	80%	113.21
Trees, shrubs, native grass	20.68	0.72	80%	18.61

Parks, Schools, Hotel, Retail, Office, ROW	acres	ft/yr	Irrigation Efficiency %	Total Demand af/yr
Turf	53.14	1.79	80%	118.89
Trees, shrubs, native grass	103.02	0.72	80%	92.72

Total	343.43	**391.88**

Assumptions: Residential in-house demands utilize the proposed 0.2 af/yr per unit planning value.
Return flows available to meet irrigation demands.

TABLE 2
PINE CANYON
WATER AVAILABLE

Aquifer	Annual Appropriation af/yr[1]	SEO Status	Decrees	Notes
Lower Dawson	104.0	NT	97CW097	
	33.3	NNT	98CW403, Augmentation Plan 00CW068	
	21.6	NNT	01CW082, Augmentation Plan 11CW018	
	0.1	NNT	17CW3000	*Not currently included in an augmentation plan.*
Denver	230.0	NT	97CW097	
	17.2	NNT	97CW097, Augmentation Plan 11CW018	
	54.8	NNT	98CW403, Augmentation Plan 00CW068	
	12.0	NNT	01CW082, Augmentation Plan 11CW018	
	13.5	NNT	12CW015	*Not currently included in an augmentation plan.*
	0.7	NNT	17CW3000	*Not currently included in an augmentation plan.*
Arapahoe[4]	185.0	NT	97CW097	
	56.6	NT	98CW403, Augmentation Plan 11CW018	*5.5 af/yr reserved for augmentation*
	0.6	NT	17CW3000	
Laramie-Fox Hills[5]	104.0	NT	97CW097, Augmentation Plans 00CW068 &11CW018	*Total appropriation reserved for augmentation*
	30.2	NT	98CW403, Augmentation Plan 11CW018	*Total appropriation reserved for augmentation*
	0.3	NT	17CW3000	
Total	863.9			
Total Accessible	709.9			

Notes:
1. Annual appropriation based on the Denver Basin aquifer life of 100 years.
2. Nontributary water is subject to a two percent replacement requirement.

Pine Canyon Water Appeal
Applicant Summary Document

Jehn Water Consultants, Inc.
Water Resources Consulting
Celebrating Over 30 Years of Excellence

88 Inverness Circle East
Suite K-102
Englewood, Colorado 80112
(303) 321-8335

May 29, 2024

Mr. Curt Weitkunat
Long Range Planning Manager
Douglas County Department of Community Development
100 Third Street
Castle Rock, Colorado 80104

Re: Pine Canyon Water Appeal Summary
Job No. 986.1

Dear Curt:

This letter is a narrative of the Water Appeal being requested and included in the planned development application that has been filed by the Applicant. This is an update to the letter provided to you on May 8, 2020. Since the submittal of that original letter, a number of rounds of comments and responses have occurred between County staff, Lytle Water Solutions (the County's water consultant), and the Pine Canyon team. Our intent with this update is to provide one summary document of the water appeal request which details how the appeal meets the approval criteria. In early May 2024, the Pine Canyon team and County Staff held a meeting to discuss elements of the water appeal, and this letter has been updated to clarify and respond to comments made during that meeting.

As provided in the last Water Supply Plan, dated January 27, 2023, Pine Canyon is a proposed master planned community in Douglas County which includes up to1,800 residential units, up to 650,000 square feet of commercial/light-industrial/retail uses including a resort/spa, an elementary school site, and over 175 acres of parks and open spaces. The water demands for the development will be met by a more sustainable two-pipe system to reduce total water demand. A central well system will provide potable demands and recycled water produced by a water reclamation facility will meet all irrigation demands. Figure 1 illustrates the proposed dual-pipe system:

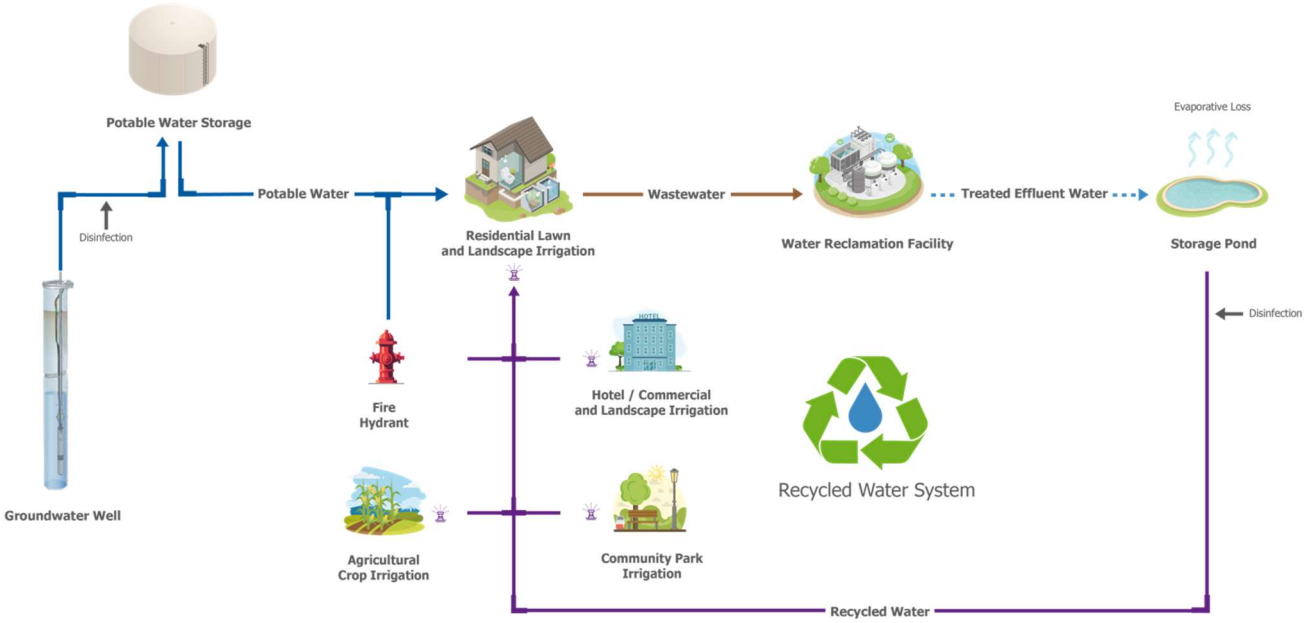


Figure 1 – A visualization of the central and recycled dual-pipe water system

Under Section 1805A.02 of the Douglas County Zoning Resolution (DCZR), the following minimum water demand standards would be required for the Pine Canyon proposed development:

1805A.02.2	Residential:	0.75 acre-feet/year per residence
1805A.02.3	Non-Residential Irrigation:	2.5 acre-feet/year/acre
1805A.02.4	Commercial/Office:	0.75 acre-feet/year per 6,695 sq.ft.
1805A.02.5	Other uses: Sufficient water supply for the proposed uses, based on the estimate of the proposed usage and analysis by the County.	

The Residential demands outlined in the DCZR include both in-house and irrigation demands per residence. Since Pine Canyon will be served by the two-pipe system, where only indoor demands will be met by the central well system, and outdoor irrigation demands will be met by the recycled water produced at the reuse treatment facility, the DCZR Residential demand is not an appropriate standard for the project.

As allowed for in 1808A of the DCZR, this letter is being submitted in support of an appeal request of Section 1805A Water Demand Standards of the DCZR. The Applicant is proposing the following alternative demand standards:

	County Demand Standard	**Pine Canyon Proposed Alternative Demand Standard**
1805A.02.2 Residential	0.75 acre-feet/year/residence	0.273 acre-feet/year/residence (0.20 acre-feet/year/residence in-house from the central well system and 0.073 acre-feet/year/residence irrigation from reuse)
1805A.02.3 Non-Residential Irrigation	2.5 acre-feet/year/acre	0.72 acre-feet/year/acre for trees and shrubs AND, 1.79 acre-feet/year/acre for turf irrigation (All from reuse)

The appeal process criteria to be met are as outlined in 1808A.07:

> An appeal shall be approved only upon the finding, based upon the evidence presented in each specific case, that:
>
> (1) The request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County.

The Pine Canyon project will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County. The Applicant's overall water plan was specifically designed to maximize efficiency, longevity, and sustainability. Throughout the past few years, The Applicant's planned water and wastewater system has received multiple approvals from the Colorado Department of Public Health and Environment's (CDPHE) Water Quality Control Division, all of which help promote the long-term sustainability of Pine Canyon's water resources. As it considered approval of the Applicant's application, part of CDPHE's analysis focused on water demand and usage, and the Applicant provided details for forecasted water demand for all of Pine Canyon's various planned uses, including the Applicant's proposed alternative indoor demand standard. After thoroughly evaluating all aspects of the planned water and wastewater system, CDPHE issued its approvals. One of the criteria upon which CDPHE based these approvals was ensuring that the District would not have "foreseeable potential adverse impacts upon public health, welfare, and safety" and that it could "operate and manage [the water and wastewater system] at the proposed site location to minimize such foreseeable adverse impacts as related to wastewater treatment and/or water quality" (Colorado Regulation 22.5(1)(f)).

Independence, a community which has a water and wastewater system very similar to the one proposed for Pine Canyon, has been operating successfully for years in neighboring Elbert County. The water and wastewater system at Independence is an excellent corollary to the one proposed at Pine Canyon, as it went through the same CDPHE approval review and process, and has been using the same type of two-pipe system for its community. Independence has illustrated how a water conscious community can thrive while conserving and maintaining the longevity of its most precious resource through diligent planning and robust monitoring. While the two systems are quite similar, Pine Canyon will have additional layers of treatment and internal monitoring and control standards to ensure the health, safety, and welfare of the Pine Canyon community. The following table illustrates the two Districts' systems:

	Independence	Pine Canyon
System	Dual-pipe	Dual-pipe
Indoor Water Supply	Central Potable System	Central Potable System
Outdoor Water Supply	Recycled Water Reuse System	Recycled Water Reuse System
Treatment Level	Category 3	**Category 3Plus**
Reg. 84 Allowed Use	Residential landscape Irrigation	Residential landscape Irrigation
Recycled Water End Users	Residents	**District**
Landscaping Plan and Change Approver	District	District
Responsible Party for Irrigation Monitoring and Maintaining	Residents with District Oversight	**District**

The above table clearly shows that Pine Canyon's system will be quite similar to the one successfully operating at Independence, but will include enhanced elements. Notably, the recycled water will be treated to a higher category (Category 3Plus vs. Category 3), and the operation, monitoring, and maintenance of the recycled water system will be conducted completely by a professional irrigation company hired by the Pine Canyon Water and Sanitation District (whereas at Independence, residents have full access to their recycled water irrigation system, are in charge of the application of recycled water, and monitor and maintain their irrigation systems). BrightView Irrigation Systems, the third-party irrigation company, will be the sole entity responsible for maintaining the recycled water irrigation system. This means that BrightView will be the entity winterizing and de-winterizing sprinkler systems, fixing sprinkler malfunctions, monitoring irrigation use, setting watering schedules, and maintaining and operating the system. BrightView will be able to complete these duties by relying on their extensive experience operating complex irrigation systems throughout Douglas County, and by utilizing the real-time data from the smart metering and monitoring system that will be integrated into the residences at Pine Canyon through a partnership with Flume Inc. Flume technology will provide real-time data for indoor and outdoor water usage to the Water and Sanitation District, BrightView, and to residents. This data is granular (it can be broken down to individual indoor appliances) and dynamic (showing usage in real-time). Pine Canyon's

proposed water and wastewater system takes inspiration from a proven, reliable, intelligent system like the one at Independence and adapts that system to be even better suited for long-term water sustainability for the future of Douglas County.

Implementation of the water conservation techniques and enforcement of the regulations, limits, and restrictions necessary for Pine Canyon to maintain its commitments to water sustainability, and meet its proposed reduced demand standards will be governed by the Pine Canyon Water and Sanitation District. These techniques, regulations, limits, and restrictions are codified in the CDPHE Water Quality Control Division approvals and the mandatory Pine Canyon Water Efficiency Plan, which are included in, and cross-referenced throughout the planning documents.

Additionally, the Applicant has consulted numerous experts who have analyzed and confirmed the viability of every aspect of the water plan – from water use forecasting to irrigation techniques. One such expert, Peter Mayer of Water Demand Management, LLC., wrote an expert opinion letter attesting to the viability and sustainability of the Applicant's water demand planning. This letter states that the Applicant's water demand forecast is "appropriate and reasonable for a brand-new community. There is ample data to show that residences today use less than 50 gpcd on average [this number translates to the Applicant's requested alternate indoor demand standard]. There is also tremendous support for the use of 50 gpcd as a planning value for residential water demand in published research as well as Colorado statute, the Colorado Water Plan, and in policy across the United States". This letter is attached.

Recycled water reuse is a foundation of the water supply plan. Thanks to cutting-edge technology and a commitment to longevity, *100% of the District's wastewater effluent will be recycled and reused*. Reuse is a highly respected and utilized method of ensuring the long-term sustainability of a water supply. The South Metro Water Supply Authority declares that reuse "is a priority…because it offers an opportunity to significantly increase supplies and make them more reliable" (https://southmetrowater.org/our-work/reuse). Castle Rock Water describes reuse as one of the "most cost-effective, environmentally sound and safe water supplies. Reuse water is economical because we do not have to purchase new water, nor pump it from great distances…Since we are using water that is

already available, reuse water is also a sustainable supply regardless of growth or drought" (https://www.crgov.com/3025/Reuse-Water). There are over 584 users in Colorado who use Regulation 84 to reuse and recycle their water – 103 of these users are within a 10 mile radius of Pine Canyon, and 29 of those are within Douglas County limits (27 of those 29 – 93% are in unincorporated Douglas County). Some of the noteworthy nearby users include:

- Arapahoe County Water and Wastewater Authority
- Plum Creek Water Reclamation Authority
- Centennial Water and Sanitation District
- Independence Water and Sanitation District
- South Suburban Parks and Recreation
- Inverness Metro District
- Meridian Metro District/Meridian Village
- Stonegate Village Metro District
- Highlands Ranch Golf Course
- Lincoln Park at RidgeGate
- Red Hawk Ridge Golf Course
- Redstone Park/Shea Stadium
- The Ridge at Castle Pines
- Country Club at Castle Pines
- Castle Pines Golf Club
- Villagio II Master Association HOA
- Fox Run at Centennial HOA
- Villagio at Inverness Condo Association
- Elevation at County Line Station Apartments

Pine Canyon's cutting-edge recycled water reuse system will allow the District to ensure long-term viability, dependability, safety and sustainability of the water supply.

By utilizing the advanced recycled water system, the District will provide 0.273 acre-feet/year to each residence at Pine Canyon, but it will only withdraw 0.20 acre-feet/year/residence – the rest will be supplied from the recycled water. This system places less pressure on the aquifers, strategically lengthens the lifespan of the water that is withdrawn, and conservatively uses and reuses the water to make sure that our most precious resource is being managed as efficiently as possible.

In addition to lengthening the long-term viability of the water supply, Pine Canyon's reuse system also bolsters water quality. The District has received approvals from CDPHE mandating that wastewater at Pine Canyon be treated to Category 3 Plus (as defined in Colorado Regulation 84). This is the highest possible standard of treatment, and it means that recycled water at Pine Canyon will be treated to nearly drinking water standards. Most of the wastewater in the area near Pine Canyon is only treated to Category 2 standards and then it is discharged directly into surface water. Not only will wastewater at Pine Canyon be treated to a significantly higher standard, but because Pine Canyon will be reusing 100% of its recycled water, the District will have no discharge to surface or ground water. This lack of any discharge will help protect the quality of both ground water and surface water resources for the watershed and the entire County and, therefore, this appeal request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County.

(2) For appeals to the Water Demand Standards set forth in Section 1805A or to the Documentation Standards set forth in Section 1806A, the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality, and dependability.

1805A.02.2 – Residential Demand

The Applicant is proposing an alternate residential demand standard which reflects with the water conservation requirements, restrictions, and mandates that will be present at Pine Canyon, and the long-term sustainability achieved by the recycled water reuse system. Unlike the County's standard, The Applicant's proposed alternative standard is best understood broken into two distinct parts: Indoor Residential Demand (planning value of 0.20 af/yr/unit) and Outdoor Residential Demand (0.073 af/yr/unit). These two parts are added together to create the total proposed alternate residential demand (0.273 af/yr/unit).

Indoor Residential Demand

The Applicant has proposed an indoor demand standard of 0.17 af/yr per residence, which will be fulfilled by groundwater from a central well system. In order to evaluate the Applicant's proposed alternative *indoor* demand standard, it ought to be compared to actual indoor usage from operating districts in the area. Local data from districts of varying sizes and ages supports an indoor residential demand value of 0.17 af/yr:

Water Provider	Current Units Served	Demand (af/yr)	Year Established	Notes
Castle Pines North Metro District[1]	3,914	0.18	1984	At Build-out
Independence Water and Sanitation District[2]	208	0.13	2017	Build out approx. 1,400 units
Spring Valley Metro District	561	0.16	2001	Build-out at approx. 1,785 units
Sterling Ranch[3]	624	0.14	2016	Build-out over 12,000 units
Average: 0.153				

Data from major water providers around Douglas County also supports the proposed indoor demand standard (data collected from the 1051 Reporting Database using a conservative average of 3 persons/household)[4]:

[1] Data collected from water provider. Indoor usage calculated by from the water provider's reported average use for the months of December through February. This is a commonly used method for estimating indoor and outdoor uses from total water use data in locations that have limited outdoor use during winter months and where the indoor and outdoor uses are not measured separately.
[2] Data collected from water provider compiled by meter readings. Independence uses a Regulation 84 reuse system nearly identical to the one proposed at Pine Canyon, so indoor data is discrete from outdoor data.
[3] Data collected from water provider's water use analysis. Sterling Ranch has separate indoor and outdoor meter data and provided distinct indoor data in their analysis.
[4] Data collected from the 1051 Reporting Database. Indoor usage calculated from the water provider's reported average use for the months of December through February. This is a commonly used method for estimating indoor and outdoor uses from total water use data in locations that have limited outdoor use during winter months and where the indoor and outdoor uses are not measured separately.

Water Provider	Indoor Usage (af/yr) per Residence
Castle Rock Water	0.17
Centennial Water and Sanitation	0.16
Parker Water and Sanitation	0.17
Average: 0.167	

The data clearly shows that the Applicant's proposed alternative Indoor Demand Standard is reasonable, achievable, and sufficient in terms of its quantity, quality, and dependability.

In its most recent set of comments, LWS stated a concern due to "potential variability in water demands that could occur for a number of reasons." In light of this, the Applicant has agreed to utilize a planning value of 0.20 af/yr per residence, which is an 18% demand buffer that would be available to meet water use variability within the residential development. Table 1, attached, is an update of a table from the January 2023 Pine Canyon Water Supply Plan which reflects this updated planning demand value. This conservative planning value will ensure the sufficiency of the quantity, quality, and dependability of the Applicant's water supply even in the face of unforeseen variability.

Outdoor Residential Demand

Based on studies completed by Hydro Systems, Inc., AQUA Engineering, and PCS Group, Inc., the Applicant is proposing an alternate outdoor residential irrigation demand standard of 0.073 af/yr/unit. This demand was approved by CDPHE through the Land Application Management Plan (LAMP) approval process. AQUA worked collaboratively with CDPHE during preparation and approval of the LAMP to establish and agree on ET rates, precipitation, and application efficiencies to determine the irrigation application rates for the various types of vegetation to be irrigated.

Total Residential Demand

When the proposed indoor demand (using the conservative planning value) of 0.20 af/yr/unit is added with the proposed outdoor demand of 0.073 af/yr/unit, the total proposed residential demand is created: 0.273 af/yr/unit.

1805A.02.3 – Non-Residential Irrigation

Based on studies completed by Hydro Systems, Inc., AQUA Engineering, and PCS Group, Inc., the Applicant is proposing an alternate irrigation demand standard that would range between 0.72 and 1.79 acre-feet/year/acre. The 0.72 acre-feet/year/acre is for the irrigation of trees and shrubs, while the 1.79 acre-feet/year/acre is for turf irrigation. Assuming an 80% irrigation efficiency, the total irrigation demand totals approximately 318 af/yr. These demands are reflected in the attached Table 1. These irrigation demands were approved by CDPHE through the Land Application Management Plan (LAMP) approval process. AQUA worked collaboratively with CDPHE during preparation and approval of the LAMP to establish and agree on ET rates, precipitation, and application efficiencies to determine the irrigation application rates for the various types of vegetation to be irrigated.

If there are any questions, please do not hesitate to contact the Pine Canyon team. We reserve the right to supplement this appeal request with additional supporting information as needed.

Sincerely,
JEHN WATER CONSULTANTS, INC.

Gina L. Burke
President

TABLE 1
PINE CANYON
ESTIMATED DEMANDS AT FULL BUILD-OUT

Potable

	af/unit	No. Units	Total Demand af/yr
Residential	0.20	1800	360.00

	Sqft	af/yr/1,000 sqft	Total Demand af/yr
Office	550,000	0.11	61.61

	Sqft	af/yr/1,000 sqft	Total Demand af/yr
Retail	50,000	0.11	5.60

	No. Rooms	No. People	gpd/pers	gpd	Total Demand af/yr
Hotel	220	440	30	13200	14.80

	gpd/student	No. Students	Total Demand af/yr
School	25	800	16.88

Totals	**458.89**	**af/yr**

Non-Potable Irrigation
(Reuse System)

Residential	acres	ft/yr	Irrigation Efficiency %	Total Demand af/yr
Turf	50.60	1.79	80%	113.21
Trees, shrubs, native grass	20.68	0.72	80%	18.61

Parks, Schools, Hotel, Retail, Office, ROW	acres	ft/yr	Irrigation Efficiency %	Total Demand af/yr
Turf	53.14	1.79	80%	118.89
Trees, shrubs, native grass	103.02	0.72	80%	92.72

Total	343.43	**391.88**

Assumptions: Residential in-house demands utilize the proposed 0.2 af/yr per unit planning value.
Return flows available to meet irrigation demands.

July 20, 2020 (Original)
February 6, 2023 (Update)

JRW Family Limited Partnership, LLLP.
5975 East Jamison Place
Centennial, CO 80112

Re: Expert opinion regarding residential indoor per capita water use and planning for Pine Canyon

To Whom it May Concern:

At the request of JRW Family Limited Partnership, LLLP., I have updated this expert letter report regarding residential water demand planning in partial response to Douglas County's Initial Review Letter Concerning the Water Supply for Pine Canyon (Project File: MI2020-009).

In summary, this letter report concludes that using 50 gallons per person per day (50 gpcd) to estimate the likely indoor residential water demand for Pine Canyon is both appropriate and reasonable for a brand-new community. There is ample data to show that residences today across America use less than 50 gpcd on average. There is also tremendous support for the use of 50 gpcd as a planning value for residential water demand in published research as well as Colorado statute, the Colorado Water Plan, and in policy across the United States.

Summary of Qualifications

I am the Principal of Water Demand Management, LLC (WaterDM) based in Boulder, Colorado.

WaterDM is a water consulting firm providing expertise and services in the following areas:

- Municipal and industrial water use, research, and analysis
- Water conservation and demand management planning and implementation
- Integrated water resources planning
- Water loss control
- Analysis of municipal water rates and rate structures
- Drought preparedness and response
- Demand forecasting
- Evaluation of changes in demand
- Statistical analysis of water demand and modeling
- Meter technology implementation
- Meter and service line sizing

I have a Master of Science in Engineering (1995) from the University of Colorado, Boulder and a Bachelor of Arts (1986) from Oberlin College. I am a registered and licensed Professional Engineer in Colorado. I am a civil engineer and the focus of my career for over 25 years has been on urban water systems and demand management including: water demand research, conservation planning and implementation, rate analysis, demand forecasting, drought preparation and response, utility metering, and water loss control.

Since 1995, I have served as a consultant and researcher to urban water providers, US EPA, the Water Research Foundation, the Alliance for Water Efficiency, state governments, and municipal and industrial water users in the US and Canada.

Over my engineering and consulting career, I have worked with and advised hundreds of water providers and organizations such as the Colorado Water Conservation Board; the California Department of Water Resources; Marina Coast Water District; Tucson Water; New York City Water Board; Hilton Head, SC; Denver, CO; Scottsdale, AZ; San Antonio, TX; Metropolitan Water District of Southern California; US EPA; the US Department of Justice; the Alliance for Water Efficiency and many others. In 2016, I testified as an expert witness on municipal and industrial water use at the US Supreme Court (FL v. GA, 142 Original) on behalf of the State of Georgia.

Most recently, I co-created the Flume Household Water Use Index which reports quarterly on residential water use trends across the US.[1]I am currently leading a team to update the Guidebook of Best Practices for Municipal Water Efficiency on behalf of the Colorado WaterWise, the Colorado Water Conservation Board, and the Colorado River District.

I have served as the principal investigator and lead or co-author of numerous national and state-level water demand research studies including: Residential End Uses of Water (2016, 1999); Assessing Water Demand Patterns to Improve Sizing of Water Meters and Service Lines (2020); Peak Demand Management (2018); Colorado Water Plan and Update (2010, 2018); National Submetering and Allocation Billing Program Study (2004); Water Budgets and Rate Structures (2008); Commercial and Institutional End Uses of Water (2000); and many others.

I Chair of the subcommittee and am lead author of the American Water Works Association (AWWA) M22 Sizing Water Service Lines and Meters 3rd. ed. (2014) and 4th ed. (currently in publication review). I am co-author of the AWWA G480-20 Water Conservation Standard and co-author of the Colorado Best Practices Guidebook for Municipal Water Conservation (2010). I served as Trustee of the AWWA Water Conservation Division from 2001-2007 during which time I worked with EPA to create the WaterSense™ program and helped establish the Alliance for Water Efficiency. I have been a Senior Technical Advisor to the Alliance for Water Efficiency since 2007. I am a member of the American Water Works Association, the Alliance for Water Efficiency, the American Water Resources Association, the American Society of Civil Engineers (ASCE), the Colorado Water Congress, and the Colorado River Water Users Association.[2]

[1] https://www.flumedatalabs.com/water-index

[2] A copy of my curriculum vitae is available at www.waterdm.com

Pine Canyon Indoor Residential Water Demand

Pine Canyon is a planned mixed-use development located near the Town of Castle Rock, Colorado. The approximately 535-acre site is generally bounded by East Plum Creek on the west and Founders Parkway on the east. The current development plan includes a total of 1,800 residential units and assumes 3 people per household using 50 gpcd each (150 gal/household/day) which amounts to 54,750 gallons (0.17 AF) per household per year for indoor use (4,462 gallons per household per month). The total indoor water requirement forecast for the 1,800 residential dwelling units is 306 acre-feet per year according to the April 22 Water Supply Plan Report.[3] Other demands including residential outdoor use, commercial use, and system losses are calculated separately. **This letter is exclusively focused on the calculation of indoor residential demand.**

Douglas County's Review Letters Concerning the Water Supply for Pine Canyon

May 2020 Letter

In a May 21, 2020 letter, Douglas County's water consultant, Bruce Lytle[4] provided comments regarding the proposed residential water demand forecast for Pine Canyon.[5] Specifically the letter criticized Pine Canyon's use of 50 gpcd to forecast future residential demand because these "demands are based on Denver's draft Water Efficiency Plan (not a final adopted plan), which is not a good basis"[6] and the letter then cited the following five specific reasons.

> *"a. Denver as a whole is not representative of Douglas County or Pine Canyon as there is large range of economic classes in Denver, which brings water use down from what would be expected in Douglas County;*
>
> *"b. As an example, the outdoor use goal is 1.6 ac-ft/ac (Douglas County presumptive value is 2.5 ac-ft/ac), but this will require water conservation/xeriscaping, a voluntary action not mandatory;*
>
> *"c. The estimated indoor and outdoor water use numbers are goals not actual numbers and the document mentions numerous times that reduced water use is voluntary, so there is no proof these values can actually be reached even in Denver;*
>
> *"d. To achieve these goals Denver is proposing an extensive education and marketing plan, i.e., this will not happen on its own; and*

[3] Jehn Water Consultants, Inc. April 22, 2020. Water Supply Plan Report Pine Canyon Douglas County, Colorado.
[4] Bruce Lytle, P.E., President of Lytle Water Solutions, LLC.
[5] Curt Weitkunat, AICP, Long Range Planning Manager. May 21, 2020. Letter to Mr. James Walker, Project File: MI2020-009 – Pine Canyon Water Appeal Water Supply & Water Appeal Initial Review.
[6] IBID p. 3

"e. The plan admits if they meet this indoor use goal it "would be a third less per person than other utilities based on a 2016 Residential End Use study." In other words, this is a very ambitious goal that may or may not be attainable even in Denver."

The Douglas County response letter then concludes, *"Given the basis of their appeal of the water demand standards being an unrealized demand in what I consider to be a non-representative area to Pine Canyon, I think their demand estimates are unproven and, therefore, unrealistic. I also note that they are planning 325 "custom homes" (Attachment A to Jehn report) which are unlikely to be low water use homes."*[7]

July 2020 Expert Opinion

In response to the suggestion that Pine Canyon's proposed indoor water estimates are unproven, in 2020 WaterDM was asked to prepare an expert opinion regarding the indoor residential demand. WaterDM's first expert opinion on Pine Canyon, responded and to every concern raised by Douglas County's water consultant with respect to the indoor water demand forecast. WaterDM's report provided ample data and evidence from recent research and the Colorado Water Plan to support for the use of 50 gpcd for indoor residential demand planning.

To date, Pine Canyon has not received any comments or responses to WaterDM's July 2020 report.

October 2020 Review of Water Supply and Demand Issues

Three months after WaterDM's July report, Douglas County issued an opinion. The October 23, 2020 letter *Review of Water Supply and Demand Issues with the Pine Canyon Planned Development Service Plan, Rezoning, and Appeal, File Nos. SV2020-001, ZR2020-010, and MI2020-009,* also prepared for Douglas County by Bruce Lytle, provided additional comments regarding the proposed residential water demand forecast for Pine Canyon. The October letter makes the following points related to indoor residential water use:

"(1) The estimated demands presented in the Jehn report are not supported by actual water use data.

(3) The September 17 water efficiency plan cites a projected use of 50 gallons per capita per day ("gpcd") at Pine Canyon. However, in the Denver Water document, it is cited that "attaining 40 gallons per person per day indoors would be a third less per person than other utilities based on a 2016 Residential End Use study." In other words, achieving 50 gpcd or 40 gpcd will be very difficult.

…. it is our recommendation that this appeal be denied unless, and until, further site-specific actual long-term water use data can be provided to substantiate the demands requested and it can be demonstrated that these demands can be met under all

[7] IBID p. 3

foreseeable hydrologic conditions to provide a sufficient water supply in terms of quantity, quality, and dependability."

Response to Douglas County Review Letter

There are numerous problems with these conclusions regarding indoor water use and water planning. Suggestions by Douglas County's water consultant that 50 gpcd is a value would be "difficult" to achieve and only under a specific set of circumstances are incorrect and are not backed by research or data. This report provides specific data and examples to support the use of 50 gpcd to plan for future indoor residential water use.

Many communities in Colorado and across the US, with a mix of new and older housing (not just Denver), currently average well below 50 gpcd for residential indoor purposes. In fact, the Colorado Water Plans (2015 and 2023) use lower values to forecast indoor residential demand. A review of the data shows that 50 gpcd is a readily achievable and reasonable planning number to use when planning, particularly for a new community such as Pine Canyon.

WaterDM's updated expert opinion provides research and data that show:

1. The indoor demands presented in the Jehn report are fully supported by actual water use data from multiple sources.
2. Achieving indoor water use below 50 gpcd in not "very difficult" and is in fact common place in major cities across the United States in 2023.
3. The Pine Canyon Water Efficiency Plan will ensure that these indoor water demand targets are achieved and maintained over time.

Pine Canyon Demand Forecast and Efficiency Plan

Pine Canyon Residential Demand Forecast

The current development plan for Pine Canyon includes 1,800 single-family and multi-family residential units, a 220-guest room hotel and spa, 550,000 square foot (SF) of office space, 50,000 SF of retail space, and 800-student school. The development will also include over 170 acres of public parks and open space. **This letter report is focused exclusively on the expected residential (single-family and multi-family) demand.**

Pine Canyon will include 1,800 single and multi-family residences of varying sizes. As a brand-new community in Douglas County, Colorado, every one of the 1,800 residences will be equipped with brand-new plumbing fixtures and appliances. In Colorado, CO Rev Stat § 6-7.5-101 (2017) requires that all fixtures including toilets, showerheads, and faucets sold in the state must meet EPA WaterSense specifications. This statute ensures that all new homes and buildings including "custom homes" in Pine Canyon will come equipped with water efficient fixtures from the outset. Pine Canyon has further committed to indoor efficiency through its Water Efficiency Plan which includes full metering, pressure regulation, efficient clothes washers and dishwashers, volumetric billing, and more.

Using an average of 50 gpcd for indoor residential, Jehn Water Consultants forecast that the total average annual indoor residential water demand for Pine Canyon will be 306 acre-feet.[8] There is ample research and data to support the use of 50 gpcd to plan for future indoor residential use.

Pine Canyon Water Efficiency Plan and Colorado Law Assures Efficient Indoor Fixtures and Appliances

Pine Canyon recognizes the importance of integrating responsible water and land use planning and has developed a comprehensive water efficiency plan[9] to manage water demands and extend water supplies by implementing aggressive design guidelines for the entire development. The Pine Canyon Water Efficiency Plan was originally developed by ELEMENT Water Consulting, a highly experienced and respected firm that has worked closely with Sterling Ranch, an intentionally water efficient community in Douglas County.[10]

For indoor residential water efficiency, the Pine Canyon plan requires that all single-family residential units and residential units in multi-family buildings, including mixed-use buildings, will be constructed according to the following indoor criteria[11]:

- Metering
    - Full metering of single-family homes.
    - In multi-family buildings, each unit must be individually metered, sub-metered, or equipped with an alternate technology capable of tracking water use and making the information available to the residents of the individual unit.
- Leaks
    - There shall be no detected leaks from any water-using fixtures, appliances, or equipment.
    - Compliance will be verified through pressure-loss testing and visual inspections.
- Service Pressure
    - The static service pressure will be limited to 60 pounds per square inch (psi) at the point of service. Piping for home fire sprinkler systems is excluded from this requirement and should comply with state and local codes and regulations. For units in multi-family buildings, the service pressure within each unit shall be a maximum of 60 psi.
- Toilets and Urinals
    - Toilets - WaterSense labeled, less than or equal to 1.28 gallons per flush (gpf).
    - Urinals - WaterSense labeled, less than or equal to 0.5 gpf.
- Lavatory Faucets
    - WaterSense labeled, less than or equal to 1.5 gallons per minute (gpm).

[8] Jehn Water Consultants, Inc. April 22, 2020. Water Supply Plan Report Pine Canyon Douglas County, Colorado.
[9] Element Water Consultants. Updated January 2023. Water Efficiency Plan. Pine Canyon, Douglas County, CO.
[10] Indoor residential water use at Sterling Ranch is below 50 gpcd. https://www.bizjournals.com/denver/news/2022/07/05/denver-housing-water-conservation.html
[11] Pine Canyon's indoor criteria are largely based on the U.S. Environmental Protection Agency's WaterSense Version 1.2 New Home Specification with adjustments to reflect new technologies and requirements.

- Kitchen Faucets
    - Less than or equal to 2.2 gpm.
- Showerheads
    - WaterSense labeled, less than or equal to 2.0 gpm per showerhead.
- Clothes Washers & Dishwashers
    - Energy Star labeled.
- Education
    - Residents, including property managers and occupants of multi-family units, shall be educated regarding installed indoor and outdoor water efficiency measures, as described in the Water Efficiency Plan.
- Water Rates
    - All residential units at Pine Canyon will be billed using a non-promotional rate structure where customers pay for every gallon of use. Current plans call for a uniform volumetric rate for water usage.

Residential Water Use Research

I am the co-author and co-principal investigator for a series of residential end use studies that closely investigated where and how residential customers use water. I am the co-author of the 2016 Residential End Uses of Water study cited in Douglas County's October report and the 1999 study it was based on.[12] To further augment the information from these studies, I was also co-principal investigator for a series of retrofit and new home studies sponsored by the US EPA and participating water utilities that measured water use in new and existing homes equipped with toilets, faucets, and showerheads meeting WaterSense specifications along with modern efficient clothes washers and dishwashers. The summary findings from these studies are shown in Table 1.

In 1999, the Residential End Uses of Water study (version 1) measured an average 69.3 gpcd across 14 cities in the US and Canada. In 2016, the follow-op Residential End Uses of Water (version 2) measured an average of 58.6 gpcd across 9 cities in the US and Canada. Over a period of about 15 years between these two studies, indoor water per capita water use declined about 1% per year because of codes and standards applied across the continent which assure all plumbing fixtures sold meet basic efficiency criteria.

Colorado has taken the national plumbing codes a step farther with CO Rev Stat § 6-7.5-101 (2017) that requires that all fixtures including toilets, showerheads, and faucets sold in the state must meet EPA WaterSense specifications. This statute ensures that all new homes and buildings including "custom homes" in Pine Canyon will come equipped with water efficient fixtures from the outset.

How water efficient are new homes equipped with WaterSense fixtures likely to be? In a separate water demand study commissioned by the US EPA for which I was the co-principal

[12] The 1999 and 2016 *Residential End Uses of Water* studies were sponsored by the Water Research Foundation and a consortium of more than 25 water utilities across the United States.

investigator, residents in homes equipped with toilets, showerheads, and faucets meeting US EPA WaterSense specifications used an average of 39.8 gpcd.

Table 1: Summary of per capita use from Residential End Uses of Water Studies (REUWS)

	1999 REUWS (indoor gpcd)	2016 REUWS (indoor gpcd)	WaterSense New Home (indoor gpcd)
Toilet	18.5	14.2	7.7
Clothes Washer	15	9.6	4.4
Faucet	10.9	11.1	8.1
Shower	11.6	11.1	11.0
Dishwasher	1.0	0.7	0.5
Leak	9.5	7.9	5.0
Bath	1.2	1.5	1.5
Other	1.6	2.5	1.6
Indoor Total	**69.3**	**58.6**	**39.8**

Sources: Mayer, P.W., W.B. DeOreo, et. al. 1999. Residential End Uses of Water. American Water Works Association Research Foundation, Denver, CO.; DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO; W.B. DeOreo, A. Dieteman, T. Skeel, P. Mayer, et. al. 2001. Retrofit Realities. Journal American Water Works Association, March 2001.

By using a value of 50 gpcd and 150 gallons per household per day to estimate future residential indoor demand, Pine Canyon is using a planning number that *exceeds* the likely per capita use by 20% based on published research shown in Table 1.

More recently I co-created the Flume Household Water Use Index which regularly reports on indoor and outdoor water use from thousands of single-family homes across the United States.[13] The average indoor GPCD was calculated each month from thousands of Flume customers in the 15 most populated metropolitan areas in America, covering 30% of the total US population. The monthly averages are shown in Figure 1. Every single city in the US except for Phoenix, AZ[14] had an average indoor GPCD below 50 GPC and in many places like Los Angeles, Seattle, and the San Francisco Bay area, the average was below 40 GPCD indoors.

In 2023 it is normal and usual for residential customers to use less than 50 GPCD. This level of use has become the norm in the United States. The combination of the gradual retrofit of old fixtures and appliances in older housing stock coupled with code-efficient new customers joining the system results in a gradual reduction in gpcd as has been observed across the US.

[13] https://www.flumedatalabs.com/water-index

[14] In Phoenix, the average was 50.1 GPCD indoors because of additional fixtures like evaporative coolers and misters.

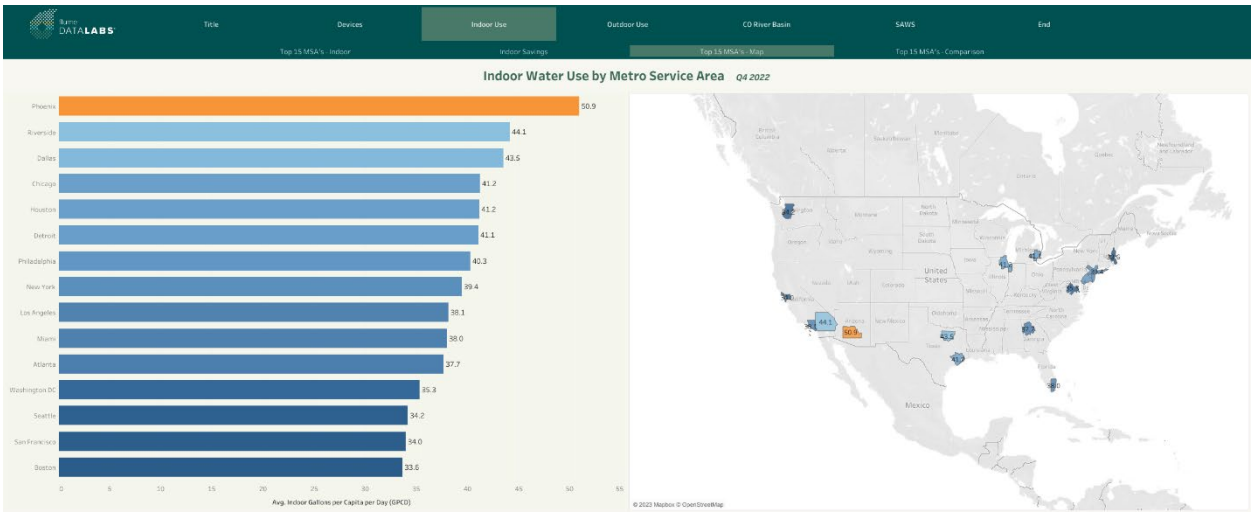


Figure 1: Average indoor per capita water use during Q4 2022, 15 largest metropolitan areas in US

The Colorado Water Plan Used 40 gpcd or Less to Plan Future Demand

The Colorado Water Plan is our state's lead planning document, prepared by the Colorado Water Conservation Board (CWCB) with the help of a team of technical experts. I have served as a consultant to the CWCB over the last 20 years and I contributed to both the 2015 and 2023 Colorado Water Plan and its supporting technical research projects the State Water Supply Initiatives specifically in the area of water demand.

In Chapter 5 – Water Demands of the 2015 Water Plan, Table 5-1 three possible future residential indoor gpcd values are considered for future planning – 40 gpcd, 35 gpcd, and 30 gpcd. The varying levels are all feasible and based on varying levels of water efficiency that could be implemented. The value of 40 gpd was considered to have the least level of water efficiency and be the easiest and most likely to be achieved, but both 35 gpcd and 30 gpcd usage levels were also found to be achievable.

When planning for future water supply requirements, 30 – 40 gpcd are the indoor per capita use values used by the State of Colorado. Statements from Douglas County's consultant that 50 gpcd only applies to Denver Colorado and under certain circumstances are incorrect. In fact, the CWCB is actively planning for lower future indoor residential demand in all communities across the state.

Based on the Colorado Water Plan demand forecasting analysis, the use of 50 gpcd by Pine Canyon to plan for future demand represents a perfectly reasonable (if conservative) approach. As the Colorado Water Plan forecasts, even lower per capita use could be achieved in Pine Canyon through implementation of further efficiency measures. Pine Canyon has chosen to use 50 gpcd to provide a supply cushion above the level used in the Colorado Water Plan. This is a

reasonable and appropriate planning approach and 50 gpcd is a well vetted and conservative value to estimate future indoor residential use.

California Has Set 42.5 gpcd as a Residential Target for the Entire State

Denver Water isn't the only large entity using 50 gpcd as a planning number for future indoor residential demand. In 2022, the State of California updated water demand objectives set in AB 1668 and SB 606 by the California Legislature. The indoor residential use standard will decrease to 45 gpcd in 2025 and to 42.5 gpcd in 2030. All water providers will be expected to achieve this level of water efficiency, but data from the CA State Water Board and Flume show that many places are already at or below the 2030 objective.

California originally set these standards based on the same data and analysis presented in Table 1 and gained confidence in the approach by evaluating measured water demand from monthly billing records across the state which showed the increasing efficiency of indoor use. California, like Colorado, also has legislation requiring the sale of only WaterSense fixtures and future forecasting relies on the understanding all new construction will include an effective level of water efficiency built-in from the start.

Conclusions

Pine Canyon's use of 50 gallons per person per day (50 gpcd) to estimate likely indoor residential water demand is both appropriate and reasonable for a brand-new community in Colorado. There is tremendous support for the use of 50 gpcd as a planning value for residential water demand in published research as well as Colorado statute, the Colorado Water Plan, and in policy across the United States.

Suggestions by Douglas County's water consultant that 50 gpcd is a value would be difficult to achieve or that only applies to Denver and only under a specific set of circumstances are incorrect and are not backed by research or data.

- Research sponsored by the US EPA found that new homes equipped with water efficient fixtures and appliances use less than 40 gpcd on average.
- Analysis from Flume Data Labs shows typical indoor residential water use is well below 50 gpcd in 14 of 15 cities in the US.
- The Colorado Water Plan uses a range from 30 – 40 gpcd to plan for future indoor residential use.
- The State of California uses 42.5 gpcd and a planning target for 2030 demand, inclusive of all housing new and old.

Pine Canyon has chosen to use 50 gpcd to provide a supply cushion above the level used in the Colorado Water Plan. In my expert opinion, this is a reasonable and appropriate planning approach and 50 gpcd is a well vetted value to estimate future indoor residential use.

Sincerely,

Peter Mayer, P.E.
Principal

Pine Canyon Water Appeal
Applicant Response

March 8, 2024

James Walker
JRW Family Limited Partnership
5975 E. Jamison Place Englewood, CO 80112

Project File: MI2020-009 – Pine Canyon Water Appeal
Water Supply & Water Appeal

Mr. Walker:

This letter serves as a staff assessment of the information submitted to date to demonstrate compliance with the Douglas County Zoning Resolution (DCZR) 18A – Water Supply Overlay and the related Water Appeal. Planning Services and Lytle Water Solutions, the County Water Consultant, reviewed the resubmitted Water Supply Plan and Water Appeal documents and related resubmittals. The resubmittals have refined the existing appeal and provided missing information but have not provided the compelling documentation needed to provide a positive assessment for a future staff report.

The Pine Canyon PD proposes development supported solely by Denver Basin aquifers without a renewable supply option. A renewable water supply is a key element in reducing dependence on the aquifers. The submitted water supply plan and water appeal propose to implement urban level development solely on groundwater.

A sufficient water supply is a critical component of a Planned Development rezoning application. The County is committed to having land use applications demonstrate a sufficient water supply in terms of quantity, quality, and dependability. The County promotes the development of renewable water resources with County water providers to prolong the life of finite Denver Basin aquifers, as the aquifers alone are not a long-term water solution for providing a dependable water supply.

Pine Canyon shares the County's concern with ensuring the long-term viability of all water sources. We recognize the finite nature of groundwater, and kept this in mind when creating our innovative water supply plan. The plan was specifically designed to maximize efficiency, longevity, and sustainability. Throughout the past few years, Pine Canyon's planned water and wastewater system has received multiple approvals from the Colorado Department of Public Health and Environment's (CDPHE) Water Quality Control Division, all of which help promote the long-term sustainability of Pine Canyon's water resources. As it considered approval of the Applicant's application, part of CDPHE's analysis focused on water demand and usage, and the Applicant provided details for forecasted water demand all of Pine Canyon's various planned uses, including the Applicant's proposed alternative indoor demand standard. After thoroughly evaluating all aspects of the planned water and wastewater system, CDPHE issued its approvals. One of the criteria upon which CDPHE these approvals was ensuring that the District would not have "foreseeable potential adverse impacts upon public health, welfare, and safety" and that it could "operate and manage [the water and wastewater system] at the proposed site location to minimize such foreseeable adverse impacts as related to wastewater treatment and/or water quality" [1].

[1] Colorado Regulation 22.5(1)(f) https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=8775&fileName=5%20CCR%201002-22

Implementation of the water conservation techniques and enforcement of the regulations, limits, and restrictions necessary for Pine Canyon to maintain its commitments to water sustainability, and meet its reduced standards will be governed by the Pine Canyon Water and Sanitation District. These techniques, regulations, limits, and restrictions are codified in the CDPHE Water Quality Control Division approvals and the mandatory Pine Canyon Water Efficiency Plan, which are included in, and cross-referenced throughout the planning documents.

Additionally, the applicants have consulted numerous experts who have analyzed and confirmed the viability of every aspect of the water plan – from water use forecasting to irrigation techniques. One such expert, Peter Mayer of Water Demand Management, LLC., wrote an expert opinion letter attesting to the viability and sustainability of Pine Canyon's water demand planning. This letter states that Pine Canyon's water demand forecast is "appropriate and reasonable for a brand-new community. There is ample data to show that residences today use less than 50 gpcd on average [this number translates to Pine Canyon's requested alternate indoor demand standard]. There is also tremendous support for the use of 50 gpcd as a planning value for residential water demand in published research as well as Colorado statute, the Colorado Water Plan, and in policy across the United States". This letter is attached.

Recycled water reuse is a foundation of the water supply plan. In fact, thanks to cutting-edge technology and a commitment to longevity, *100% of the District's wastewater effluent will be recycled and reused*. Reuse is a highly respected and utilized method of ensuring the long-term sustainability of a water supply. The South Metro Water Supply Authority declares that reuse "is a priority…because it offers an opportunity to significantly increase supplies and make them more reliable"[2]. Castle Rock Water describes reuse as one of the "most cost-effective, environmentally sound and safe water supplies. Reuse water is economical because we do not have to purchase new water, nor pump it from great distances…Since we are using water that is already available, reuse water is also a sustainable supply regardless of growth or drought"[3]. Dominion Water and Sanitation describes reuse as an effective way a district can "stretch [its] water supply portfolio"[4]. Reuse is viewed as such a sustainable resource it is even categorized as a type of renewable water by Douglas County water providers: Castle Rock Water's "Long Term Water Plan" shows that they plan to meet their goal of renewable water making up 75% of their water supply by using reuse[5].

Because Pine Canyon will be reusing 100% of its recycled water, the District will have no discharge to surface or ground water. This lack of any discharge will help protect the quality of both ground water and surface water resources for the watershed and the entire County.

As detailed in the Water Supply Plan, the water and wastewater system will yield significant amounts of return flows at full build out (over 436 acre-feet), while the outdoor demand which will be fulfilled by this recycled and reused water will be significantly less than that total yield (just over 318 acre-feet). This abundant supply of reuse water will ensure that demands are met even if the standards are exceeded for some anomalous reason.

District control of recycled water application is a powerful tool that the Pine Canyon Water and Sanitation District will use to ensure that the proposed water demand standards in the Water Appeal are followed. The CDPHE Water Quality Control Division approved Land Application Management Plan details the amount of recycled water that will be produced by the Pine Canyon Water Reclamation Facility, and how that recycled water will be re-distributed on-site for irrigation at agronomic uptake rates. This irrigation will all be operated and managed by BrightView

[2]
[3] https://www.crgov.com/3025/Reuse-Water
[4] https://www.dominionwsd.org/Home/Components/News/News/48/
[5] https://www.crgov.com/1697/Long-Term-Water

Landscape Services, a leading irrigation company who operates multiple projects in Douglas County. Realtime monitoring of all indoor and outdoor water usage will be provided by a partnership with Flume Inc., a leading smart water monitoring company. Flume has extensive experience working with major water providers across the United States, and their system will provide an effective, streamlined tool by which the District can monitor water usage by individual residential unit (even down to the individual fixture level), water budgets, leaks, and high water users.

Not satisfied with our water supply plan alone, Pine Canyon has created a Renewable Water Fund within the financial structure of our proposed Water and Sanitation District. This fund will allow the District to fund the acquisition of, and the infrastructure related to, a reliable, non-interruptible renewable water resource to supplement the groundwater supplies. This Fund will allow Pine Canyon to join the County in its efforts and partnerships with countywide and regional water providers.

Pine Canyon's long term plan of combining the efficient, sustainable use of its own groundwater supply focused on longevity and conservation with a distinct, focused, and planned fund for the acquisition and integration of a supplementary surface water resource not only mirrors what other communities throughout Douglas County have done, but it emulates the goals and priorities of the County itself.

Going forward, please provide a summary document that describes the basis of the water appeal and the water appeal approval criteria. The summary should be specific in the demand standards being appealed and the alternative demand standards being requested. The Water Efficiency Plan is not the appeal document that will be approved by the Board that is why there is need for a summary appeal document.

A summary document which includes the specific proposed alternative indoor demand standards has been prepared and is enclosed with this response.

Lytle Water Solutions provided an updated review letter, dated March 8, 2024. The review letter is referenced herein and attached to this correspondence.

Water Appeal Approval Standards

Based on a review of the revised documents submitted to date for the water appeal, it is staff's assessment that two of the three standards in Douglas County Zoning Resolution (DCZR) 1808A.07 have not ben adequately met. Staff's current assessment of the water appeal evidence is provided below in additional detail.

DCZR 1808A.07.1 The request will not be detrimental to the health, safety, and welfare of the present or future inhabitants of the County.

Staff comment: As currently presented, the requested appeal to the Water Demand Standards will be detrimental to future inhabitants of the County. Currently, the appeal assumes a reduced demand standard that is approximately 73 percent less than the County's demand standard to maximize the use of 708 acre-feet of groundwater. The proposed demand standard of 0.17 acre-feet per year per dwelling unit (indoor use only) has no built-in margin of safety for system losses or for periods of increased demand or for outdoor use. Instead, the proposed margin of safety is the approximately 50 percent of the nonrenewable groundwater "saved" by the reduced demand standard.

This comment seems to be based upon some misconceptions. First, the Applicant's proposed alternate demand standard of 0.17 af/yr per unit is for *indoor* use only. The County's standard

of 0.75 af/yr/unit includes both *indoor use and outdoor irrigation*. Comparing the County standard for all water demand to the Applicant's proposed indoor demand standard is not comparing apples to apples. The percentage stated above is not accurate to the true nature of either the proposed demand nor the County's standard. Furthermore, as stated in the attached summary letter, the Applicant has agreed to use a more conservative planning value of .2 af/yr/unit for indoor residential uses to account for any variability or unforeseen circumstances which arise.

Second, this application is not trying to "maximize the use" of the 708 af/yr available to the project. If that were the case, then the application would not contain the water reuse system, or the restrictions, commitments, and limits that it does – the application would simply ask for a reduction to the applicant's total available water. Pine Canyon is committed to longevity, sustainability, and responsible water use. Those core tenants are the foundation upon which the water supply plan is based. The proposed alternative water demand standards will only use a portion of the applicant's water rights portfolio while the rest will be available to be used as a safety factor if necessary, or as an underlying asset of the property.

Finally, the proposed alternative demand standard is very reasonable and achievable. As evidenced in the attached summary letter, there are many districts who achieve indoor water usage amounts very similar to the Applicant's proposed demand standards. These usages are achieved by new and old districts alike, small and large districts, and districts who practice recycled water irrigation and those who do not. Major water providers in Douglas County also achieve similar average indoor usage numbers.

While the commercial industrial demand standard may be based on 600,000 square feet of development, there is no limit on potential water intensive commercial uses. The Nonresidential Indoor Water Use table is not a weighted average based on square feet of use and equally weights each use at 50 percent. The table does not account for potential light industrial uses that may have increased demands as compared to a retail or office use. Data farms and certain manufacturing have increased water demands that would need to be accounted for in the anticipated usage. Uses with increased demands could count against the maximum nonresidential development area. It is not clear if there is a margin of safety built into the proposed nonresidential demand standards.

As provided in our last response, dated January 12, 2024, the office/retail demand calculations have been adjusted to reflect the County standard of 0.75 af/yr per 6,695 sqft which is assumed to include a margin of safety.

Additionally, water intensive uses such as the examples above shall not be permitted at Pine Canyon. Allowing uses that are by their nature heavily water intensive would be anathema to the goals, standards, and overall character of Pine Canyon. As noted in the Water Efficiency Plan, nonresidential users will be required to submit water management plans to the Pine Canyon Water and Sanitation District for review. These plans shall include water use projections for individual facilities which the District can review for their congruence with Pine Canyon's overall water goals, standards, and demands.

Staff questions the ability of the new yet-to-be-formed water and sanitation district's ability to monitor and enforce residential demand standards. With what seems to be no margin for error to account for periods of increased demand except though penalties, the future inhabitants' health, safety, and welfare may be affected by paying a penalty for increased residential demands.

To preserve the groundwater for domestic uses only, all outdoor irrigation will be provided via

reclaimed wastewater. The complex wastewater reuse system proposes effluent storage, irrigation uses, land application, and a no-discharge treatment plant to meet the requirements of the Plum Creek watershed. Staff questions the ability of the proposed water and sanitation district's ability to monitor and enforce outdoor irrigation standards on residential lots. The newly formed district would have an enormous responsibility to ensure that the reclaimed wastewater is safely and appropriately used on every park, open space, residential, and commercial lot in the development in perpetuity.

State Regulation 84 (Reg. 84) for Category 3 plus reclaimed water use has substantial monitoring, reporting, notification, and training requirements especially when outdoor irrigation is resident controlled for landscape or gardens. This alone will create a large burden on a newly formed district to enforce on 1,800 residences, let alone the requirements associated with nonresidential irrigation. At least one exterior residential hose bib for potable water is required with a reclaimed water irrigation system.

Pine Canyon acknowledges Staff's question regarding capability of the Pine Canyon Water and Sanitation District (PCWSD,) to comply with the monitoring, reporting, notification, and training requirements under State Regulation 84 (Reg. 84) for Category 3 plus reclaimed water use. Our response follows:

The District is fully aware of the monitoring, reporting, notification, and training requirements that are required to practice water conservation and reuse. Specifically, Pine Canyon and the PCWSD has retained and will retain additional experienced professionals to assist in complying with these requirements. These professionals include:

- AQUA Engineering (Regulation 84 Permitting and Compliance),
- SKM Engineering (system-wide instrumentation and control system. i.e. SCADA)
- Flume, Inc. (individual user water use monitoring and data collection)
- KDS Hydro (Irrigation Specialists)
- Brightview (Irrigation System Operations and Maintenance)
- Ramey Environmental Compliance (Professional Water and Wastewater Systems Operators)
- Dr. Jim Ippolito, PhD – Water Quality Specialist (phosphorus control)

In addition, the District will utilize a system-wide smart irrigation control and monitoring system along with an integrated supervisory control and data acquisition (SCADA) system to provide real time "dashboard" monitoring and control of the entire reclaimed water system, from the point the Category 3+ (highest quality) water leaves the Pine Canyon Water Reclamation Facility and throughout the storage, pumping, distribution, and irrigation systems. This SCADA system will integrate data collected by Flume Inc. products installed at all residences, as well as data from BrightView Landscape Services, to ensure that the entire water system (both potable and recycled water) is working efficiently and within its standards.

All irrigation and outdoor water use of reclaimed will be controlled, operated, and maintained by the PCWSD through our irrigation system operator, Brightview Landscape Services. We clarify that residents will not be allowed to directly and independently use reclaimed water – only Brightview will have operational control of all outdoor irrigation systems. Residential vegetable gardens will not be allowed to be irrigated via the recycled water system. If residents wish to have a food crop garden, then will only be able to irrigate it via the designated potable water hose bib. This minimal and specific outdoor use will be considered within proposed water budgets for residences. As a water usage, the demand on the system is minimal, as these hose bibs are only for single-family residences, a maximum of 800 of them can be placed at Pine Canyon

We also note that irrigation using reclaimed water and compliance with Colorado Regulation 84 – Reclaimed Water Regulations is common in Colorado, with many other Colorado Municipalities and Special Districts – including many small and new Districts – demonstrating the capability and capacity to comply with all Regulation 84 requirements. We provided an extensive list of Regulation 84 permittees with our previous response to Lytle Water. One pertinent example is the Independence Water and Sanitation District, who also practice a "100% reclaimed water" system. While Brightview is also the Irrigation System operator for Independence, residents at Independence have full control of their own recycled water irrigation systems, whereas at Pine Canyon, BrightView will be the only operator of the recycled water irrigation system.

Lastly, we note that the ability of the PCWSD to comply with Regulation 84 has already been evaluated and approved by CDPHE's Engineering Section, Permits Unit, the Watersheds Unit during the extensive review and approval of District's Site Application for the new PCWRF and also CDPHE's review and approval of the District's Land Application Management Plan. (LAMP).

At a minimum, the proposed residential demand standard needs to consider the potential for outdoor usage of potable water, even if an individual water budget is based on indoor use as outdoor irrigation with potable water remains a possibility. Lytle Water Solutions also notes:

> *The County's presumptive residential demand standard of 0.75 ac-ft/yr/unit is not applicable in this application **if, and only if,** a full non-potable reuse system is installed such that there is no outdoor landscaping demand on the potable water supply system.*

It is unclear if the proposed fire suppression water lines and hydrants will use potable or reclaimed water. If potable water is used has this been factored into the demand standards for the district? If reclaimed water is used, how will the district ensure enough water is available for fire suppression?

The Applicant takes fire protection very seriously. From a water supply planning perspective, fire suppression demands are very low. Data from a neighboring fire department shows that a project of the size of Pine Canyon can expect between 3-5 af/year total for fire protection purposes. Regulation 84 allows for Recycled Water treated to Category 3 standards or higher to be used for fire suppression purposes, accordingly, Pine Canyon plans to use any and all available water for fire protection.

If the return flows are not of sufficient quantity for irrigation uses, the district would have to make up the difference with potable water that also serves as the margin of safety water for potable demands. The potential for contamination in residential settings remains a concern. The misuse of reused wastewater by an inexperienced water provider and residents could have a direct impact on the health and safety of future inhabitants of Douglas County

The District's CDPHE-approved Land Application Management Plan (LAMP) provides the needed flexibility to balance the overall water budget to 1) ensure that prioritized irrigation demands are satisfied, 2) all reclaimed (reuse) water is responsibly applied, and 3) that the total water withdrawal from the District's potable water supply aquifers does not exceed 0.2 af/yr/unit.

The main water use management tools are the control of recycled water irrigation and District's discretionary ability to irrigate agricultural crops. As noted in the LAMP, there is the potential to irrigate 42 acres of agricultural crops with reclaimed water if needed to balance the water budget. However, irrigation of the District's residential and non-residential demands

are prioritized first; and irrigation of agricultural crops would only be practiced after the residential and non-residential irrigation needs are fulfilled. In other words, if there is a need in either the residential or non-residential areas for additional recycled water to meet these prioritized irrigation demands, it can be deducted from the amount that would be available for agricultural irrigation. As noted in the LAMP and in prior responses to LWS, this provides the District with a significant degree of flexibility to 1) properly manage all generated reclaimed water without discharge to groundwater or surface water, and 2) prioritize irrigation needs of the residential and commercial areas.

We also note that since this is a closed loop system, if there is insufficient reclaimed water, then the direct cause would be decreased indoor water use and aquifer use. Therefore, even if the prioritized development area irrigation system were supplemented by potable water, then the total withdrawal would not exceed the proposed 0.2 af/yr/unit allocation allowance.

DCZR 1808A.07.2 For appeals to the Water Demand Standards set forth in Section 1805A, … the application provides sufficient supporting data of alternate water demand criteria, so the water supply is still considered sufficient in terms of quantity, quality, and dependability.

Staff comment: In staff's assessment, the sole use of an established municipal provider serving 28,000 customers for supporting data is insufficient. The proposed Pine Canyon development would possibly have around 2,000 customers, so supporting data from similarly sized providers is expected to assess the feasibility of the proposed alternative demand standard.

The supporting data for an alternate demand standard of 0.17 ac-ft/yr/unit is based on indoor water budget number from Castle Rock Water. Castle Rock Water uses a 1.1 Single-Family Equivalent (SFE) (equal to 1.1 ac-ft/yr/unit) for planning purposes for new development. The larger residential demand number is used for outdoor uses and "unforeseen variable demands." Lytle Water Solutions notes that the requested demand standard of 0.17 ac-ft/yr/unit provides "no allowance for potentially higher demands and/or variable demands from year to year."

The Applicant understands comments requesting more and different supporting data, and has prepared a memo detailing the water demand and usage of multiple districts and water providers which are of a similar nature to the planned Pine Canyon Water and Sanitation District. This includes districts with a smaller number of units served, districts that have been formed more recently, and a district which operates a recycled water irrigation system similar to the one proposed for Pine Canyon. All of these Districts successfully operate with indoor water demands which are in line with the Applicant's proposed demand standards (these districts use an average of .153 af/yr/unit). The Applicant has also included data from three major water providers in Douglas County, all of whom have indoor usage similar to the Applicant's proposed demand standard.

Pine Canyon proposes the alternative demand standard also as a planning amount. A reduced demand standard is asserted to provide excess groundwater that will meet "unforeseen variable demands" considering that actual water use numbers are not available on which to base an alternative demand standard. Pine Canyon has not provided information that this is a sufficient demand quantity for residential uses to account for unforeseen variables in the system. Lytle Water Solutions also recommends that a larger demand value be provided to "allow for water use variability among 1,800 homes."

The Applicant understands this comment and has updated the water appeal documents to include a more conservative planning value of .2af/yr/unit to account for any "unforeseen variable demands" as noted by LWS. This value represents a buffer of 18% to cover variability and unforeseen circumstances. The Applicant also clarifies that the project will have a maximum of 1,800 residential units, only 800 of those are planned as single family homes.

Throughout the documents there are references to Castle Rock Water for supporting data of its proposed alternate demand standards. Staff notes that Castle Rock is an established municipal water provider with years of data to support its demand numbers, an established and refined education and enforcement system, and developed diverse water portfolio to ensure a dependable supply to its customers.

Previously submitted supporting data used Denver Water's Water Plan which is aspirational in its demand standard and not actually quantified. In previous reviews, the County's water consultant noted that aspirational plans do not demonstrate that the requested alternative demand standard is providing a water supply that is sufficient in terms of quantity, quality, and dependability.

Understood. A broad spectrum of real use data has been collected and presented from many different water and sanitation districts of various sizes and ages to illustrate the reasonableness and achievability of the Applicant's proposed alternative demand standard.

Also missing is sufficient data to support the proposed reclaimed water irrigation system that will serve residential and nonresidential customers. As this is a key piece in supporting Pine Canyon's alternate demand standard, data from a water and sanitation district with a separate irrigation system should be provided.

The Applicant has included real use data from the Independence Water and Sanitation District. Independence is a new (established in 2021) district that will build out to a similar size to Pine Canyon located just 10 miles away. Independence operates a 100% recycled water irrigation system very similar to the one proposed at Pine Canyon. Indoor usage at Independence averages .13/af/yr/unit. Pine Canyon will treat its water to a higher standard than Independence (Category 3+ vs Category 3) and will have stronger water conservation and monitoring practices than Independence, as recycled water irrigation at Pine Canyon will be controlled by the District rather than by individual homeowners.

As the County water consultant, Lytle Water Solutions notes, in its opinion, sufficient supporting data for the proposed alternative demand criteria has not been submitted to date by the applicant.

The Applicant has included significantly more supporting data all of which supports the proposed alternative demand standard in the attached summary document.

Wellfield Analysis Comments

The applicant agreed to provide a dynamic wellfield analysis at the rezoning stage of development to demonstrate that the district's groundwater wells would not have an adverse effect on neighboring municipal wells. Lytle Water Solutions reviewed the revised wellfield analysis and found it satisfied the requirements of DCZR 1807A.05

Understood.

Water Efficiency Plan Comments

The Water Efficiency Plan (WEP) is a supplemental document to demonstrate how the alternative

demand standard proposed in the Water Appeal could be implemented. The water and sanitation district would need to enforce the WEP as it will not be subsequently reviewed or approved by the County. These comments are intended to identify inconsistencies in the WEP. Below are comments specific to the Water Efficiency Plan (WEP) submitted on January 12, 2024.

1. The WEP will not be the enforcement document of the district. The water and sanitation district will need to develop and adopt rate structures, rules and regulations, procedures, and penalties for water and wastewater use in the planned development. The WEP serves as a road map for the district.

   Understood. The Water and Sanitation will use the WEP as a guiding document in its creation of all rate structures, rules, regulations, restrictions, procedures, and penalties.

2. There is going to be a narrow balance of supply and demand of the treated wastewater for irrigation purposes. It appears that if outdoor irrigation is restricted too much, it could exceed the reclaimed water storage system capacity.

   This is correct. The outdoor irrigation calculations have been finely tuned to ensure that there is enough recycled water for irrigation and that there is enough irrigation demand for the recycled water that is produced. However, it is important to note that the allotted agricultural irrigation (up to 115 acre-feet) is available for situations where the residential and non-residential irrigation demands have been met and there is more recycled water available.

3. In the Executive Summary Nonresidential Design Guidelines section, the Nonresidential Indoor Water Use table is not a weighted average based on square feet of each use and weights each use at 50 percent. Also, the table does not account for potential indoor light industrial uses that may have increased demands as compared to a retail or office use.

   This table has been updated to reflect this comment. The average row has been removed to avoid confusion. Light industrial uses were included in the calculations, but were not labeled correctly, this has been corrected in the update. Also, heavy water uses in light industrial areas will not be permitted at Pine Canyon.

4. The Nonresidential Outdoor Water Use table, “Light Industrial/Office” is noted with an outdoor water demand standard even though it does not have an associated indoor demand.

   This table has been updated to reflect the newly proposed demand standard. The indoor demand table has been corrected to correlate with the outdoor demand table.

5. In the Executive Summary Adequacy of Water Supply, please edit the first sentence to reflect that the proposed total demand is premised on an alternative demand standard, not the County presumptive standards. There is not a 189-year supply based on State or County standards.

   This sentence has been edited to reflect the request for an alternate demand standard.

6. From the WEP, it appears that the outdoor usage has not been estimated on a lot size basis. How will each residential outdoor use area be defined? Will each residential lot be assigned a flat budgeted amount regardless of lot size?

   This is not correct. Outdoor usage has been estimated according to different lot sizes. Areas are categorized by different lot sizes and each have corresponding allowed irrigable area sizes. These areas are categorized into allowed turf areas, and allowed ornamental bed areas. All of these residential areas, their corresponding irrigable areas, and their allowed irrigation rates are detailed in the LAMP. The District will monitor the real-time usage of the irrigation (being operated and managed by BrightView) to ensure compliance with the LAMP, and CDPHE’s Water Quality Control Division will continue its oversight authority of the District and LAMP compliance.

7. The Residential Landscape Design Section (2.1.2.1) refers to Town of Castle Rock

Landscape Design Standards for maximum irrigated turf area. New development in Castle Rock is limited to 500 sq. ft. of turf in the rear yard, regardless of lot size. Is the intent to use old or new Castle Rock turf standards?

These references were to previous Town standards. These have been removed.

8. The Residential Landscape Design Section (2.1.2.2) refers to Douglas County plant lists. The County does not have required plant lists for residential or non-residential landscapes. All plant lists and standards will need to be developed and enforced by the HOA or district.

   This reference has been updated to reflect the Pine Canyon Master Plant List and enforcement by appropriate Title 32 Metro Districts and HOAs.

9. The Education section should address future real estate transactions when the builder is no longer involved. How will subsequent lot owners be informed of the water efficiency plan?

   This section has been updated to reflect that subsequent owners shall be informed by the appropriate Title 32 Metro District or HOA.

10. New residential construction requires water conserving indoor fixtures and appliances. How will this be enforced when fixtures and appliances are replaced by homeowners?

    Regulatory changes at the State and Federal level have mandated the sale of more water conscious fixtures and appliances which will help ensure that homeowners are replacing their appliances and fixtures appropriately at Pine Canyon. However, in order to ensure compliance with the District's water demand and usage goals, the District will also be able monitor water usage at the appliance and fixture level using Flume's integrated smart technology. When residential units are showing high water consumption, the District will be able to drill down into the usage and reveal exactly what appliance or fixture is using more water, and when this change in usage occurred. Once this change is detected, the District can rectify the situation with the homeowner.

11. In Section 2.3.1 it states that residents or businesses will not operate the system. In Executive Summary Section F, it states that "all development irrigation systems will be operated and maintained by Brightview…" Does this mean the district will operate and maintain the system and the property owner will own the system? How will the district operate and maintain the irrigation lines and sprinkler heads on property it does not own? Could a property owner move a sprinkler head or repair a drip line? It may be necessary for easements to allow the district to operate and maintain the irrigation system on individual lots.

    The irrigation system will be operated and maintained by BrightView Landscape Services and will be owned by the District. This means that property owners will not have the ability to alter or move or repair the irrigation system. Those operations will be conducted by BrightView. As detailed in the January 11 2024 letter from BrightView, "The irrigation system will only be operated, managed, checked, activated, winterized and repaired by BrightView technicians familiar with reclaimed irrigation practices. The individual homeowner will not have access to the reclaimed system controller or operation. Interaction with homeowners will be in the same manner as other similar sites we manage". If easements are required for individual lots, they will be written into the appropriate documentation (subdivision, final plat, etc.).

12. Will each lot have its own irrigation meter? Would there be a separate irrigation water budget and tiered rate structure? If the district operates and maintains the irrigation system, will an owner be billed for excessive irrigation, if they do not control its watering schedule?

    Yes, each lot will have its own irrigation meter. The Flume smart metering system will also report on both indoor and outdoor water uses in real time to complement the meter readings. Yes, outdoor use will be budgeted in its own tier as detailed in the WEP. Because the irrigation system will be operated and maintained by BrightView, with real-

time monitoring by the District, there is a small chance of excessive irrigation from the recycled water system. If this occurs, the situation will be rectified between the District and system operator, not the homeowner. However, if excess outdoor irrigation is coming from the potable water hose bib, this can be detected by the Flume smart monitoring system or smart sprinkler system. In this case, the homeowner will be charged for excess outdoor irrigation.

13. Reg. 84 requires programs to train and certify all property owners in the use of the reclaimed water irrigation system. Based on the discussion in Items 11 and 12 above, would the homeowner be educated and trained on the residential irrigation system? Or is this to be controlled by the district? This should be clarified in the local water and sanitation district requirements so property owners are on notice that they may or may not have control of the irrigation system.

    This seems to be a misinterpretation. Regulation 84 requires "conduct an annual education and training program for all Users, Site Managers (when applicable) and Management Users (when applicable)". At Pine Canyon, only the District and BrightView will be "users", as defined by Regulation 84 ("User means the entity or person listed as "User" in the User Application and Site Management Plan and User Authorization who uses reclaimed water and is responsible for the Site and for compliance with the requirements in section 84.9 and 84.10 of this regulation. A User may also be a Treater. A User may also be a person(s) designated by the User to use reclaimed water on a User Site"). However, property owners will still be educated on what Recycled Water is and isn't, how it is being used, how safe it is, and why it is an important recourse via a District created and operated website. An example of such a website for the Independence Water and Sanitation District can be found here: https://independencewsd.colorado.gov/important-info.

14. Please clarify the system operation in terms of complying with Reg. 84 – Reclaimed Water Control. It appears the WEP conflicts with the requirements of system operation, especially as it relates to Resident-controlled food crop (gardens) and the use of sprinklers. Reg. 84 allows "Only drip, subsurface drip, button drip or other low to the ground irrigation systems are allowed and must cover a small distribution area" for gardens.

    These sections of Regulation 84 apply to "Resident Controlled Food Crop Irrigation", while PCWSD will be treating water to Category 3+ standards, food crop gardens will not be allowed to be irrigated with recycled water at Pine Canyon. If residents wish to have a food crop garden, they will have to use the designated potable water hose bib for irrigation.

15. No specific Landscape Design measures were listed in the Non-Residential Water Efficiency Plan section. Specific design standards and plant lists for non-residential landscaping to balance the use of reclaimed water in the development is needed. The County does not have specific plant lists for nonresidential development, so a different reference is needed. Any landscaping submitted to the County with a Site Improvement Plan would only be reviewed against the requirements of Section 2708 of the Zoning Resolution. Landscape standards should not be identified in the PD, as the County will only enforce landscape standards that are included in the Zoning Resolution.

    The Non-Residential Water Efficiency Plan section has been updated to include landscaping design standards and plant list references. The Pine Canyon Master Plant List as referenced in the WEP will be a binding document overseen by the appropriate Title 32 Metro Districts. Landscape plans will be submitted to the appropriate Title 32 Metro District for approval, and will be incorporated into the overall "Water Management Plans" for larger facilities to be approved by PCWSD.

16. Nonresidential water budget is to be set on wintertime water use for a residence? With

different indoor demands how would this work for a nonresidential use? Will it be an average of annual usage? Will this be adjusted on an annual basis or with a change in occupancy?

This section of the WEP has been updated, as it was subject to a typo. Indoor non-residential water budgets will be determined by wintertime usage by that non-residential customer. These rates will be set to be adjusted annually, however, the District retains the right to adjust the rate as necessary, and will do so at a change in occupancy or as new data or technology require a rate adjustment if conditions require.

17. Please explain how a tiered rate structure will work with a separate indoor and outdoor infrastructure. Would there be a separate tier structure for outdoor usage?

This comment seems to be related to non-residential uses, however the tiered structure is similar for both residential and nonresidential users. Outdoor usage falls into the tiered rate structure itself - Tier 2 - and any excessive use (including excessive outdoor use as detailed in the answer to question 12 above) falls into Tier 3.

This concludes the review of the water-related documents submitted with the Pine Canyon Planned Development. Please provide a written response summarizing the changes made to the water supply and appeal documents. The summary should be specific in the demand standards being appealed and the alternative demand standards being requested. This has been provided previously, but it seems to have been separated in the recent resubmittal.

Planning Services reserves the right to review revised documents when submitted and provide additional comments as necessary.

Sincerely,

Curt Weitkunat, AICP, Long Range Planning Manager

Attachment:

- March 8, 2024 Lytle Water Solutions Review letter

cc: Matt Jakubowski, AICP, Chief Planner
Mike Pesicka, Principal Planner
Lauren Pulver, Community Resources Supervisor

LYTLE WATER SOLUTIONS, LLC

March 8, 2024

Douglas County Department of Community Development
100 Third Street
Castle Rock, Colorado 80104

Attn: Mr. Curt Weitkunat, AICP
Long-Range Planning Manager

Mr. Matt Jakubowski, AICP
Chief Planner

Mr. Mike Pesicka
Principal Planner

Subject: Fourth Review of Water Supply and Demand Issues with the Pine Canyon Planned Development Service Plan, Rezoning, and Appeal, File Nos. SV2020-001, ZR2020-010, and MI2020-009.

Project No. 1633-24

Dear Curt, Matt, and Mike:

Lytle Water Solutions, LLC ("LWS") has previously reviewed three simultaneous applications related to the Pine Canyon planned development in our letters dated October 23, 2020 and April 21, 2023 for File Nos. SV2020-001, ZR2020-010, and MI2020-009. Pine Canyon is requesting approval of its service plan and a rezoning, and also is seeking approval of an appeal pursuant to Section 1808A.07.2 related to setting alternative demand standards for all aspects of the water demand uses.

Since the time of the previous LWS review letters of October 23, 2020, April 21, 2023 and November 27, 2023, Pine Canyon has submitted additional information from Jehn Water Consultants, Inc. ("Jehn") dated January 12, 2024, which addresses the issues identified in our November 27, 2023 letter. An updated Water Efficiency Plan was also submitted. Based on the supplemental information provided, we have reviewed the responses provided by Jehn to document issues that have been resolved and those that are still outstanding.

12600 W. Colfax Ave., Suite A-270
Lakewood, CO 80215
www.lytlewater.com
Phone: 303-350-4090
E-mail: lws@lytlewater.com

The Pine Canyon planned development is comprised of 534.6 acres ("ac") located in portions of Sections 34, 35, and 36 of Township 7 South, Range 67 West and Section 1 of Township 8 South, Range 67 West. As such, this development is located in the Central Basin according to the Douglas County Water Supply Standards map. Therefore, all of the Denver Basin aquifer water beneath the property can be developed to serve the property. Service is proposed to be provided through the Pine Canyon Water and Sanitation District, approval of which is subject to the pending applications.

Given this application seeks to establish a new special district, there are several criteria related to a new special district that have to be met pursuant to Section 1807A. These criteria are summarized below and the degree to which these criteria have been met by the applicant are presented in our summary of the proposed water supply to serve the development, as well as the demands for the development. This information is presented in the following sections.

1.0 REQUIREMENTS OF SECTION 1807A FOR NEW SPECIAL DISTRICTS

Section 1807A cites seven required submittal criteria for new special districts. However, Section 1807A.06 is not applicable to this application since the property is located in the Central Basin. These submittal criteria include:

- **1807A.01** An attorney's opinion letter stating ownership by the applicant(s) of adjudicated water rights and a copy of the court decree adjudicating the water rights.

- **1807A.02** An adjudicated Augmentation Plan, if required by the Colorado State Engineer, and a copy of the court decree adjudicating the Augmentation Plan. An adjudicated Augmentation Plan shall be submitted prior to the scheduling of a public hearing for the application.

- **1807A.03** A Water Plan.

- **1807A.04** Water demand standards as established in Section 1805A.

- **1807A.05** For service plan provisions to use Denver Basin wells in Margin B and Central Basin Water Supply Zones, the service plan shall include a wellfield analysis that demonstrates that such wells will not adversely impact existing water rights on adjoining lands, considering the statutory requirement that material injury does not result solely from reductions of hydrostatic pressure or water level in an aquifer.

- **1807A.07** Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

The following sections summarize the current water supply availability and water demands, as provided by the applicant. Compliance with the Section 1807A submittal criteria have been evaluated based on the submittals LWS has reviewed.

2.0 ESTIMATED WATER SUPPLY

The proposed water supply for the Pine Canyon development is Denver Basin aquifer water supplies beneath the property. Multiple Water Court decrees have been obtained for this property, including Case Nos. 97CW97, 98CW403, 01CW82, 12CW15, and 17CW3000. These decrees adjudicated volumes of nontributary and not-nontributary Denver Basin aquifer water but did not adjudicate augmentation plans for the not-nontributary water. Case Nos. 00CW68 and 11CW18 decreed augmentation plans for a portion of the not-nontributary Lower Dawson and Denver aquifer water. Section 1807A.01 has been satisfied based on the June 11, 2020 letter from Petrock Fendel Poznanozic, P.C. which cites the JRW Family Limited Partnership as having the marketable title to the water rights shown in **Table 1**.

Table 1

DENVER BASIN WATER SUPPLY AVAILABILITY-PINE CANYON [1)]

AQUIFER	ANNUAL VOLUME (ac-ft)	LEGAL STATUS
Lower Dawson	104.0	NT
Lower Dawson [2)]	54.9	NNT
Denver	230.0	NT
Denver [2)]	84.0	NNT
Arapahoe [3)]	236.7	NT
Laramie Fox Hills [3)]	0.3	NT
TOTAL	**709.9**	

1) Total decreed volume is 863.9 ac-ft/yr, but not all decreed water is available for use.
2) Annual volume of not-nontributary water that has been augmented.
3) Only nontributary water beyond what was reserved for augmentation is included in the water supply availability.

Table 1 summarizes the net amount of Denver Basin aquifer water available versus the total amounts adjudicated. This adjustment in water availability is necessary because there is (a) not-nontributary water beneath the property that has not currently been augmented and (b) some of the nontributary water has been reserved in perpetuity through a decreed augmentation plan to augment the predicted stream depletions caused by the development of some of the not-nontributary water. These factors reduce the total water supply availability and **Table 1** only includes decreed water that is currently available for use. The reduced values in **Table 1** meet the criteria in Section 1807A.02 as they are based on the fully augmented volumes available at Pine Canyon.

Based on information provided to LWS, the water supply presented in **Table 1** is the only source of first-use water for the Pine Canyon development. The applicant proposes to establish a Renewable Water Fund that will involve charges to water users within the district for the future purchase of renewable water to reduce its dependence on the Denver Basin aquifers. However, at this time, no additional renewable water is available to serve the proposed development.

Pursuant to the requirements of Section 1807A.05, a wellfield analysis is required for new special districts located in the Central Basin to assess potential impacts to adjacent water rights to demonstrate no material injury to adjacent water rights from pumping the required water supply. In a memorandum dated January 12, 2024 from Jehn, a revised wellfield analysis was provided.

The January 12 wellfield analysis provided by Jehn was a Theis analysis whereby wells were pumped at a constant rate for 100 years at two separate wellfields across the Pine Canyon property, i.e., the eastern and western side of the property. While the Theis equation is a steady-state analytical solution where aquifer and water level conditions are not changed with time, the revised analysis considered changes in aquifer hydraulic characteristics over time by modeling the Lower Dawson and Denver aquifers as unconfined aquifers, while the Arapahoe aquifer was modeled as converting from fully confined, to partially confined, to unconfined aquifer conditions over the 100 year pumping period.

The aquifer hydraulic characteristics used by Jehn in its analysis of pumping drawdown effects at the closest non-exempt well are judged to be reasonable. The pumping rates modeled are consistent with the annual volumes shown in **Table 1**, inclusive of the nontributary and not-nontributary water that is fully augmented. Therefore, this analysis evaluates the effects of pumping the full annual volume from the three stratigraphically-highest aquifers (709.6 ac-ft/yr). The results of the modeling indicated minor drawdown effects at the nearest offsite well in each of the three aquifers modeled after 100 years of continuous pumping (8.5 to 26 feet).

Jehn also evaluated the portion of the saturated thickness in each aquifer that would be reduced due to the Pine Canyon pumping. This is an important consideration as the actual drawdown values don't tell the entire story. Based on evaluation of water-bearing strata from local geophysical logs, the percentage decline in water-bearing strata was minor (range of 2-6 percent). Therefore, it is our opinion that the revised wellfield analysis provided by Jehn is adequate to satisfy Section 1807A.05.

Section 1807A.07 requires that the water rights in all Denver Basin aquifers have been reserved in perpetuity for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants. The applicant has submitted a draft declaration to the County and will be recorded if the PD is approved. Therefore, Section 1807A.07 has been satisfied.

3.0 ESTIMATED WATER DEMAND

According to the January 12, 2024 revised *Pine Canyon Water Efficiency Plan*, prepared by the JRW Family Limited Partnership (and consultants), the Pine Canyon development proposes 1,800 single-family units ("SFEs") and multi-family units ("MFEs") which were undifferentiated, 550,000 ft^2 of office space, 50,000 ft^2 of retail space, a 220-room hotel and spa, and an 800-student school. In addition, it is our understanding that there can be no more than 1,800 units in this planned development, inclusive of the residential units and hotel/spa. There will also be "over" 170 ac of public parks and open space, although the acreage of that total that will be irrigated was not quantified.

It is proposed that first-use Denver Basin aquifer water will only be used to serve in-house demands. While there will be significant residential, commercial, park, and agricultural irrigation, it is our understanding that all irrigation demands will be served through a full dual-pipe, non-potable water supply system throughout the development to serve residential, commercial, park, and school irrigation. We recommend more details of how irrigation will be controlled by an outside entity on private property should be provided.

In estimating water demands for the proposed development, the applicant proposes to not adopt the County's presumptive water demand estimates as outlined in Section 1805A for the uses proposed. Instead, alternate water demand standards are being proposed. As such, an appeal has also been filed pursuant to Section 1808A.07.2.

4.0 WATER DEMAND APPEAL

While Section 1807A.04 presumptively requires the use of the water demand standards in Section 1805A, the applicant is appealing these presumptive water demand standards. For each of the proposed uses in the Pine Canyon development, alternative water demand standards are proposed, as summarized in **Table 2**, which also provides a comparison to the County's presumptive values in Section 1805A.

Table 2

PROPOSED UNIT WATER DEMANDS BY USE [1)]

USE	PROPOSED UNIT DEMAND	PRESUMPTIVE DEMAND STANDARD
Single-family	0.17 ac-ft/yr	0.75 ac-ft/yr [2)]
Multi-family	0.17 ac-ft/yr	0.75 ac-ft/yr [2)]
Office/Retail [6)]	0.75 ac-ft/6,695 ft^2	0.75 ac-ft/6,695 ft^2
Hotel	1.38 ac-ft/6,695 ft^2 [4)]	2.30 ac-ft/6,695 ft^2 [3)]
School	25 gpd/student	25 gpd/student
Irrigation	0.9-2.24 ac-ft/yr	2.5 ac-ft/yr [5)]

1) Based on values presented in the September 13, 2023 revised Pine Canyon Water Efficiency Report.
2) Includes outdoor irrigation, while Jehn's proposed demand is exclusive to indoor demand.
3) No County presumptive demand for hotel rooms. Value based on common criterion for hotel water use per room, 100 gpd/room, 220 rooms, each room is 325 ft^2.
4) Jehn uses a demand of 30 gpd/person with an occupancy of 2 persons/room, i.e., 60 gpd/room.
5) The County uses the same unit irrigation demand for all types of irrigation. The January 12 Jehn memo identifies a range based on the irrigation of trees/shrubs, cool season turf, and alfalfa.
6) Jehn uses a variable demand for office versus retail space; however, Section 1805A does not differentiate between commercial use. Light industrial is also included in the office/retail presumptive unit water demand criterion.

The unit water use values presented in **Table 2** are from the January 12, 2024 revised *Pine Canyon Water Efficiency Report*, which we have assumed are the proposed values in the appeal. The primary differences in the proposed unit water demand values relate to the residential demands and the hotel demand. However, light industrial use is not typically included in the office/retail unit demand. Therefore, if there is going to be light industrial use at Pine Canyon, we would recommend the applicant provide further details on the type of use and estimated water demand. The irrigation demands are variable based on the vegetation type.

Based on the proposed unit demands values in **Table 2** and the proposed development plan, **Table 3** presents the total *potable* water demands using the appeal criteria versus the County's presumptive demand criteria in Section 1805A.

The January 12, 2024 revised *Pine Canyon Water Efficiency Report* indicated a total estimated potable water demand of 375.79 ac-ft/yr, which varies slightly from the value in **Table 3**, possibly due to rounding errors. Based on the January 12 Jehn memo, Pine Canyon has adjusted the retail/office demand to be consistent with the County's presumptive demand and the annual school demand has been reduced to reflect a school year of 275 days. We agree with the estimated school demand.

Table 3

COMPARATIVE POTABLE WATER DEMAND ESTIMATES

USE	AMOUNT [1]	PINE CANYON APPEAL DEMAND [2]	COUNTY DEMAND CRITERIA [3]
SFE/MFE	1,800 units	306.0 [5]	1,350.0 [4]
Retail/Office	600,000 ft^2 [2]	67.2	67.2
Hotel/spa	220 rooms, 325 ft^2/room	14.8 [6]	24.7 [8]
School	5 gpd/student, 800 students	16.9 [7]	16.9 [9]
TOTAL		381.3	1,488.9

1) From January 12, 2024 revised Pine Canyon Water Efficiency Report.
2) Based on unit demands proposed in January 12, 2024 revised Pine Canyon Water Efficiency Report.
3) Presumptive demand criteria from Section 1805A.
4) County's presumptive criterion assumes both indoor and outdoor uses to be served by potable water supply system. Therefore, only indoor potable demand criterion should be less.
5) Demand based on 0.17 ac-ft/yr/unit
6) Demand based on 30 gpd/person, 2 persons/room, rooms are 325 ft^2.
7) Demand based on occupancy 365 days/year, which likely overestimates the demand.
8) Demand based on 100 gpd/room. rooms are 325 ft^2.
9) Assumed same occupancy as estimated in January 12, 2024 revised Pine Canyon Water Efficiency Report.

As shown in **Table 3**, there are two remaining differences in the demands estimated by Pine Canyon versus the County's presumptive demand standards. Our opinions related to the estimated demands in **Table 3** include:

(1) The County's presumptive residential demand standard of 0.75 ac-ft/yr/unit is not applicable in this application **if, and only if,** a full non-potable reuse system is installed such that there is no outdoor landscaping demand on the potable water supply system. However, Regulation 84 requires at least one potable outdoor hose bib, so the demand associated with homeowners using water outside of the managed irrigation system needs to be provided.

While the applicant is proposing an alternate residential indoor water use demand standard of 0.17 ac-ft/yr/unit (which is a 77 percent reduction from the County's presumptive demand criterion), we don't agree with that value as (a) we haven't been provided with data to demonstrate the long term ability to reliably maintain this annual volume, and (b) there is no allowance for potentially higher demands and/or variable demands from year to year.

We understand the County's presumptive residential demand is being appealed with the values stated herein.

(2) In our opinion, a reduced demand for water use in a hotel and spa is not reasonable as transient water use of room and spa facilities cannot be easily controlled. The standard water use in hotels is 100 gallons per day per room ("gpd/room"), not the 60 gpd/room proposed by the applicants. The demands in **Table 3** have been revised to reflect these different unit demand estimates. Presumably, the difference in the hotel demand is also being appealed.

We appreciate the additional enforcement layers that are now proposed to control the potable water use within Pine Canyon. According to the January 12, 2024 revised *Pine Canyon Water Efficiency Report*, all residential units will be required to have a smart monitoring and reporting system that will monitor water usage by unit and, if the water budget is exceeded, there will be a succession of enforcement actions, from "warnings, citations, financial punishments, and potential discontinuance of service." It is our opinion this is a positive step to control indoor water use.

Given the water use protections that have now been included in the revised *Pine Canyon Water Efficiency Report*, the fact that the number of units is capped at 1,800, and the excess water available to the property (over 300 ac-ft/yr at the 0.17 ac-ft/yr/unit criterion), we recommend a more conservative unit residential demand value that would allow for water use variability among 1,800 homes and adequate installed well capacity, which could also be shown to adequately serve the Pine Canyon development.

In summary, we understand the County's presumptive water demand standard is not appropriate in this case as long as there won't be potable demands associated with any irrigation demands. However, potential variability in water demands that could occur for a number of reasons are not accounted for with the alternative demand standards being proposed in the appeal. For the reasons stated, it is our opinion the criteria in Section 1808A.07.2. related to the application providing "sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality, and dependability" have not been met by the documents submitted to date by the applicant.

If you have questions regarding our fourth review of the applications related to the Pine Canyon development, please feel free to give us a call.

Yours truly,

Bruce A. Lytle, P.E.
President

Pine Canyon Water Appeal
Wellfield Analysis Documents

Jehn Water Consultants, Inc.
Water Resources Consulting
Celebrating Over 25 Years of Excellence

88 Inverness Circle East
Suite K-102
Englewood, Colorado 80112
(303) 321-8335

MEMORANDUM

TO: James Walker
Kurt Walker

FROM: Gina Burke
Hillary Banks

DATE: January 12, 2024

SUBJECT: Pine Canyon – Updated Wellfield Interference Analysis

JOB NO: 986.1

This Memorandum provides the details of the wellfield interference analysis our office completed for the Pine Canyon Water Supply Plan Report, dated January 27, 2023, and provides additional updates to those original analyses.

As Pine Canyon is a new special district proposing to use Denver Basin wells located in the Central Basin Water Supply Zone, Section 1807A.05 of the Douglas County Zoning Resolution requires the submittal of a wellfield analysis that demonstrates that pumping from its central basin wells will not adversely affect existing water rights on contiguous lands. This requirement does not consider impact on water level or hydrostatic pressure alone to constitute injury.

To address concerns of impacts of pumping at Pine Canyon on the closest wells, a worst case pumping scenario was modeled, whereby all of the Denver Basin ground water was pumped over 100 years at a constant rate. Since there are two proposed Well Facilities, we ran two separate models simulating each Facility pumping the full volume of water available to each aquifer. The Theis Solution was used to model drawdown in the pumping well and the closest neighboring well in each aquifer, as shown on Figure 1.

To address concerns about the changing aquifer conditions in the Denver Basin aquifers, we reviewed published water level data in the vicinity of Pine Canyon in order to assess current aquifer conditions. Ground water levels in the Denver Basin aquifers

are reported annually in the Colorado Division of Water Resources publication titled Groundwater Levels in the Denver Basin Bedrock Aquifers. We reviewed static water levels measured in nearby wells in 2023. Ground water levels in nearby Lower Dawson and Denver aquifer wells indicated that these aquifers are generally unconfined in the vicinity of Pine Canyon. Ground water levels in nearby Arapahoe aquifer wells indicate that the Arapahoe aquifer is generally confined in the vicinity of Pine Canyon. Due to factors such as well construction characteristics, aquifer conditions and water level declines are not consistent within each aquifer and at all locations.

To address concerns of changing aquifer conditions in the Arapahoe aquifer from confined to unconfined, we modeled pumping under varying hydraulic conditions. Our modeled scenarios included a confined aquifer condition, a semi-confined aquifer condition, and an unconfined aquifer condition. The parameters used in each aquifer scenario are provided in Table 1, attached. As stated above, a worst case pumping scenario was modeled, and each Well Facility (Wellfield 1 and Wellfield 2) was modeled to pump the full volume of water available to each aquifer over a 100-year period. The total effect of drawdown was estimated at the closest well in each aquifer to Wellfield 1 and Wellfield 2. Table 2 shows the drawdown impacts to each well in the modeled scenario. Additionally, Table 2 shows the drawdown to nearby Arapahoe aquifer wells under unconfined, semi-confined, and confined aquifer conditions. A larger amount of drawdown can be expected under confined conditions, as the cone of depression that is formed in a confined aquifer is both deeper and broader than the cone of depression that is formed when pumping a well under unconfined aquifer conditions.

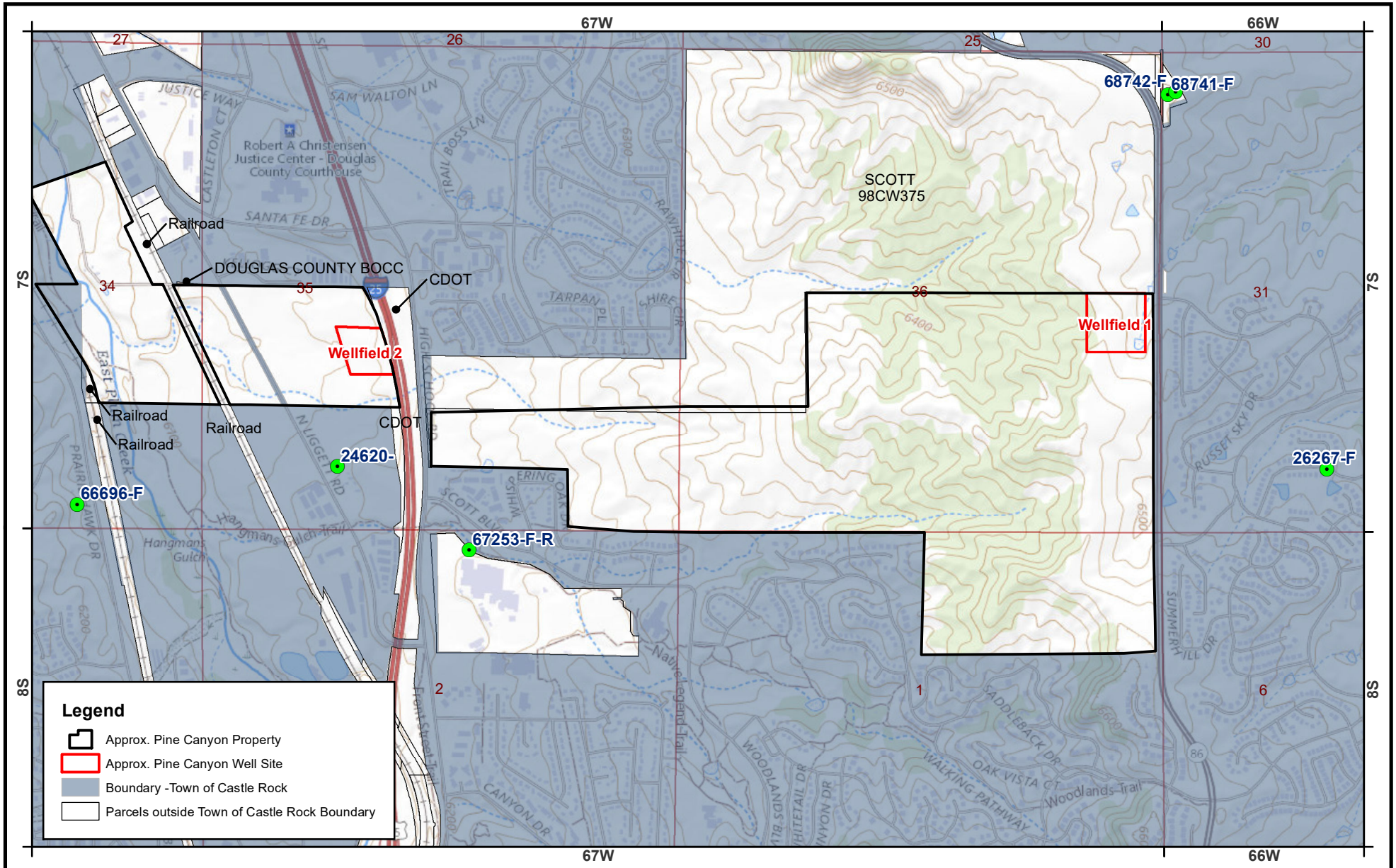
The results of this analysis show that, in the worst case under unconfined conditions, the closest Lower Dawson well could see impacts of 9 to 10.5 feet after 100 years of pumping. This is an average of 0.09 to 0.11 feet per year, an effect that we consider to be immeasurable in a well. In the closest Denver well the impacts from pumping after 100 years could be from 22 to 24.8 feet, an average of 0.22 to 0.25 feet per year. And finally, the closest Arapahoe aquifer well could see impacts ranging from 8.5 to 25.8 feet after 100 years under this worst case scenario (this range includes both confined and unconfined conditions). This is an average of 0.09 to 0.26 feet per year, depending on location and aquifer condition modeled, an amount we consider immeasurable and an

impact to water level in neighboring wells that we do not consider to constitute material injury. Furthermore, based on the Pine Canyon Water Supply Plan Report, Pine Canyon will only be using less than sixty percent of its total ground water rights portfolio, and pumping volumes will likely be distributed across Well Facilities as Facilities 1 and 2 are built out.

We were asked to further assess impact by analyzing the drawdown in the nearby Arapahoe aquifer wells and the estimated drawdown as a percentage of the total saturated sand thickness present in the aquifer at the well location. At Wellfield 1, the potential drawdown at 100 years to the nearby Arapahoe Well Permit No. 68742-F under unconfined, semi-confined, and confined conditions is 9.9 feet, 16.6 feet and 25.8 feet, respectively. Based on the geophysical log at this location, the total aquifer thickness is 501 feet, of which 51% or 255 feet is saturated sand. The 100-year drawdown may impact a portion of the saturated sand in the well. The portion of the total saturated sand that may be impacted after 100-years of pumping is 2% under the unconfined conditions, 3% under the semi-confined conditions, and 5% under the confined conditions.

At Wellfield 2, the estimated drawdown at 100 years to the nearby Arapahoe Well Permit No. 66696-F under unconfined, semi-confined, and confined conditions is 8.5 feet, 15.1 feet and 24.3 feet, respectively. Based on the geophysical log at this location, the total aquifer thickness is 392 feet, of which 74% or 289 feet is saturated sand. The 100-year drawdown may impact a portion of the saturated sand in the well. The portion of the total saturated sand that may be impacted after 100-years of pumping is 2% under the unconfined conditions, 4% under the semi-confined conditions, and 6% under the confined conditions.

This Revised Wellfield Analysis has been completed to satisfy Douglas County Zoning Resolution requirements and finds that under potentially changing aquifer conditions in the Arapahoe aquifer, any potential drawdown from Pine Canyon's wells is immeasurable and non-injurious.



Jehn Water Consultants, Inc.
88 Inverness Circle East,
Suite K-102
Englewood, CO 80112
(303) 321-8335
www.jehnwater.com

FIGURE 1

Pine Canyon
Property Location

1 inch = 1,500 feet
0 — 1,500 Feet
N

Job No. 986.1
Prepared By: HLB 01/09/2024
Checked By: GLB 01/09/2024
Projection: UTM NAD83
Sources: Esri USGS Topo Map
Town of Castle Rock Boundary
9-11-23, Douglas County Parcels
7-23-23, DWR

P:\Pine Canyon\GIS\HLB_mxd\Pine_Canyon_CRService.mxd

TABLE 1
PINE CANYON
Wellfield Analysis Parameters

Aquifer	Lower Dawson		Denver		Arapahoe	
Wellfield	Wellfield 1	Wellfield 2	Wellfield 1	Wellfield 2	Wellfield 1	Wellfield 2
Transmissivity (gpd/ft)	4235	2580	3634	3176	7132	7122
Specific Yield Unconfined Condition	0.2	0.2	0.17	0.17	0.17	0.17
Storage Coefficient Semi-Confined Condition					0.01	0.01
Storage Coefficient Confined Condition					0.0002	0.0002
Pumping Rate (gpm)	98.5	98.5	194.7	194.7	146.7	146.7

Note: Transmissivity values based on hydraulic conductivity values in local wells, and saturated sand thickness in DWR Denver Basin Aquifer Determination Tool. Specific Yield values from Denver Rules 2CCR-402-6. Semi-Confined Storage Coefficient provided by LWS, Confined Storage Coefficient from Lewis, 2014.

TABLE 2
PINE CANYON
Wellfield Analysis Drawdown Results

Aquifer	Lower Dawson		Denver		Arapahoe	
Wellfield	Wellfield 1	Wellfield 2	Wellfield 1	Wellfield 2	Wellfield 1	Wellfield 2
Well Analyzed	26267-F	24620	68741-F	67253-F-R	68742-F	66696-F
Unconfined Condition						
Estimated Drawdown after 100 years (feet)	9	10.5	22	24.8	9.9	8.5
Semi-Confined Condition						
Estimated Drawdown after 100 years (feet)					16.6	15.1
Confined Condition						
Estimated Drawdown after 100 years (feet)					25.8	24.3

Pine Canyon Water Appeal
Water Efficiency Plan
(WEP)

WATER EFFICIENCY PLAN

Pine Canyon
Douglas County, Colorado

OWNER/APPLICANT

JRW Family Limited Partnership
5975 E. Jamison Pl.
Centennial, CO 80112
P. 303.623.9000

CONSULTANT TEAM

Primary Author

ELEMENT Water Consulting
P.O. Box 140785
Denver, CO 80214
P. 303.481.2365

Water Consultants

AQUA Engineering, Inc.
5325 S. Valencia Way
Greenwood Village, CO 80111
P. 720.667.1255

Jehn Water Consultants, Inc.
88 Inverness Circle East, K-102
Englewood, CO 80112
P. 303.321.8335

Land Planning Consultant

PCS Group, Inc.
P.O. Box 18287
Denver, CO 80218
P. 303.531.4905

Draft Dates:
April 3, 2018 (Original)
September 17, 2020 (Update)
April 12, 2024 (current)

PINE CANYON WATER EFFICIENCY PLAN
APRIL 12, 2024

OWNER/APPLICANT

The commitments in this document are made by the undersigned:

James Walker

JRW Family Limited Partnership
5975 E. Jamison Pl.
Centennial, CO 80112
P. 303.623.9000

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This is an update as of April 12, 2024 to the Water Efficiency Plan (WEP) first developed by Element Water Consulting for the Pine Canyon development. Revisions generally include updates to flows and water usages and references to Douglas County instead of the Town of Castle Rock when applicable.

Pine Canyon is a planned mixed-use development located in Douglas County, Colorado, outside of the Town of Castle Rock (Town). The Pine Canyon Water and Sanitation District (referred to herein as "Pine Canyon" or "PCWSD") provides potable and irrigation water supply, storm water collection and drainage, and wastewater collection and treatment for Pine Canyon. The approximately 535-acre site is generally bound by East Plum Creek on the west and Founders Parkway on the east. The current development plan includes 1,800 single-family and multi-family residential units, a 220-guest room hotel and spa, 550,000 square foot (SF) of office space, 50,000 SF of retail space, and 800-student school. The development will also include over 170 acres of public parks[a] and open space.

Pine Canyon recognizes the importance of integrating responsible water and land use planning, and has worked to develop this Water Efficiency[b] Plan to manage water demands and extend water supplies by implementing aggressive design guidelines for the entire development. The overall theme and character for Pine Canyon has been created to ensure visual harmony with the community, an appropriate and consistent image within an alpine style setting with an overriding objective to build in unity with nature. A significant portion of the property is characterized by relatively dense natural vegetation and steep terrain. The intent for development in these areas is to fit the development into the natural setting, with very limited turf areas and heavy utilization of native plant materials, which will limit the amount of irrigation required.

Pine Canyon's Water Efficiency Plan will significantly reduce water demands relative to other similar developments and will maintain higher water conservation standards than Douglas County (County) requirements. Given the amount of non-residential development (e.g. commercial) at Pine Canyon, the Water Efficiency Plan has separate standards and regulations for residential and non-residential land uses. **The Pine Canyon Water Efficiency Plan will be a component of the codes, covenants, and restrictions of the development, and participation by all builders and property owners is required.** This document provides a framework for the Water Efficiency Plan, which may be updated or amended in the future upon mutual agreement between the PCWSD, local jurisdictions, and developers or their designees.

RESIDENTIAL

The Pine Canyon Water Efficiency Plan has five primary elements for residential land uses:

A. Design Guidelines and Education
B. Builder Verification
C. Third-Party Inspection and Certification
D. Monitoring and Enforcement
E. Operations

[a] At this time, all parks are anticipated to be dedicated to the County but owned and maintained by the Pine Canyon Metro Districts.
[b] The terms water efficiency and water conservation are used interchangeably throughout this document, although efficiency is a more appropriate term for a new development where water demand reductions will be realized from inception.

The Design Guidelines herein require the incorporation of indoor and outdoor water efficiency measures to ensure that all residential units are built to achieve low water demands, including further limiting the maximum size of irrigated turf areas. Pine Canyon residents will have a customized outdoor water budget that is adequate for the lot size and the specific landscape and irrigation plan for each home. The water budget will be more restrictive than those of other similar developments and will assist in implementing the Plan into the future.

A. Design Guidelines and Education

Mandatory indoor and outdoor water efficiency standards are included in the Design Guidelines to ensure that all residential units are built to achieve low water usage. The *indoor* standards are largely based on the U.S. Environmental Protection Agency's WaterSense Version 1.2 New Home Specification (EPA 2014a,b). The indoor standards are intended to yield usage values that are equal to or less than the metered data presented in the 2011 Analysis of Water Use in New Single-Family Homes study (Aquacraft 2011).

The *outdoor* standards emulate current regulations from communities across Douglas County because they are already some of the most progressive and stringent landscape and irrigation regulations in Colorado. Pine Canyon's Design Guidelines will result in lower outdoor water demands by reducing the maximum allowable turf areas as compared to similar developments, promoting the use of low-water demand plant materials, and requiring high efficiency sprinkler heads. Pine Canyon will utilize reclaimed water for residential and commercial landscape irrigation. Reclaimed water will be applied in conformance with A Notice of Authorization (NOA Permit) and associated Land Application Management Plan (LAMP) issued by the Colorado Department of Public Health and Environment (CDPHE) under Colorado Regulation 84- Reclaimed Water Control Regulation. Thus, outdoor irrigation will comply with the NOA Permit.

Residential education programs will be incorporated to communicate with the residents about the importance of these features, as well as the economic relationship between each residential unit's water budget rate structure and the associated water bill.

Per the Pine Canyon Water Supply Appeal, the water efficiency goals of Pine Canyon result in estimated water use less than the County's minimum water supply requirements per Section 1805A. Pine Canyon is currently in the appeal process for approval of these water supply targets.

Pine Canyon will utilize Category 3 reclaimed water per CDPHE Water Quality Control Division Regulation 84 to offset the development's outdoor water demands. Using reclaimed water for irrigation needs conserves water and enables PCWSD to better manage their potable water supply resources with their current water rights in a responsible manner.

B. Builder Verification

Pine Canyon's Water Efficiency Plan requires each builder, as well as the landscape and irrigation contractors, to verify through a self-verification process, that all homes are being constructed in compliance with the standards outlined in the Design Guidelines. As part of the building permit application, builders will be required to submit detailed information regarding the specific high-efficiency

fixtures and appliances being installed in each residential unit. Each submittal will be compared to the Design Guidelines to ensure compliance with PCWSD's water efficiency standards.

C. Third-Party Inspection and Certification

Pine Canyon's Water Efficiency Plan requires that all residential units be inspected and certified by a qualified third party. Inspectors will be specifically trained to assess compliance with the Pine Canyon Water Efficiency Plan. The third-party certification must be provided to the PCWSD prior to the issuance of a Certificate of Occupancy.

D. Monitoring and Enforcement

All residential units at Pine Canyon will be billed at a flat rate for water usage. With residences designed and constructed to use less water, customers in Pine Canyon will have a stricter water budget relative to other less efficient communities. All residential units will have the same indoor water budget and billing rate.

Outdoor water budgets and billing rates will vary depending on the size of residential lots and total irrigation area.

The PCWSD shall reserve the right to adjust the water budget rate structure as necessary to cover the operation and maintenance expenses of the water and reclaimed water systems.

All residential units at Pine Canyon will be required to use a smart monitoring and reporting system, as identified in the Flume Letter of Intent (Appendix C). These systems will monitor water usage by unit, and will report the usage to both the user and PCWSD. Users will be alerted when there are any leaks on their property, and when they are in danger of exceeding their allocated water budget.

Violations of a residential user's water budget shall be rectified by a tiered enforcement strategy which includes warnings, citations, financial punishments, and potential discontinuance of service.

F. Operations

All development irrigation systems will be operated and maintained by BrightView Landscape Services; a professional irrigation operations company retained by the Pine Canyon Metropolitan District (Appendix D). BrightView has operated many irrigation systems throughout the region, and is familiar with the techniques, standards, and operating demands planned at Pine Canyon. Residents or businesses will not operate the systems.

NON-RESIDENTIAL

The Pine Canyon Water Efficiency Plan for non-residential units includes Design Guidelines for all uses as well as a provision that allows the PCWSD to require larger facilities to develop individual Water Management Plans that must be approved by PCWSD. Through the implementation of the Pine Canyon Water Efficiency Plan, non-residential irrigation water demands are projected to total 212acre-feet/year.

A. Design Guidelines

The Pine Canyon Water Efficiency Plan requires that indoor and outdoor water saving technology be incorporated into non-residential development. The *indoor* standards are largely based on the U.S. Environmental Protection Agency's WaterSense Version 1.2 New Home Specification (EPA 2014a,b) and the WaterSense at Work, Best Management Practices for Commercial and Industrial Facilities (EPA 2012).

Non-Residential Indoor Water Use

	Pine Canyon	Douglas County[1]
Hotel Resort and Spa[2]	1.38 af/yr/6,695 SF	No County Standard
Light Industrial, Retail, and Office	0.75 af/yr/6,695 SF	0.75 af/yr/6,695 SF

Notes:
1 – County Demand Standards per Section 1805A of the Douglas County Zoning Resolution.
2 – Assumes 325 SF per hotel room, 220 total rooms.

Indoor water usage at the hotel resort and spa is equivalent to 13,200 gallons per day (30 gallons per person, 2 people per room, 220 hotel rooms). Douglas County does not have a stated water demand standard for this specific use. The water efficiency goals for Pine Canyon retail buildings and offices result in estimated water use less than the County's minimum water demand requirements per Section 1805A. Pine Canyon is currently in the appeal process for approval of these water demand targets.

The planned indoor water usage for the Pine Canyon school is 25 gallons per day per person, which is consistent with CDPHE WQCD Regulation 43. This is approximately 22.4 af/yr of indoor water usage by the build-out 800 students and staff.

Non-Residential Outdoor Water Use

	Pine Canyon	Douglas County[1]
Hotel	1.85 af/yr/acre	2.50 af/yr/acre
Retail Within Business Area	1.85 af/yr/acre	2.50 af/yr/acre
Light Industrial/Office	1.35 af/yr/acre	2.50 af/yr/acre
OSP Areas - Including School Site	1.2 af/yr/acre	2.50 af/yr/acre
Major Roadway ROW	1.64 af/yr/acre	2.50 af/yr/acre
Average	1.58 af/yr/acre	2.50 af/yr/acre

Notes:
1 – County Demand Standards per Section 1805A of the Douglas County Zoning Resolution.

The outdoor water demands of were calculated by:

- Multiplying the square footage of irrigatable area associated irrigation rate (13.38 gallons/SF/yr for cool season turf, and 5.39 gallons/SF/yr for trees and shrubs)[a] to get total irrigation water required per year.
- Dividing the total irrigation water per year by 325,851 to convert from gallons to acre-feet.
- Dividing the acre-feet of water per year by the total irrigatable area (acre-feet) to get af/yr/acre.

Per the Pine Canyon Water Supply Appeal, the water efficiency goals of Pine Canyon result in estimated water use less than the County's minimum water demand requirements per Section 1805A. Pine Canyon is currently in the appeal process for approval of these water supply targets. Pine Canyon will utilize Category 3 reclaimed water per CDPHE Water Quality Control Division Regulation 84 to offset outdoor water demands, further reducing the overall water usage and impact to water supplies.

B. Water Management Plans for Large Facilities

The Pine Canyon Water Efficiency Plan requires a Water Management Plan submittal for non-residential structures having tap sizes greater than or equal to 2 inches. Specific requirements of the Water Management Plan will be developed in cooperation with PCWSD, and the submittals will be reviewed and approved by PCWSD staff prior to the connection of utilities.

ADEQUACY OF WATER SUPPLY

Per the Douglas County Zoning Resolution, Water Supply Overlay District, Section 18A for the Central Basin Water Supply Zone, Pine Canyon may rely solely on ground water, not to exceed 100 percent of the total annual appropriable water contained in the Denver Basin aquifers. Pine Canyon has a total of 863.9 af/yr of decreed water rights based on a 100-year aquifer life. Pine Canyon is proposing to utilize its decreed nontributary and not-nontributary water rights, totaling 709.9 af/yr to meet development demands.

As part of its rezoning application, PCWSD has proposed an alternate indoor demand standard to the County's standard. The County's demand standard includes both indoor and outdoor uses so the actual values are not comparable. PCWSD's proposed indoor demand standard, .17 af/yr/unit, aligns with indoor demand standards and observed real usages of mutliple water and sanitation districts throughout the area near PCWSD. These include newer and older districts, districts with strict water conservation practices, and districts witch use recycled water for irrigation. This proposed alternative indoor demand standard also aligns with the indoor usage of major water providers throughout Douglas County. Using this proposed alternative indoor demand standard, the Pine Canyon project has a total indoor groundwater demand of 404.89 af/yr. For planning purposes, PCWSD has proposed a .2af/yr/unit value to ensure that the District is capcable of meeting its goals and requirements in the face of any unforseen difficulties as the District begins operations. Pine Canyon's decreed water rights portfolio is sufficient to satisify the water demand. The PCWSD's estimated 318 af/yr of outdoor water demand will be offset in entirety by Category 3+ reclaimed (highly treated) water per Colorado Department of Public Health and Environment, Water Quality Control Division Regulation 84. Using recycled water for irrigation needs conserves water and enables PCWSD to better manage their potable water supply resources.

[a] Application rates per Hydro System KDI

RESIDENTIAL WATER EFFICIENCY PLAN

The Pine Canyon Water Efficiency Plan has five primary elements for residential land uses:

A. Design Guidelines and Education

B. Builder Verification

C. Third-Party Inspection and Certification

D. Monitoring and Enforcement

E. Operations

A. DESIGN GUIDELINES & EDUCATION

The following Design Guidelines provide mandated standards for all residential units at Pine Canyon.

1. Indoor Water Efficiency

Single-family residential units and residential units in multi-family buildings, including mixed-use buildings, will be constructed according to the following indoor criteria. The standards listed below are largely based on the U.S. Environmental Protection Agency's WaterSense Version 1.2 New Home Specification; however, the values may be adjusted to reflect new technologies, revisions to the WaterSense program, or other statutory requirements.

1.1. Metering

1.1.1 In multi-family buildings, each unit must be individually metered, sub-metered, or equipped with an alternate technology capable of tracking water use and making the information available to the residents of the individual unit.

1.2. Leaks

1.2.1 There shall be no detected leaks from any water-using fixtures, appliances, or equipment. Compliance will be verified through pressure-loss testing and visual inspections.

1.3. Service Pressure

1.3.1 The static service pressure will be limited to 60 pounds per square inch (psi) at the point of service. Piping for home fire sprinkler systems is excluded from this requirement and should comply with state and local codes and regulations. For units in multi-family buildings, the service pressure within each unit shall be a maximum of 60 psi.

1.4. Toilets

1.4.1. WaterSense labeled, less than or equal to 1.28 gallons per flush (gpf).

1.5. Urinals

1.5.1. WaterSense labeled, less than or equal to 0.5 gpf.

1.6. Lavatory Faucets

1.6.1. WaterSense labeled, less than or equal to 1.5 gallons per minute (gpm).

1.7. Kitchen Faucets

1.7.1. Less than or equal to 2.2 gpm.

1.8. Showerheads

1.8.1. WaterSense labeled, less than or equal to 2.0 gpm per showerhead.

1.9. Clothes Washers

1.9.1. Energy Star labeled.

1.10. Dishwashers

1.10.1. Energy Star labeled.

1.11. Any installed recirculation systems will be demand-initiated.

1.12. Education

1.12.1. Residents, including property managers and occupants of multi-family units, shall be educated regarding installed indoor and outdoor water efficiency measures, as described in Section 2.3 below.

2. Outdoor Water Efficiency Measures

2.1. Landscape Design[a]

Residential landscape designs shall adhere to the following requirements.

2.1.1. All front and rear yards will be designed and installed by the builder.

2.1.2. The following requirements shall apply to all residential landscapes at Pine Canyon:

2.1.2.1. Maximum irrigated turf areas shall be limited by lot size as listed below.

2.1.2.1.1. Lots up to 7,000 sf – 30%

2.1.2.1.2. Lots between 7,001 sf and 17,000 sf – 20%

2.1.2.1.3. Lots over 17,000 sf – 20%, not to exceed 4,500 sf

2.1.2.2. All plantings must be in accordance with the Pine Canyon Master Plant List and practices. Coordinate with PCWSD, Pine Canyon Metro Districts, and appropriate HOAs for more details.

2.1.3. 100% Xeriscape landscapes plans including use of synthetic turf in front yards must be approved by the homeowners association and/or architectural control committee.

2.1.4. In no case will bare soil be exposed unless the area is part of a cultivated garden which is in a dormant state. Gardens must be planted during the growing season. Gardens may only be located in rear yards.

2.1.5. Food crop gardens may only be irrigated by potable water from the designated potable water hose bib.

2.2. Irrigation Design

Residential irrigation designs shall adhere to the following requirements:

2.2.1. Sprinkler Heads: Pop-up or rotor heads that utilize high efficiency spray nozzles designed with head to head coverages. This may include conventional rotors, stream rotators or pop-up spray nozzles. All irrigation emission devices shall meet the requirements set in the American National Standards Institute (ANSI) standard, ASABE/ICC 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard" authored by the American Society of Agricultural and Biological Engineers and the International Code Council and verified by an independent third-party. The distribution uniformity (DU) must be verified by third-party tests.

2.2.1.1. Minimum pop-up height must be 6 inches.

2.2.1.2. Sprinkler bodies shall have built-in pressure regulating stems and check valves.

2.2.1.3. Maximum spacing for sprinkler heads to be head-to-head at 90% of the maximum spray radius.

2.2.1.4. Turf areas shall use pop-up sprays on areas 25 feet wide or less and may use a combination of pop-up spray and short-to medium range rotors in areas greater than 25 feet wide.

[a] See attached landscape plan examples (Attachment A). The water demand calculations are based on the projected number of ranch and 2-story homes.

2.2.1.5. Traditional fixed and variable arc spray nozzles are not allowed.
2.2.1.6. Pop-up heads cannot be zoned together with rotator or rotor heads.
2.2.2. Sprinkler heads will be used in all ornamental shrub bed areas;

2.3 Education

2.3.1. Educational programs will contain information pertinent to the Water Efficiency Plan, landscape plans and outdoor water budgets, water budget rate structure, and specific water conservation measures including, but not limited to, soil preparation appropriate for existing conditions and selected plant materials, smart irrigation controllers, and high efficiency sprinkler heads and nozzles.

2.3.2 Prior to closing, the developer/builder shall provide residents a copy of the Water Efficiency Verification Checklists along with a copy of landscape plans and explanation of outdoor water budgets. When homes are subsequently resold, Verification Checklists, landscape plans, and explanations of water budgets shall be provided to new owners by PCWSD or the appropriate HOA.

2.3.3 The developer/builder shall create additional educational materials to be provided to residents. Prior to closing, homebuyers will be required to take a water efficiency class that will be incentivized (e.g. receiving a gift card upon completion of the class prepaid by the developer/builder). The educational program will include a community website where residents can obtain information on the care and operation of the landscape and irrigation system as well as resources for additional technical assistance and services.

2.3 Operation of Irrigation Systems

2.3.1. All development irrigation systems will be operated and maintained by a professional irrigation operations company retained by the Pine Canyon Metropolitan District. Residents or businesses will not operate the systems.

B. BUILDER VERIFICATION

Pine Canyon's Water Efficiency Plan requires each builder, as well as the landscape and irrigation contractors, to certify that all homes are being constructed in compliance with the standards outlined in the Design Guidelines.

1. Indoor Water Efficiency Standards

As part of the building permit application, builders will be required to submit detailed information regarding the specific high-efficiency fixtures and appliances being installed in each unit and to verify that they meet or exceed the indoor Design Guidelines. A sample verification checklist is provided below.

2. Outdoor Water Efficiency Standards

Similar to the Town's existing Landscape and Irrigation Performance Standards and Criteria Manual, a landscape and irrigation plan must be completed for each residential unit. Each submittal will be compared to the Design Guidelines, including irrigated turf restrictions, to ensure compliance with Pine Canyon's water efficiency standards. A sample verification checklist is provided below.

Pine Canyon
Water Efficiency Verification Checklist
Indoor Standards

Lot Number/Address: _____

All indoor fixtures and appliances must comply with the standards listed in the current version of Pine Canyon's Water Efficiency Plan.

Summary of Proposed Fixtures and Appliances
Complete the information on water demand and the make/model for each fixture and appliance that will be installed.

Room	Fixture/Appliance	Water Demand	Make/Model
Kitchen	Sink Faucet	____ gal/minute	_____
	Dishwasher	____ gal/cycle	_____
Bathroom 1	Toilet	____ gal/flush	_____
	Sink Faucet(s)	____ gal/minute	_____
	Showerhead	____ gal/minute	_____
Bathroom 2	Toilet	____ gal/flush	_____
	Sink Faucet(s)	____ gal/minute	_____
	Showerhead	____ gal/minute	_____
Bathroom 3	Toilet	____ gal/flush	_____
	Sink Faucet(s)	____ gal/minute	_____
	Showerhead	____ gal/minute	_____
Laundry	Sink Faucet	____ gal/minute	_____
	Clothes Washer	____ gal/cycle/cubic foot	_____
Other			

CERTIFICATION

I hereby certify that the above information is true and accurate. I understand that the falsification of any information on this submittal may result in penalties and fines.

Builder Signature: _____ Date: _____

Printed Name/Company: _____

Pine Canyon
Water Efficiency Verification Checklist
Outdoor Standards

Lot Number/Address: _____

Lot Size: _____

Landscape Design

Pine Canyon's Design Guidelines for outdoor uses were developed to limit the use of irrigated turf and reduce overall outdoor water demands. The maximum turf area for residential lots are restricted based on lot size in square feet (sf) as shown in Table 1 below.

Table 1. Turf Limitations by Lot Size.

Lot Size	Turf Limitation
less than 7,000 sf	30%
7,001 to 17,000 sf	20%
over 17,001 sf	10%

Proposed landscape plans must be summarized as specified in Table 2 below. The Douglas County approved plant list shall be used to classify selected plants into the appropriate Irrigated Water Use Zone. Landscapes plans must be submitted to document compliance with the turf limitations from Table 1.

Table 2. Landscape Irrigated Areas.

Irrigated Water Use Zone	Size of Zone
High*	_____ sf
Moderate	_____ sf
Low	_____ sf
Total	_____ **sf**

**Note: The High-water use category shall be used for turf, decorative ponds, recirculating fountains, etc.*

Does landscape plan comply with turf limitation (*Yes/No*): _____

Irrigation System Design

Automatic irrigation system controllers shall be approved by the PCWSD and be weather based (ET) or soil-moisture based, automatically adjusting irrigation in response to changes in the plants' needs as weather conditions change. All equipment must comply with the standards listed in the current version of Pine Canyon's Water Efficiency Plan.

Table 3. Proposed Irrigation System Equipment.

Device	Make/Model
Smart Controller	
Fixed Spray Heads	
Rotor Heads	
Drip Emitters	

Initial Outdoor Water Budget

Initial outdoor water budgets will be calculated by PCWSD based on the submitted landscape plans and irrigation system designs. The Builder is responsible for sharing information regarding the initial water budget with the landscape installer and residents.

Initial outdoor water budget (gallons per season) calculated by PCWSD: _____

CERTIFICATION

I hereby certify that the above information is true and accurate. I understand that the falsification of any information on this submittal may result in penalties and fines.

Builder Signature: _____ Date: _____
Printed Name/Company: _____

Landscape Designer Signature: _____ Date: _____
Printed Name/Company: _____

Irrigation Designer Signature: _____ Date: _____
Printed Name/Company: _____

C. Third-Party Certification

The Pine Canyon Water Efficiency Plan requires that residential units be inspected and certified by a third party. Inspectors will be specifically trained to assess compliance with the Pine Canyon Water Efficiency Plan.

At a minimum, the third-party inspection shall include the following:

1. Indoor Standards

All single-family residential units will be inspected for compliance with the Indoor Standards and a sampling protocol will be developed for multi-family units and approved by the PCWSD.

i. Fixtures and appliances are consistent with approved verification submittal.
ii. Results of leak detection pressure loss testing and visual inspection.

2. Outdoor Standards

All residential units will be inspected for compliance with the Outdoor Standards.

i. Verification that static service pressure does not exceed 60 psi at the point of service.
ii. Landscaping plant material is consistent with approved design.
iii. Irrigated square footage for turf and planting/mulched areas.
iv. Visual inspection/audit of irrigation system to ensure installation is consistent with approved design.
v. Correct heads and nozzles.
vi. Correct clock with appropriate weather or soil moisture sensor. Ensure that it is connected and operational.
vii. Check sprinkler head spacing to ensure head-to-head coverage at 90% of the maximum spray radius, as determined by running the system.
ix. Check sprinkler adjustment to ensure no overspray onto impervious surfaces.

The third-party certification must be provided to the PCWSD prior to the issuance of a Certificate of Occupancy.

D. Monitoring And Enforcement

Residential customers at Pine Canyon will have a custom water budget rate structure where the:

- Indoor water budget is based on actual wintertime water use data at that residence.
- Outdoor budget is adequate for the lot size and the specific landscape and irrigation plan for each residence.

The custom water budget rate structure will be used as a tool for monitoring compliance with the water efficiency standards and reduced water demands. While the custom water budget will be more restrictive relative to other similar homes, it will still provide a sufficient supply to maintain healthy plant material. Pine Canyon will utilize Category 3 Plus reclaimed water per CDPHE Water Quality Control Division Regulation 84 to offset the entirety of the development's outdoor water demands. Using recycled water for irrigation needs conserves water and enables PCWSD to better manage their potable water supply resources with their current water rights in a responsible manner.

Additionally, all residential units shall be equipped with a smart meter monitoring system (as detailed in the Flume LOI – Attachment C). This system will report users realtime indoor and outdoor water usage (broken down even by indoor appliance) to both the user and the PCWSD. This realtime monitoring will allow the District to alert users when they are in danger of violating their water budget.

The PCWSD shall reserve the right to:

- Adjust the water budget rate structure as necessary to cover on-going operation and maintenance costs.
- Adjust the water budget allocation based on new technology and scientific data.

The Pine Canyon water budget rate structure will initially be based on the following:

Tier 1 – Indoor Use. Flat rate for each residential SFE (3 people/SFE, 50 gpd/person, 150 gpd/SFE) that will cover the costs to operate and maintain the water system. These rates will be revisited each year and adjusted as necessary.

Tier 2 – Outdoor Use. Amount of water required to meet outdoor demands. The outdoor water budget for each residential unit will be customized according to the lot size and the specific landscape and irrigation plan, based on the verification submittal and third-party certification.

Tier 3 – Excessive Use & Surcharges. Amount of water used in excess of indoor and outdoor water budget. Residents whose water use falls in this tier will be charged higher rates for excessive water use. Extreme water waste will subject user to service disruption.

Warnings and notices of water budget violations shall be issued using the following process:

9o% of Water Budget Used – Warning. When 90% of a water budget has been used, the District shall notify the user that they are in imminent danger of excess water use, which will lead to a violation if left uncured, by U.S. Mail and by means integrated into the District's communication with users including e-mail and in-app notifications.

Water Budget Violated – Violation Notice and Surcharge. When a user exceeds their allotted water budget, the District shall issue a violation via U.S. mail to the account holder. Violation notification shall include notation of surcharge.

2nd Violation – Notice and Surcharge. If a user has not rectified their violation, a second violation notification shall be issued via U.S. Mail to the account holder. Second violations shall not be issued within a five day period following the first violation to allow the user to rectify the situation.

3rd Violation – Notice and Surcharge. If a user has not rectified their violation, a third violation notification shall be issued via U.S. Mail to the account holder. Third violations shall not be issued within a five day period following the second violation to allow the user to rectify the situation.

4th Violation – Notice and Surcharge. If a user has not rectified their violation, a fourth violation notification shall be issued via U.S. Mail to the account holder. This notification shall notice the user that service may be discontinued should non-compliance persist.

Subsequent Violations – Surcharge and Possible Service Discontinuance. If a user has not rectified their violation after the 4th notification has been issued, PCWSD reserves the ability to immediately terminate irrigation or other water waste for due cause, and not to reinstate service until the system or use comes into compliance.

PCWSD reserves the right to determine and alter the values of violation surcharges.

NON-RESIDENTIAL WATER EFFICIENCY PLAN

A. DESIGN GUIDELINES

The Pine Canyon Water Efficiency Plan requires that indoor and outdoor water saving technology be incorporated into non-residential development. Indoor water efficiency measures outlined above for residential uses shall be used whenever practical and consistent with the plumbing design. The following Design Guidelines provide potential standards for non-residential units at Pine Canyon.

1. Indoor Water Efficiency

Non-residential units will be constructed according to the following indoor criteria, which may be adjusted to reflect new technologies and updates to the WaterSense program.

1.1. Metering

1.1.1 All tenant spaces, including commercial and mixed-use customers, shall be individually metered, sub-metered, or equipped with an alternate technology capable of tracking water use and making the information available to the individual customers.

1.2. Leaks

1.2.1 All service connections will be tested for leaks and verified through pressure-loss testing and visual inspections.

1.3. Toilets

1.3.1. *Tank-Type Toilets:* WaterSense labeled, less than or equal to 1.28 gallons per flush (gpf).

1.3.2. *Flushometer-Valve Toilets*: WaterSense labeled, using less than or equal to 1.28 gpf. For maximum water savings and performance, purchase the flushometer valve and bowl in hydraulically matched combinations that are compatible in terms of their designed flush volume.

1.4. Urinals

1.4.1. WaterSense labeled, less than or equal to 0.5 gpf.

1.5. Lavatory Faucets

1.5.1. *Private-Use Lavatory Faucets* (e.g., offices): WaterSense labeled, less than or equal to 1.5 gallons per minute (gpm) at 60 psi.

1.5.2. *Public-Use Lavatory Faucets* (e.g., recreation center): Less than or equal to 0.5 gpm at 60 psi.

1.6. Kitchen Faucets

1.6.1. Less than or equal to 2.2 gpm at 60 psi. Consider installing temporary shut-off or foot-operated valves for kitchen faucets in commercial facilities.

1.7. Showerheads

1.7.1. *Single Shower Stalls*: WaterSense labeled, less than or equal to 2.0 gpm per showerhead.

1.7.2. *Communal Shower Stalls*: May have multiple showerheads that each flow equal to or less than 2.0 gpm.

1.8. Laundry Equipment

1.8.1. Commercial clothes washers shall be Energy Star labeled.

1.8.2. *Commercial coin- or card-operated, single load clothes washers:* Energy Star labeled.

1.8.3. *Multi-load clothes washers:* Less than or equal to 8.0 gallons/cycle/cubic foot.

1.8.4. *Washer extractors:* Models with built-in water recycling capabilities that can store the rinse water from the previous load for use in the next load.

1.9. Private-Use Dishwashers

1.9.1. Energy Star labeled.

1.10. Commercial Kitchen Equipment

1.10.1. *Pre-Rinse Spray Valves***:** WaterSense labeled, less than or equal to 1.28 gpm.

1.11. Mechanical Systems

1.11.1. Single Pass Cooling Systems prohibited.

2. Outdoor Water Efficiency

In conjunction with utilizing the Green Industries of Colorado (GreenCO 2008) best management practices (BMPs), Pine Canyon is committed to outdoor water efficiency through well-designed landscapes that are supported by healthy soils with appropriate grading, mulches, appropriate plant choices, limited turf, and hydro zone planning for irrigation.

The overall theme and character for Pine Canyon has been created to ensure visual harmony with the community, an appropriate and consistent image within an alpine style setting with an overriding objective to build in unity with nature. A significant portion of the property is characterized by relatively dense natural vegetation and steep terrain. The intent for development in these areas is to fit the development into the natural setting, with very limited turf areas and heavy utilization of native plant materials, which will limit the amount of irrigation required. The following outdoor water efficiency measures will be incorporated throughout Pine Canyon as approved by the PCWSD:

1. Right-of-way, streetscape, and easement areas will utilize natural (non-irrigated) vegetation in steeper and other suitable locations as approved by plan review.
2. Pine Canyon is interested in exploring the use of alternative right-of-way and streetscape landscaping concepts such as bioswales, which can be designed to meet all applicable stormwater requirements while reducing the need for supplemental irrigation

2.1. Landscape Design

Non-residential landscape designs shall adhere to the following requirements.

2.1.1. All plantings must be in accordance with the Pine Canyon Master Plant List and practices. Coordinate with PCWSD and Pine Canyon Metro Districts for more details.

2.1.2. 100% Xeriscape landscapes plans including use of synthetic turf must be approved by the PCWSD.

2.1.3. In no case will bare soil be exposed unless the area is part of a cultivated garden which is in a dormant state. Gardens must be planted during the growing season.

2.2. Irrigation Design

Residential irrigation designs shall adhere to the following requirements:

2.2.1. Sprinkler Heads: Pop-up or rotor heads that utilize high efficiency spray nozzles designed with head to head coverages. This may include conventional rotors, stream rotators or pop-up spray nozzles. All irrigation emission devices shall meet the requirements set in the American National Standards Institute (ANSI) standard, ASABE/ICC 802-2014 "Landscape Irrigation Sprinkler and Emitter Standard" authored by the American Society of Agricultural and Biological Engineers and the International Code Council and verified by an independent third-party. The distribution uniformity (DU) must be verified by third-party tests.

2.2.1.1. Minimum pop-up height must be 6 inches.

2.2.1.2. Sprinkler bodies shall have built-in pressure regulating stems and check valves.

2.2.1.3. Maximum spacing for sprinkler heads to be head-to-head at 90% of the maximum spray radius.
2.2.1.4. Turf areas shall use pop-up sprays on areas 25 feet wide or less and may use a combination of pop-up spray and short-to medium range rotors in areas greater than 25 feet wide.
2.2.1.5. Traditional fixed and variable arc spray nozzles are not allowed.
2.2.1.6. Pop-up heads cannot be zoned together with rotator or rotor heads.
2.2.2. Sprinkler heads will be used in all ornamental shrub bed areas.

B. Water Management Plans For Large Facilities

The Pine Canyon Water Efficiency Plan allows the PCWSD to require a Water Management Plan submittal for non-residential structures having tap sizes greater than or equal to 2 inches, however this requirement can be waived by the PCWSD. The required Water Management Plan submittals will be reviewed and approved by PCWSD staff prior to the connection of utilities. Plans are anticipated to include the following at a minimum:

1. Inventory of all major water-using fixtures, appliances, equipment, systems, and processes.
2. Facility water use projection, including a water use baseline with anticipated winter and summer monthly total water use, and a plan for tracking water use at least monthly through billing and water meter data.
3. Leak detection program. Measures to identify and correct any water use that is unaccounted for and could be attributed to leaks shall include, but are not limited to: a) regular visual and auditory inspections; b) reading facility meters during off-peak hours when water-using equipment can be turned off; c) reviewing monthly water bills to identify anomalies; d) promptly repairing/replacing leaking water-using equipment.
4. Method for evaluating water savings options and creating an action plan for implementation. Example worksheets from WaterSense at Work, Best Management Practices for Commercial and Industrial Facilities (EPA 2012) are provided as Attachment B.
5. Outreach and education plan for communicating the importance of water efficiency with employees and visitors. Example measures may include indoor and outdoor signage, tenant orientations, and efficiency challenges.
6. Landscape and irrigation plans in conformance with all outdoor water efficiency measures per this Water Efficiency Plan.
7. Water conservation plan review and approval of all landscape and irrigation proposed for the facility.

C. Monitoring And Enforcement

Non-residential customers at Pine Canyon will have a custom water budget rate structure where the:

- Indoor water budget is based on actual wintertime water use data for that customer.
- Outdoor budget is adequate for the the specific landscape and irrigation plan required as part of each user's Water Management Plan.

The custom water budget rate structure will be used as a tool for monitoring compliance with the water efficiency standards and reduced water demands. While the custom water budget will be more restrictive relative to other similar non-residential uses, it will still provide a sufficient supply to maintain healthy plant material. Pine Canyon will utilize Category 3 reclaimed water per CDPHE Water Quality Control Division Regulation 84 to offset in entirety the development's outdoor water demands. Using reclaimed

water for irrigation needs conserves water and enables PCWSD to better manage their potable water supply resources with their current water rights in a responsible manner.

The PCWSD shall reserve the right to:

- Adjust the water budget rate structure as necessary to cover on-going operation and maintenance costs.
- Adjust the water budget allocation based on new technology and scientific data.

The Pine Canyon water budget rate structure will initially be based on the following:

Tier 1 – Indoor Use. Flat rate that will cover the costs to operate and maintain the water system. These rates will be revisited each year and adjusted as necessary

Tier 2 – Outdoor Use. Amount of water required to meet outdoor demands. The outdoor water budget for each customer will be customized according to the specific landscape and irrigation plan, required within the user's Water Management Plan.

Tiers 3 and 4 – Excessive Use & Surcharge. Amount of water used in excess of indoor and outdoor water budget. Users whose water use falls in this tier will be charged a higher rate for excessive water use.

Warnings and notices of water budget violations shall be issued using the following process:

9o% of Water Budget Used – Warning. When 90% of a water budget has been used, the District shall notify the user that they are in imminent danger of excess water use, which will lead to a violation if left uncured, by U.S. Mail and by means integrated into the District's communication with users including e-mail and in-app notifications.

Water Budget Violated – Violation Notice and Surcharge. When a user exceeds their allotted water budget, the District shall issue a violation via U.S. mail to the account holder. Violation notification shall include notation of surcharge.

2nd Violation – Notice and Surcharge. If a user has not rectified their violation, a second violation notification shall be issued via U.S. Mail to the account holder. Second violations shall not be issued within a five day period following the first violation to allow the user to rectify the situation.

3rd Violation – Notice and Surcharge. If a user has not rectified their violation, a third violation notification shall be issued via U.S. Mail to the account holder. Third violations shall not be issued within a five day period following the second violation to allow the user to rectify the situation.

4th Violation – Notice and Surcharge. If a user has not rectified their violation, a fourth violation notification shall be issued via U.S. Mail to the account holder. This notification shall notice the user that service may be discontinued should non-compliance persist.

Subsequent Violations – Surcharge and Possible Service Discontinuance. If a user has not rectified their violation after the 4th notification has been issued, PCWSD reserves the ability to immediately

terminate irrigation or other water waste for due cause, and not to reinstate service until the system or use comes into compliance.

PCWSD reserves the right to determine and alter the values of violation surcharges.

REFERENCES

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ATTACHMENTS

A. Example Landscape and Irrigation Plans for Residential Units
B. WaterSense at Work Example Water Management Plan Worksheets
C. Flume Letter of Intent
D. BrightView Landscape Services Letter of Intent

APPENDIX A

A.1 Example Landscape and Irrigation Plans for Residential Units

APPENDIX B

B.1 Example Water Management Plan Worksheets

APPENDIX C

C.1 Flume Inc. Letter of Intent

March 29, 2023

Kurt Walker, M.A.
Principal Project Manager
PINE CANYON

Dear Kurt,

With this letter of intent, we confirm Flume's strong interest in collaborating with Pine Canyon on their proposed project to monitor residential water use in the Pine Canyon development.

We are prepared to support this project as follows:

1. Flume can provide each homeowner within the Pine Canyon development with a Flume device. This device will enable homeowners to monitor their water use (both inside and out) in real-time on their smart-phones. The device will also alert homeowners of any leaks on their properties.
2. Working with Pine Canyon, Flume can assign a daily, weekly or monthly water budget for each property. The Flume app will then be able to notify homeowners if they are in danger of exceeding their allotted budgets.
3. Flume can provide access to Pine Canyon to monitor all Flume devices through a web portal in real-time. All active leaks will be detailed in this portal, as well as high water users.
4. Flume can provide monthly or quarterly reports to Pine Canyon that will detail how water is being used in aggregate by all homeowners in Pine Canyon. These reports will detail indoor use, outdoor use and fixture level use (i.e. toilets, showers, wash machines, etc.).
5. Flume can also equip each household with a Rain Bird smart irrigation controller. These controllers will automatically adjust outdoor watering schedules based on evapotranspiration (ET). Since these controllers will be integrated with the Flume devices, they will be able to immediately detect leaks and notify the homeowner where the leak occurred (i.e. which zone).

For more information about the Flume device, please visit flumewater.com. For more information about our data analysis capabilities, please visit flumedatalabs.com.

If you have any questions or need additional information, my contact information is below.

Sincerely,

Joe Fazio
Flume, Inc.
(805) 705-2590
joe@flumewater.com

APPENDIX D

D.1 BrightView Landscape Services Letter of Intent

10 July 2023

Mr. Bruce Lytle Lytle Water Solutions, LLC

RE: Second Review of Water Supply and Demand Issues with the Pine Canyon Planned Development Service Plan, Rezoning, and Appeal, File Nos. SV2020-002, ZR2020-010 and MI2020-009

Project No. 1587-23 Letter dated April 21, 2023, comment 14

Dear Bruce,

Thank you for your time discussing Lytle Water Solutions comments and questions regarding this project on 7/6/23. On behalf of Pine Canyon, I would like to address BrightView's capability regarding the operational management of a reclaimed irrigation system for this planned community.

BrightView's team will work closely with Pine Canyon's engineer, Bob Frachetti of AQUA Engineering, Inc. regarding the interaction of services and professional management of all reclaimed irrigation water systems within the community in accordance with Regulation 84 specifics as well as other BMP and regulations regarding irrigation water management in practice within Douglas County.

Our irrigation management team and technicians are experienced with:

- Reclaimed water use, delivery, management, and Regulation 84.
- Well, pump and irrigation pond storage and delivery.
- Utilization of "smart" irrigation controllers and systems.
- Weather stations, sensors, flow control, in ground and online management techniques and equipment.
- Sub surface, drip, and spray irrigation water delivery to vegetation.
- Scheduling and documenting water usage.
- Physical checks, adjustment and repairs of delivery systems.
- Emergency, 24-7 availability.
- As a national provider of water management services, we are able to access equipment and parts manufacturers easily for trouble shooting or solutions. Additionally, our daily water management services in low water environments in California and the Southwest allow us to bring best practices to our Colorado clients.

We have experience with several reclaimed irrigation properties in Douglas County with our Parker branch including:

- Stonegate
- Lincoln Park
- Badger Gulch
- Stepping Stone

BrightView is fully capable of and looks forward to managing the reclaimed irrigation system at Pine Canyon. Please let me know if there is any other information I can provide.

Truly,

Eric Keesen, RKAM

BrightView Landscape Services, Inc.

Eric.Keesen@BrightView.com

303-356-9578

Water Appeal Referral Correspondence

Arapahoe County Water and Wastewater Authority
13031 E Caley Avenue, Centennial, CO 80111 9364
Phone (303) 790-4830, Fax (303)790-9364
www.arapahoewater.org

October 9, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon PD - Water Appeal

Dear Mr. Jakubowski,

The Arapahoe County Water and Wastewater Authority and many other water providers in the South Metro area have worked diligently over the years to bring renewable water resources to the South Metro area to ensure a secure, reliable, and renewable water future.

We understand the JRW Family Limited Partnership is planning to submit a Water Appeal under Douglas County Zoning Resolution 1808A. The notion of developing a new community solely relying on non-renewable groundwater, we believe is unreliable and unsustainable as groundwater levels have been shown to be declining quickly.

The water providers in the South Metro area, including ACWWA and other SMWSA members, have been working to build a sustainable water future. Relying upon non-renewable groundwater and allowing this Water Appeal goes against the efforts these organizations have been working towards. We believe that this will set an unwanted precedent for future developers in this area.

We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to long term renewable water supply.

Regards,

Steve Witter

Steve Witter, P.E.
General Manager
Arapahoe County Water and Wastewater Authority

Aurora Water
15151 E. Alameda Parkway, Ste. 3600
Aurora, Colorado 80012
303.739.7370

City of Aurora
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October 1, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

Re: Pine Canyon PD Water Appeal - MI2020-009

This letter is being provided to recommend Douglas County deny the upcoming Pine Canyon PD Water Appeal (Water Appeal) being sought by the JRW Family Limited Partnership (Applicant) under Douglas County Zoning Resolution 1808A. The Douglas County Planning Commission and the Douglas County Board are required to consider the Water Appeal based upon evidence 1) the request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County and 2) the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality and dependability.

Since the Applicant is proposing to develop strictly off of non-renewable groundwater, the request will be detrimental to the long-term health, safety and welfare of present and future inhabitants of the County as this non-renewable water supply will not be able to support the development over the long term. Further, additional new use of this non-renewable water supply will only speed up the depletion of the resource which is currently still relied upon by existing residents of Douglas County and will be for many years to come as water providers continue their decades long plan to transition to a renewable water supply. The application also does not provide sufficient supporting data that the water supply will be sufficient in terms of quantity and long-term dependability since again the proposed sole supply is non-renewable groundwater.

The South Metro Denver area including Douglas County historically developed off of non-renewable groundwater resources. The City of Aurora does not rely on non-renewable groundwater resources and holds its Denver Basin water rights in reserve for emergency drought supply. In the early 2000's, region wide efforts were undertaken to reduce pressure on and preserve this limited and essential resource to avoid impacts that would be detrimental to the health, safety, and welfare of the present and future inhabitants of the region as well as significant economic disruptions to the region's prosperity. Water providers in the South Metro area developed long term renewable water supply plans and invested hundreds of millions of dollars to transition from a non-renewable groundwater resource to a sustainable, fully renewable water supply that would allow for the continued prosperity of inhabitants and economic success.

Approval of this Water Appeal will set these efforts back by allowing additional new development off of this non-renewable resource. At some point in the future, one of the existing water providers in the area will be required to step in with renewable water resources to avoid a disaster for the potential future residents of this

Aurora Water
15151 E. Alameda Parkway, Ste. 3600
Aurora, Colorado 80012
303.739.7370

City of Aurora
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Douglas County has partnered with many of the water providers in these critical initiatives for the better part of a decade. The Water Infrastructure and Supply Efficiency (WISE) project and partnership was born out of these efforts. Specifically, the WISE project is a partnership of ten South Metro water providers and Denver Water, Aurora Water, and East Cherry Creek Water and Sanitation District. Douglas County invested significant time and money into supporting and promoting the WISE project for the benefit of the County. These water providers together have invested over $120M in this successful work.

community. We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to a long-term renewable water supply.

Sincerely,

Marshall P. Brown, P.E.
General Manager
Aurora Water

COLORADO
Division of Water Resources
Department of Natural Resources

October 14, 2020

Curt Weitkunat, AICP, Long Range Planner
Douglas County Planning Department
Transmission via email: cweitkun@douglas.co.us

RE: Pine Canyon Planned Development Water Appeal
MI2020-009
Part of the E1/2 Section 34, part of the S1/2 of Section 35, and part of the S1/2 of Section 36, T7S, R67W, 6th P.M.; and part of the NE1/4 of Section 1, T7S, R67W, 6th P.M.
Water Division 1, Water District 8

Dear Mr. Weitkunat:

We have reviewed your October 5, 2020 referral request related to the Pine Canyon Planned Development ("PCPD") Water Appeal. PCPD is a proposed development on about 535 acres for 1,800 single-family and multi-family residential units, a 220-guest room hotel and spa, 550,000 square feet of office space, 50,000 square feet of retail space, an 800-student school, and 170 acres of public parks and open space. This application is being processed concurrent with the Pine Canyon Planned Development Rezone and Pine Canyon Metropolitan District service plans, case nos. ZR2020-010 and SV2020-001.

This referral does not appear to qualify as a "subdivision" as defined in section 30-28-101(10)(a), C.R.S. Therefore, pursuant to the State Engineer's March 4, 2005 and March 11, 2011 memorandums to county planning directors, this office will only perform a cursory review of the referral information and provide informal comments. The comments do not address the adequacy of the water supply plan for this project or the ability of the water supply plan to satisfy any County regulations or requirements. In addition, the comments provided herein cannot be used to guarantee a viable water supply plan or infrastructure, the issuance of a well permit, or physical availability of water.

Water demands including residential indoor and outdoor use, commercial use, and system losses were provided in a Water Supply Plan Report ("Water Report") dated April 22, 2010 and a memo from Gina Burke of Jehn Water Consultants dated July 7, 2020. It is our understanding that this referral is seeking comments exclusively for the calculation of indoor residential demand.

According the Water Report, the indoor residential uses are estimated at 150 gallons/household/day or 302.44 acre-feet for the 1,800 residential dwelling units. In addition, according to a July 20, 2020 report on expert opinion regarding residential per capita use from Peter Mayer of WaterDM Demand Management ("WaterDM Report") the current development assumes an estimated demand of 150 gallons/household/day based on 3 people per household and 50 gallons/capita/day, for a total demand of 54,750 gallons/household/year or 306 acre-feet/year for the 1,800 residential dwelling units. We assume that the total estimated amount of 306 acre-feet/year in the July 20, 2020 letter is an error as the 150 gallons/household/day x 1,800 residential dwelling units x 365 days = 98,550,000 gallons/year divided by 325851 = 302.44 acre-feet/year.

The WaterDM Report basis its assumption on Residential End Uses of Water studies from 1999 and 2016 of more than 25 water utilities across the United States that measured water use in new and existing homes equipped with toilets, faucets, and showerheads, washes and dishwashers. Based on the above mentioned studies, in 1999, the Residential End Uses of Water study measured an average of 69.3 gallons/capita/day across 14 cities and in 2016, the Residential End Uses of Water study, measured an average of 58.6 gallons/capita/day across 9 cities. Over a period of about 15 years between these two studies, indoor water per capita water use declined due to implementation of fixture that meet basic efficiency criteria. In a separate water demand study by EPA, it was determined that residential dwellings equipped with toilets, showerheads, and faucets meeting the basic efficiency criteria used an average of 39.8 gallons/capita/day.

In the 2015 water demand of the Colorado Water Plan three possible future residential indoor gallons/capita/day values were considered for future planning at varying levels of 40 gallons/capita/day, 35 gallons/capita/day, and 30 gallons/capita/day. These appear to be all feasible based on implementation of water efficiency.

In 2017, Colorado has adopted the national plumbing codes, which requires that all fixtures including toilets, showerheads, and faucets sold in the state must meet EPA Water Sense specifications. Therefore the WaterDM Report states that the developer within Pine Canyon will ensure that all new homes and including “custom homes” will be equipped with WaterSense fixtures.

The PCPD proposed water demand of 50 gallons/person/day under Section 18A directly impact the County’s reference to Section 18A, and will not change the subdivision water supply requirements. Specifically, the sections references to Section 18A requirements and the requirement that the applicant provide evidence of a water supply that is sufficient in terms of quantity, quality and dependability for the type of application will still apply.

For the proposed water supply standard, for planning purposes, we recommend that the PCPD monitor indoor and outdoor water consumption, and implement demand management plans due to the emphasis on water conservation, and account for security reserve due to hydrologic variability. In addition, prior to these new standards being applied for this development we also recommend that the PCPD considers the potential increase of water consumption in 2020 and possible in the future due to drought conditions and increase in water demand due to people working from home.

Should you have any questions, please contact Ioana Comaniciu of this office at 303-866-3581 x8264.

Sincerely,

Joanna Williams, P.E.
Water Resource Engineer

Ec: Subdivision File No. 27350

JMW/idc

DENVER WATER

1600 West 12th Ave
Denver, CO 80204-3412
303.628.6000
denverwater.org

October 21, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon Planned Development

Dear Mr. Jakubowski,

Denver Water understands that the JRW Family Limited Partnership has submitted a Water Appeal under Douglas County Zoning Resolution 1808A, regarding its application for approval of the Pine Canyon Planned Development. The developer is proposing a water supply based only on nonrenewable groundwater. Approval of new development based on nonrenewable groundwater does not meet County requirements and will set dangerous precedent.

Historically, the South Metro area, including Douglas County, developed using only nonrenewable groundwater resources. Beginning in the 1990's, studies indicated that groundwater levels in the Denver Basin aquifers were declining quickly, and that many wells were nearing the end of their useful life. To help address these regional concerns, Denver Water, Aurora Water and the South Metro Water Resource Authority developed the WISE Partnership. WISE is a regional, collaborative effort that has produced a permanent renewable water supply for South Metro using Aurora's Prairie Waters project infrastructure and renewable water sources from Denver Water and Aurora Water. Although WISE is permanent, it is interruptible and is not sufficient on its own to meet the region's need for renewable water. Additional renewable supplies must be developed in the South Metro area to ensure a reliable water supply.

Allowing new development to occur solely on nonrenewable supplies would undermine these regional cooperative efforts to develop renewable supplies. It would also represent a reversal of policy by Douglas County in requiring sustainable long-term water supplies for new development. Denver Water encourages the County to continue regional cooperation among water providers to better develop reliable water supplies.

We urge the County to deny the Water Appeal. The Applicant should work with one of the existing water providers in the area to obtain access to a long-term renewable water supply.

Sincerely,

James S. Lochhead
CEO/Manager

ParkerWater
& SANITATION DISTRICT

RECEIVED
JUL 30 2020
Douglas County Planning

RECEIVED
JUL 28 2020
DOUGLAS COUNTY
COMMISSIONERS

Copy
BCC
Doug
C. D.

July 23, 2020

Douglas County Board of County Commissioners
100 Third Street
Castle Rock, CO 80104

Re: Water and Sanitation District Serving Pine Canyon Property

Dear Commissioners:

The Parker Water and Sanitation District has been asked to comment on the formation of a new special district providing water and sanitation service to a proposed planned unit development located in Douglas County on property commonly referred to as the Pine Canyon Property.

Parker Water is generally opposed to the formation of new special districts providing water and sanitation services in Douglas County, particularly in areas that can be readily served by existing municipalities or special districts. Douglas County is heavily reliant on non-renewable water resources and the development of additional land imposes a heavier burden on this finite resource. Parker Water, the Town of Castle Rock, and other water providers in Douglas County have actively worked and continue to work to procure renewable sources of water for their customers. The investment in renewable water, while costly, is vital to the long term well-being of the County, its economy, and its citizens. Approving the formation of new water providers that will rely solely on non-renewable water is contrary to good long-term planning and will result in serious issues for the owners of property served by such providers. Ultimately, these property owners will look to the County for a solution to their inevitable water shortages.

Moreover, the County has encouraged the consolidation of smaller water and sanitary sewer providers for a number of well-founded reasons. Larger, well-funded, experienced providers benefit from economies of scale and are able to deliver water and sewer services at lower costs to their customers and with greater certainty of service over time. Allowing multiple small service providers in the County results in unnecessary and duplicative infrastructure, increased cost of service, and increased risks of inadequate and/or unsustainable service. These small providers often lack the financing to construct and maintain their facilities to increasingly stringent federal and state standards. In addition, small districts have difficulty attracting and retaining skilled managers and operators. Ultimately, these shortcomings will result in the taxpayers of the County being asked to bail out failing districts to preserve homes and businesses of other members of their community. The original developer of these projects is often no longer in existence.

Parker Water does not take a specific stance with respect to the proposed Pine Canyon Planned Unit Development and its plans to provide water and sanitary sewer services. However, Parker Water strongly urges the Commissioners to consider the concerns set forth in this letter when deciding whether to allow the formation of additional small water and sewer providers in the County.

Ron R. Redd
District Manager

19650 E. Woodman Dr. Parker, CO 80134 303-841-4627 • FAX 303-841-8992

SOUTH METRO WATER SUPPLY AUTHORITY

8400 East Prentice
Avenue Suite 315
Greenwood Village, CO 80111

Phone 720 216 5158
Fax 720 216 5154

October 5, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon Planned Development

Dear Mr. Jakubowski,

The South Metro Water Supply Authority (SMWSA) has worked diligently with its members since 2004 to provide communities in Douglas and Arapahoe counties with a permanent, high quality, renewable water supply. Together with our partners, Denver Water and Aurora Water, the South Metro WISE Authority has entered into the Water Infrastructure and Supply Efficiency (WISE) partnership to accomplish that significant task.

We understand that the JRW Family Limited Partnership is planning to submit a Water Appeal under Douglas County Zoning Resolution 1808A. This community is proposing to develop homes using only nonrenewable groundwater. Based on our extensive planning efforts and previous work, we believe that this nonrenewable groundwater will not be able to support this proposed development permanently.

The South Metro Denver area, including Douglas County, had previously developed using only nonrenewable groundwater resources. In the early 2000's, studies indicated that the groundwater levels were declining quickly. This research lead to region-wide efforts to reduce pressure on and preserve this limited and essential resource. The water leaders at that time wanted to avoid negative impacts for present and future inhabitants, as well as any decline in economic development within this area. As you may know, this area is home to many large corporations, some of which are Fortune 500 companies. Without a sustainable water supply, this area simply cannot thrive to its fullest.

These region-wide efforts produced the WISE project and partnership. The WISE project delivers treated renewable reuse water from the Aurora Water's Prairie Waters System to many of the water providers in this area. This partnership consists of ten South Metro water providers, Denver Water, Aurora Water, and East Cherry Creek Water and Sanitation District WISE. One of the original pillars that SMWSA was founded upon is partnerships, with the idea that all communities in this area needed to collaborate in order to solve a region-wide problem in a cost-effective and efficient manner.

These water providers together have invested over $120M in this successful work. Furthermore, for the last twenty years, SMWSA members have invested hundreds of millions of dollars to import and develop local renewable supplies to be able to address the South Platte Basin water supply gap. Douglas County has also invested significant time and money into supporting and promoting the WISE project for the benefit of the County. Additional sole reliance upon nonrenewable groundwater supply for new growth in this area goes against the concept of partnerships, and collaboration. This project will speed up the depletion of this precious resource that is still being relied upon by existing residents of Douglas County. Denver Basin groundwater is a shared finite resource and this application has not proven that it will not impact the water portfolios of the surrounding community.

Approval of this Water Appeal will set an unintended bad precedent for other new communities seeking to develop in Douglas County. We strongly believe that at some point one of our water providers will be required to assist this community in the future, and provide them with the renewable water resources we worked so hard to obtain. We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to a long-term renewable water supply.

Sincerely,

Lisa Darling

Lisa Darling
Executive Director

October 21, 2020

Curt Weitkunat
Douglas County Planning Services
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon Planned Development-Water Appeal
MI2020-009
TCHD Case No. 6572

Dear Mr. Weitkunat:

Thank you for the opportunity to review and comment on the Water Appeal for the Pine Canyon Planned Development. Tri-County Health Department (TCHD) staff has reviewed the application for compliance with applicable environmental and public health regulations and principles of healthy community design. TCHD has also reviewed the Pine Canyon Rezone (ZR2020-010) and the Pine Canyon Metropolitan District Service Plans (SV2020-001) to gain perspective on the subject plan. After reviewing the applications, TCHD has the following comments.

General
The applicant has submitted a Site Application to the Colorado Department of Public Health and Environment Water Quality Control Division (WQCD) for the wastewater treatment facility (WWTF). The information provided in the Site Application is specific as to the location of the WWTF and the treatment processes necessary to meet the preliminary effluent limits established by the WQCD. The WWTF will also be designed to include treatment of wastewater to levels suitable for re-use of the water for irrigation of both public and private landscaped areas.

The applicant is proposing to exclusively utilize groundwater from the Denver Basin Aquifers underlying the property to supply water to the development. The applicant's water engineer has provided a general overview of the water system, based on general design principles and estimates of the quantity and quality of groundwater typical of the Denver Basin Aquifers underlying the property.

Water Utilities
Douglas County's water consultant has provided comments on the applicant's water demand estimates and has expressed concerns about the applicant's ability to attain the demand reductions from those prescribed by Douglas County.

TCHD acknowledges and shares the concerns raised by Douglas County's water consultant.

Pine Canyon Water Appeal
MI2020-009
TCHD Case No. 6572
October 21, 2020

Several water utility agencies have raised objections to the water supply, based on exclusive use of non-sustainable Denver Basin groundwater proposed by Pine Canyon. Those agencies have requested that the developer work with an existing water provider to obtain a renewable source of water.

The United States Geological Service Professional Paper 1770, Groundwater Availability of the Denver Basin Aquifer System, concludes: "pumping from the Denver Basin bedrock aquifers is not indefinitely sustainable and renewable water supplies will be needed in the future."

TCHD acknowledges and shares the concerns raised by the agencies, regarding sustainability of water supply and the USGS provides a rigorous scientific study to support those concerns.

Wastewater Facilities
A key component of the water appeal is the capability of the proposed WWTF to treat wastewater to the level necessary to re-use the water for landscape irrigation purposes.

The Town of Castle Rock (TCR) has raised many significant issues and concerns about the WWTF. TCHD acknowledges and shares those concerns, while recognizing that the issues may be resolvable. Based on our discussions with the WQCD, it is likely that the WQCD will require that the developer work with the TCR to resolve the issues prior to making a determination regarding the Site Application.

Conclusion
Resolution of the issues regarding water demands, sustainability of the water supply and the WWTF are critical to the Water Appeal. Until those issues are resolved, TCHD believes that it is premature to approve the Water Appeal.

Recommendation
TCHD recommends that the issues raised regarding water demands and renewable water be addressed and that the CDPHE approve the WWTF Site Application, prior to approval of the Water Appeal.

Please feel free to contact me at (720) 200-1568 or email at wbrown@tchd.org if you have any questions on TCHD's comments.

Sincerely,

Warren S. Brown, P.E.
Public Health Engineer

CC: Brian Hlavacek, Sheila Lynch, Michael Weakley, Keith Homersham, Jennifer Charles, TCHD
Bret Icenogle, P.E., CDPHE

CASTLE ROCK Water
Securing our future drop by drop

October 23, 2020

Douglas County Community Development
Attn: Curt Weitkunat, AICP
100 Third Street
Castle Rock, CO 80104

Re: Referral Request - MI2020-009 Pine Canyon PD Water Appeal

Dear Mr. Weitkunat,

Introduction

The Town of Castle Rock strongly recommends Douglas County denial of the Water Appeal by the JRW Family Limited Partnership (Applicant) under Douglas County Zoning Resolution 1808A on the above referenced planned development in Douglas County (see Town Council Resolution 2020-095 provided as **Attachment A**). According to Zoning Resolution 1808A, the Douglas County Planning Commission (Commission) and the Douglas County Board (Board) are required to consider the Water Appeal based upon evidence 1) the request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County and 2) the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality and dependability.

Water Appeal Criteria 1

Since the Applicant is proposing to develop strictly off of non-renewable groundwater, the request will be detrimental to the long term health, safety and welfare of present and future inhabitants of the County as this non-renewable water supply will not be able to support the development over the long term. As the County's 2040 Comprehensive Master Plan notes, "the Denver Basin alone (a non-renewable resource) cannot sustain the population's water needs long term." Further, additional new use of this non-renewable water supply will only speed up the depletion of the resource which is currently still relied upon by existing residents of Douglas County and will be for many years to come as water providers continue their decades long plan to transition to a renewable water supply.

The County's 2040 Comprehensive Master Plan has Objective 7-1C, which is to "Support Long-Term Water Supply Planning." Approval of this Water Appeal would be entirely counter to this objective as there is no long-term water supply planning incorporated into the Applicants Water Plan. The entire Water Plan is based on a non-renewable resource and

further incorporates no safety factor into that supply, instead stretching the supply as far as possible to entitle as much development as possible. The Water Plan even relies on reusable wastewater effluent for almost half of the needed supply, a supply which will likely be denied by the Colorado Department of Public Health and Environment (CDPHE) and the Town of Castle Rock. A permit from the Town of Castle Rock will be required since the wastewater plant will discharge to the Castle Rock Watershed Protection District. Since this discharge would be immediately upstream of Castle Rock's drinking water supply wells, the proposed discharge is extremely problematic and could impact the health, safety and welfare of existing County residents living in Castle Rock. For these reasons and many others, the Town of Castle Rock has recommended that CDPHE deny the wastewater site application submitted by the Applicant (see Town Council Resolution 2020-073 and letter to CDPHE as **Attachment B**).

The Applicant has provided no proof or discussion of the first criteria, which the Board and Commission must consider in evaluating the Water Appeal. In reviewing the County's 2040 Comprehensive Master Plan, there is more discussion under Objective 7-1C of policies which would help ensure that approval of a Water Appeal will not be detrimental to present or future inhabitants of the County. Policy 7-1C.1 "encourages developments to seek water supply from existing water providers" undoubtedly to ensure that new developments will be connected to a long term renewable water supply, a supply which all of the existing major water providers in Douglas County are developing. Castle Rock Water, an existing water provider, is willing and able to serve the proposed development if it annexes into the Town. Castle Rock Water has invested over $210 million in a long-term renewable water supply for its existing and future customers.

On October 20, 2020, Town Council approved Castle Rock Water to develop an agreement to help another small water provider to connect to renewable water and solve other long-term water problems. This development was originally approved in unincorporated Douglas County many years ago. Similar to Pine Canyon, this development is also located in the Central Basin. Unlike Pine Canyon, this development actually had enough non-renewable groundwater rights for the entitled development to meet the County's criteria without having to do a Water Appeal, and yet it needs the help of Castle Rock Water to meet the long term water supply planning needs for their residents. Allowing Pine Canyon to develop off of a non-renewable groundwater supply that doesn't even meet the minimum criteria of the County will be detrimental to the future residents of the proposed development and current and future residents of Castle Rock, and the County as a whole.

Policy 7-1C.2 "promote conjunctive-use water systems" encourages water systems to develop renewable water in conjunction with protection and long term use of their non-renewable groundwater supplies. Castle Rock Water's plans include aquifer storage and recovery (ASR) which is a great solution that promotes conjunctive use. The Applicant's proposed system may actually interfere with Castle Rock Water's ASR system and ultimately

thereby with its water rights. Again, this will negatively impact the current and future residents of Castle Rock, who are also of course residents of the County. The remaining policies under Objective 7-1C all deal with the long term renewable water supply issue and meeting the spirit of these policies ensures that new development is not detrimental to the

existing and future residents of the County. The Applicant is not meeting the spirit of any of these policies.

The County's 2040 Comprehensive Master Plan goes on to discuss the South Metro Water Supply Authority (SMWSA), a partnership of 11 South Metro water providers, including the largest water providers in Douglas County. This Authority is focused on building a long-term renewable water supply for Douglas County and the region through development of renewable water supplies, water storage projects, management of water quality, reuse projects and water conservation. The SMWSA along with several other major water providers for the region have provided Douglas County with recommendations to deny the Water Appeal from the Applicant, see **Attachment C**.

Water Appeal Criteria 2

The application also does not provide adequate supporting data that the water supply will be sufficient in terms of quantity, quality and long-term dependability since again the proposed sole supply is non-renewable groundwater. This is the second criteria which the Board and Commission must evaluate the Water Appeal. The Applicant proposes a non-renewable groundwater supply of unknown real capacity based solely on paper water decrees and with no safety factor of excess non-renewable supply, a non-renewable supply with no sampling data or information showing quality, water demand criteria not proven in the Castle Rock area, and a reusable effluent, which will likely not get permitted as discussed above. As Castle Rock Water has learned through the drilling of over 60 deep groundwater wells in the area, not all wells produce the same amount of water supply.

This means the Applicant does not know without drilling wells first whether two wells will be adequate to even meet the short-term quantity needs of the proposed entitlements. Given the distance between their proposed wells, there will likely also be well to well interference between these proposed wells not to mention the interference that will occur with Castle Rock Water's nearby wells. **Attachment D** provides a review by Leonard Rice Engineers (LRE) of the well interference section prepared by the Applicant's consultant, and this review shows that interference with the Town's wells has been significantly underestimated by the Applicant. The Applicant's groundwater impact analysis does not account for predicted declines in the Denver Basin aquifers. These declines will reduce the availability of water regardless of the applicants pumping. Wells constructed and pumped by the applicant would only exacerbate future non-renewable groundwater supply challenges.

The uncertainty around the amount of actual wet water available with paper water rights is why a safety factor is needed to ensure adequate near term supply and likely why the County has established minimum criteria. To exhibit this issue, Castle Rock Water owns over 44,000 acre feet of non-renewable groundwater rights and yet the Town only uses about 8,000 to 9,000 acre feet per year of water, a safety factor of around 5 not including Castle Rock

Water's renewable water supplies. The Applicant proposes a much smaller safety factor of around 2 for their non-renewable groundwater rights, trying to stretch the possible supply to meet more development. What happens when the supply is not adequate?

The quality of the Denver Basin non-renewable groundwater supply in this area is generally good, but this does not mean that the supply does not require treatment. Most significant water providers in this area are required to provide some level of treatment for this supply

including Castle Rock Water. In fact, out of Castle Rock Water's 60 plus wells, all of them need some level of treatment. Treatment typically involves removing iron, manganese and sometimes even radium to meet State and Federal primary and secondary maximum contaminant levels (MCLs). The Applicant has not provided any sampling data from wells to ensure that treatment will not be required. Before approval of this water supply as meeting quality requirements, this sampling should be performed, and in fact, water providers are required to do that sampling and analysis before the CDPHE will permit any new well. What happens if the Applicant's proposed wells do not meet State or Federal water quality requirements? Treatment will be required, but a new water and sanitation district may not be able to afford to provide that treatment. The unincorporated Douglas County water provider mentioned above that Castle Rock Water is helping is having issues with their treatment which they cannot solve, case in point. Approval of the Water Appeal should not even be considered until this water quality question is answered fully and the need for treatment determined as criteria 2 for approval cannot be fully understood without this work.

While the Applicant provides a number of references as to the water demand criteria, none of the references are specific to the Castle Rock area where the development is proposed. At a minimum, the Applicant should be required to provide references local to the Castle Rock area to support their proposed water use criteria. There are three major water providers and a number of smaller water providers in the area that have experience with local water demand criteria. Experience as a water provider shows that criteria can be useful but that development can exceed those water demand criteria without the proper checks and balances in place. As a new water and sanitation district, the proposed Pine Canyon Water and Sanitation District has no experience implementing rate policies, water conservation policies, and management of water demand to ensure that the proposed criteria are achieved. The Applicant's Water Plan gives very little important detail on how they plan to ensure that the proposed water demand criteria will be met and enforced.

As noted above, the permitting of almost 50 percent of the Applicant's proposed water supply is in question. Treatment of wastewater to the highest standards under Regulation 84 is what the Pine Canyon Water and Sanitation District is proposing to do. This is no easy task, especially for a new water and sanitation district with no experience treating wastewater at all. Denver Water has a facility producing this quality water, but Denver Water is the largest and oldest water provider in the State. The Pine Canyon Water and Sanitation District has provided no details on how they will produce, store and distribute this highest quality Regulation 84 water. The Town does not believe the new water and sanitation district is capable of providing this consistent high quality water over the long term based on the Water Plan, the Wastewater Site Application, and the water and sanitation district service plan. These plans all have significant flaws and have underestimated the costs of providing this service, throwing into question the ability of the new district to meet the treatment objectives.

Further, this reuse water supply cannot be produced unless the wastewater site application is approved by CDPHE and a permit is approved by the Town of Castle Rock for discharge of treated wastewater in the Castle Rock Watershed Protection District immediately upstream of Castle Rock Water drinking water wells. In addition to these approvals, the Applicant also needs a phosphorus wasteload allocation in order to get a permit to discharge. This phosphorus wasteload allocation is not available unless a trade is approved by CDPHE or the

Applicant is able to purchase allocated capacity from another owner of that capacity in the Chatfield Watershed Basin. Because almost 50 percent of the proposed water supply is reuse water dependent on these approvals, the Water Appeal certainly should not even go to public hearing until these other issues are resolved. If approvals of the wastewater site application and a permit for discharge to the Castle Rock Watershed Protection District are not forthcoming, then the Water Appeal must be denied on the second criteria.

Conclusion

In closing, the South Metro Denver area, including Douglas County, historically developed off of non-renewable groundwater resources. In 2000, water providers in the region took actions to reduce pressure on non-renewable groundwater, preserving this limited and essential resource and avoiding detrimental impacts to the health, safety, and welfare of the present and future inhabitants of the region, ultimately preventing significant economic disruptions to the region's prosperity. Water providers in the South Metro area developed long-term renewable water supply plans and invested hundreds of millions of dollars to transition from a non-renewable groundwater resource to a sustainable, fully renewable water supply that would allow for the continued prosperity and economic success of inhabitants.

Douglas County has partnered with many of the water providers in these critical initiatives for the better part of a decade. The Water Infrastructure and Supply Efficiency (WISE) project and partnership was born out of these efforts. Specifically, the WISE project is a partnership of ten South Metro water providers and Denver Water, Aurora Water, and East Cherry Creek Water and Sanitation District. Douglas County invested significant time and money into supporting and promoting the WISE project for the benefit of the County. These water providers together have invested over $120M in this successful work. Castle Rock Water has invested $52M in the WISE project including local projects necessary to implement WISE and $210M in overall renewable water investments.

Approval of this Water Appeal will set these regional planning efforts back by allowing the Applicant to go it alone with additional new development off of this non-renewable resource. At some point in the future, one of the existing water providers in the area will be required to come to the Applicant's rescue with renewable water resources to avoid disaster for the potential future residents of this community, as Castle Rock Water is currently considering doing for another development in unincorporated Douglas County. We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to a long-term renewable water supply.

Sincerely,

Mark Marlowe, PE
Director of Castle Rock Water

Attachment A – Town Council Resolution 2020-095
Attachment B – Town Council Resolution 2020-073
Attachment C – Letters from other water providers recommending denial
Attachment D – Review of Applicant's well interference study

RESOLUTION NO. 2020-095

A RESOLUTION OF THE TOWN COUNCIL OF CASTLE ROCK STATING ITS OPPOSITION TO THE APPEAL SUBMITTED BY JRW FAMILY LIMITED PARTNERSHIP, LLLP, TO THE WATER SUPPLY STANDARDS SET FORTH IN SECTION 18A OF THE DOUGLAS COUNTY ZONING RESOLUTION WITH REGARD TO THE PROPOSED PINE CANYON PLANNED DEVELOPMENT

WHEREAS, JRW Family Limited Partnership, LLLP (the "Applicant"), the owner and developer of 530 acres of land located in unincorporated Douglas County (the "County"), has submitted a proposal to the County to rezone such land to a planned development consisting of a maximum of 1,800 dwelling units, 600,000 square feet of non-residential uses with a transportation mobility hub, a resort hotel, and approximately 190 acres of parks and open space (the "Pine Canyon Planned Development"); and

WHEREAS, concurrent with its rezoning application, the Applicant has submitted an appeal to the water supply standards set forth in Section 18A of the Douglas County Zoning Resolution (the "Water Supply Overlay District") for its plan to supply water to the Pine Canyon Planned Development (the "Water Appeal"); and

WHEREAS, the intent of the Water Supply Overlay District is to ensure that development in the unincorporated areas of the County provides for a water supply that is sufficient in terms of quantity, quality, and dependability; and

WHEREAS, the County will approve the Water Appeal only upon finding that: (i) the request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County, and (ii) the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality and dependability; and

WHEREAS, the County's Comprehensive Master Plan provides that the Denver Basin (a non-renewable groundwater resource) alone cannot sustain the population's water needs long-term; and

WHEREAS, for the past two decades, the County and the surrounding South Metro region have invested substantial effort and resources to transition to a renewable water supply; and

WHEREAS, the Applicant proposes to supply water to the Pine Canyon Planned Development solely from non-renewable groundwater, a request which will set back the County's efforts to transition to a renewable water supply and be detrimental to the health, safety, and welfare of the present and future inhabitants of the County; and

WHEREAS, the non-renewable groundwater supply proposed by the Applicant: (i) is of unknown real capacity and based solely on paper water decrees; (ii) does not include a safety factor of excess non-renewable supply; (iii) is not supported by any sampling data or information

showing quality, and (iv) incorporates a plan to reuse wastewater effluent which is not likely to be permitted by the Colorado Department of Public Health and Environment; and

WHEREAS, given these facts, the Applicant has failed to provide the County adequate supporting data of alternate water demand criteria and, thus, is unable to demonstrate that the proposed water supply will be sufficient to serve the Pine Canyon Planned Development in terms of quantity, quality and dependability; and

WHEREAS, although the Pine Canyon Planned Development is located within unincorporated Douglas County, it is surrounded by the Town of Castle Rock (the "Town"); and

WHEREAS, constructing non-tributary groundwater wells within the Pine Canyon Planned Development will interfere with the Town's non-tributary groundwater wells and its plan to utilize those wells for aquifer storage and recovery, thereby impinging upon the Town's water rights; and

WHEREAS, consolidation of water and wastewater services through annexation into the Town presents the best and most cost efficient option for the Applicant and future residents and will ensure that future residents of the Pine Canyon Planned Development have access to long term, sustainable and renewable water supplies; and

WHEREAS, furthermore, the Pine Canyon Planned Development lies within the Town's water and wastewater service area and the Town has planned accordingly to serve this property if and when such property is developed.

NOW, THEREFORE BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF CASTLE ROCK, COLORADO, AS FOLLOWS:

Section 1. **Statement of Opposition**. The Town Council hereby formally states its opposition to the Water Appeal submitted by JRW Family Limited Partnership, LLLP, to Douglas County for the Pine Canyon Planned Development and further recommends that Douglas County deny the Water Appeal in its entirety.

Section 2. **Authorization.** The Director of Castle Rock Water and the Town Manager are hereby authorized to take whatever action is necessary on behalf of the Town to formally oppose the Water Appeal at the respective public hearings before the Douglas County Planning Commission and Board of County Commissioners, including the submission of a written statement recommending denial of the Water Appeal consistent with this Resolution and the reasons identified therein.

PASSED, APPROVED AND ADOPTED this 15th day of September, 2020, by the Town Council of the Town of Castle Rock, Colorado, on first and final reading by a vote of 6 for and 0 against.

ATTEST:

Lisa Anderson, Town Clerk

TOWN OF CASTLE ROCK

Jason Gray, Mayor Jason Bower, Mayor Pro Tem

Approved as to form:

Michael J. Hyman, Town Attorney

Approved as to content:

Mark Marlowe, Director, Castle Rock Water

TOWN OF CASTLE ROCK SEAL COLORADO APRIL 14 1881

RESOLUTION NO. 2020-073

A RESOLUTION BY THE TOWN COUNCIL STATING ITS OPPOSITION TO THE SITE APPLICATION SUBMITTED BY JRW FAMILY LIMITED PARTNERSHIP, LLLP, TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT FOR A NEW WASTEWATER TREATMENT PLANT TO SERVE THE PINE CANYON DEVELOPMENT

WHEREAS, JRW Family Limited Partnership, LLLP, the owner and developer of Pine Canyon (the "Applicant"), has submitted a site application to the Colorado Department of Public Health and Environment (CDPHE) requesting a permit for a new wastewater treatment plant to serve the Pine Canyon development; and

WHEREAS, the Applicant has prepared a site application that has a long list of technical problems and inadequacies; and

WHEREAS, although Pine Canyon is located within unincorporated Douglas County, it is surrounded by the Town of Castle Rock (the "Town"); and

WHEREAS, constructing a wastewater treatment plant in the middle of the Town does not fit in with the nature of the surrounding development, open space, and trails in the Town and will cause negative impacts on the surrounding area, including noise and odor; and

WHEREAS, the water and sanitation district proposed by the Applicant to own and operate the plant does not yet exist and has no financial plan to demonstrate the financial capacity to fund the construction and operation of this type of facility in a manner that will protect the public health and environment; and

WHEREAS, a discharge of treated wastewater into East Plum Creek at the location proposed by the Applicant is immediately upstream of several of the Town's drinking water wells, thereby presenting undue risks to the safety of Town's water supply; and

WHEREAS, although the location of the proposed discharge falls within the boundaries of the Castle Rock Watershed Protection District, the Applicant has thus far failed to seek a discharge permit from the Town as required by Chapter 4.02 of the Castle Rock Municipal Code; and

WHEREAS, Pine Canyon does not have a waste load allocation for phosphorus to discharge wastewater effluent within the Chatfield Watershed, a requirement for any new wastewater plant in the watershed; and

WHEREAS, the trade for a phosphorus allocation proposed by the Applicant is technically inadequate to provide for the waste load allocation; and

WHEREAS, the Applicant has chosen to challenge guidance in Colorado Revised Statutes that encourages the consolidation of wastewater treatment and instead argues that the costs at the

regional wastewater plant, Plum Creek Water Reclamation Authority (PCWRA), are too high, an argument that is based upon incorrect cost comparisons; and

WHEREAS, on the contrary, correct cost information shows that consolidation of water and wastewater services through annexation into the Town presents the best and most cost efficient option for the Applicant; and

WHEREAS, furthermore, Pine Canyon lies within the Town's water and wastewater service area and the Town has planned accordingly to serve this property if and when such property is developed.

NOW, THEREFORE BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF CASTLE ROCK, COLORADO, AS FOLLOWS:

Section 1. **Statement of Opposition**. The Town Council hereby formally states its opposition to the site application submitted by JRW Family Limited Partnership, LLLP, the owner and developer of Pine Canyon, to the Colorado Department of Public Health and Environment requesting a permit for a new wastewater treatment plant to serve the Pine Canyon Development (***Exhibit 1***) officially recommends that the CDPHE deny the site location application submitted by the applicant.

Section 2. **Authorization.** The Director of Castle Rock Water and the Town Manager are hereby authorized to send communication to CDPHE recommending denial of the Site Location Application in accordance with this resolution and the reasons identified therein.

PASSED, APPROVED AND ADOPTED this 18th day of August, 2020, by the Town Council of the Town of Castle Rock, Colorado, on first and final reading by a vote of 7 for and 0 against.

ATTEST:

Lisa Anderson, Town Clerk

TOWN OF CASTLE ROCK

Jason Gray, Mayor

Approved as to form:

Michael J. Hyman, Town Attorney

Approved as to content:

Mark Marlowe, Director CR Water

TOWN OF CASTLE ROCK ★ SEAL ★ COLORADO APRIL 14, 1881

Arapahoe County Water and Wastewater Authority
13031 E Caley Avenue, Centennial, CO 80111 9364
Phone (303) 790-4830, Fax (303)790-9364
www.arapahoewater.org

October 9, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon PD - Water Appeal

Dear Mr. Jakubowski,

The Arapahoe County Water and Wastewater Authority and many other water providers in the South Metro area have worked diligently over the years to bring renewable water resources to the South Metro area to ensure a secure, reliable, and renewable water future.

We understand the JRW Family Limited Partnership is planning to submit a Water Appeal under Douglas County Zoning Resolution 1808A. The notion of developing a new community solely relying on non-renewable groundwater, we believe is unreliable and unsustainable as groundwater levels have been shown to be declining quickly.

The water providers in the South Metro area, including ACWWA and other SMWSA members, have been working to build a sustainable water future. Relying upon non-renewable groundwater and allowing this Water Appeal goes against the efforts these organizations have been working towards. We believe that this will set an unwanted precedent for future developers in this area.

We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to long term renewable water supply.

Regards,

Steve Witter

Steve Witter, P.E.
General Manager
Arapahoe County Water and Wastewater Authority

Aurora Water
15151 E. Alameda Parkway, Ste. 3600
Aurora, Colorado 80012
303.739.7370

City of Aurora
Worth Discovering • auroragov.org

October 1, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

Re: Pine Canyon PD Water Appeal - MI2020-009

This letter is being provided to recommend Douglas County deny the upcoming Pine Canyon PD Water Appeal (Water Appeal) being sought by the JRW Family Limited Partnership (Applicant) under Douglas County Zoning Resolution 1808A. The Douglas County Planning Commission and the Douglas County Board are required to consider the Water Appeal based upon evidence 1) the request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County and 2) the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality and dependability.

Since the Applicant is proposing to develop strictly off of non-renewable groundwater, the request will be detrimental to the long-term health, safety and welfare of present and future inhabitants of the County as this non-renewable water supply will not be able to support the development over the long term. Further, additional new use of this non-renewable water supply will only speed up the depletion of the resource which is currently still relied upon by existing residents of Douglas County and will be for many years to come as water providers continue their decades long plan to transition to a renewable water supply. The application also does not provide sufficient supporting data that the water supply will be sufficient in terms of quantity and long-term dependability since again the proposed sole supply is non-renewable groundwater.

The South Metro Denver area including Douglas County historically developed off of non-renewable groundwater resources. The City of Aurora does not rely on non-renewable groundwater resources and holds its Denver Basin water rights in reserve for emergency drought supply. In the early 2000's, region wide efforts were undertaken to reduce pressure on and preserve this limited and essential resource to avoid impacts that would be detrimental to the health, safety, and welfare of the present and future inhabitants of the region as well as significant economic disruptions to the region's prosperity. Water providers in the South Metro area developed long term renewable water supply plans and invested hundreds of millions of dollars to transition from a non-renewable groundwater resource to a sustainable, fully renewable water supply that would allow for the continued prosperity of inhabitants and economic success.

Approval of this Water Appeal will set these efforts back by allowing additional new development off of this non-renewable resource. At some point in the future, one of the existing water providers in the area will be required to step in with renewable water resources to avoid a disaster for the potential future residents of this

Aurora Water
15151 E. Alameda Parkway, Ste. 3600
Aurora, Colorado 80012
303.739.7370

Douglas County has partnered with many of the water providers in these critical initiatives for the better part of a decade. The Water Infrastructure and Supply Efficiency (WISE) project and partnership was born out of these efforts. Specifically, the WISE project is a partnership of ten South Metro water providers and Denver Water, Aurora Water, and East Cherry Creek Water and Sanitation District. Douglas County invested significant time and money into supporting and promoting the WISE project for the benefit of the County. These water providers together have invested over $120M in this successful work.

community. We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to a long-term renewable water supply.

Sincerely,

Marshall P. Brown, P.E.
General Manager
Aurora Water

DENVER WATER

1600 West 12th Ave
Denver, CO 80204-3412
303.628.6000
denverwater.org

October 21, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon Planned Development

Dear Mr. Jakubowski,

Denver Water understands that the JRW Family Limited Partnership has submitted a Water Appeal under Douglas County Zoning Resolution 1808A, regarding its application for approval of the Pine Canyon Planned Development. The developer is proposing a water supply based only on nonrenewable groundwater. Approval of new development based on nonrenewable groundwater does not meet County requirements and will set dangerous precedent.

Historically, the South Metro area, including Douglas County, developed using only nonrenewable groundwater resources. Beginning in the 1990's, studies indicated that groundwater levels in the Denver Basin aquifers were declining quickly, and that many wells were nearing the end of their useful life. To help address these regional concerns, Denver Water, Aurora Water and the South Metro Water Resource Authority developed the WISE Partnership. WISE is a regional, collaborative effort that has produced a permanent renewable water supply for South Metro using Aurora's Prairie Waters project infrastructure and renewable water sources from Denver Water and Aurora Water. Although WISE is permanent, it is interruptible and is not sufficient on its own to meet the region's need for renewable water. Additional renewable supplies must be developed in the South Metro area to ensure a reliable water supply.

Allowing new development to occur solely on nonrenewable supplies would undermine these regional cooperative efforts to develop renewable supplies. It would also represent a reversal of policy by Douglas County in requiring sustainable long-term water supplies for new development. Denver Water encourages the County to continue regional cooperation among water providers to better develop reliable water supplies.

We urge the County to deny the Water Appeal. The Applicant should work with one of the existing water providers in the area to obtain access to a long-term renewable water supply.

Sincerely,

James S. Lochhead
CEO/Manager

ParkerWater
& SANITATION DISTRICT

July 23, 2020

Douglas County Board of County Commissioners
100 Third Street
Castle Rock, CO 80104

Re: Water and Sanitation District Serving Pine Canyon Property

Dear Commissioners:

The Parker Water and Sanitation District has been asked to comment on the formation of a new special district providing water and sanitation service to a proposed planned unit development located in Douglas County on property commonly referred to as the Pine Canyon Property.

Parker Water is generally opposed to the formation of new special districts providing water and sanitation services in Douglas County, particularly in areas that can be readily served by existing municipalities or special districts. Douglas County is heavily reliant on non-renewable water resources and the development of additional land imposes a heavier burden on this finite resource. Parker Water, the Town of Castle Rock, and other water providers in Douglas County have actively worked and continue to work to procure renewable sources of water for their customers. The investment in renewable water, while costly, is vital to the long term well-being of the County, its economy, and its citizens. Approving the formation of new water providers that will rely solely on non-renewable water is contrary to good long-term planning and will result in serious issues for the owners of property served by such providers. Ultimately, these property owners will look to the County for a solution to their inevitable water shortages.

Moreover, the County has encouraged the consolidation of smaller water and sanitary sewer providers for a number of well-founded reasons. Larger, well-funded, experienced providers benefit from economies of scale and are able to deliver water and sewer services at lower costs to their customers and with greater certainty of service over time. Allowing multiple small service providers in the County results in unnecessary and duplicative infrastructure, increased cost of service, and increased risks of inadequate and/or unsustainable service. These small providers often lack the financing to construct and maintain their facilities to increasingly stringent federal and state standards. In addition, small districts have difficulty attracting and retaining skilled managers and operators. Ultimately, these shortcomings will result in the taxpayers of the County being asked to bail out failing districts to preserve homes and businesses of other members of their community. The original developer of these projects is often no longer in existence.

Parker Water does not take a specific stance with respect to the proposed Pine Canyon Planned Unit Development and its plans to provide water and sanitary sewer services. However, Parker Water strongly urges the Commissioners to consider the concerns set forth in this letter when deciding whether to allow the formation of additional small water and sewer providers in the County.

Ron R. Redd
District Manager

18100 E. Woodman Dr. Parker, CO 80134 303-841-4627 • FAX 303-841-8992

SOUTH METRO WATER SUPPLY AUTHORITY

8400 East Prentice
Avenue Suite 315
Greenwood Village, CO 80111

Phone 720 216 5158
Fax 720 216 5154

October 5, 2020

Douglas County Community Development
Attn: Matt Jakubowski, AICP, Chief Planner
100 Third Street
Castle Rock, CO 80104

RE: Pine Canyon Planned Development

Dear Mr. Jakubowski,

The South Metro Water Supply Authority (SMWSA) has worked diligently with its members since 2004 to provide communities in Douglas and Arapahoe counties with a permanent, high quality, renewable water supply. Together with our partners, Denver Water and Aurora Water, the South Metro WISE Authority has entered into the Water Infrastructure and Supply Efficiency (WISE) partnership to accomplish that significant task.

We understand that the JRW Family Limited Partnership is planning to submit a Water Appeal under Douglas County Zoning Resolution 1808A. This community is proposing to develop homes using only nonrenewable groundwater. Based on our extensive planning efforts and previous work, we believe that this nonrenewable groundwater will not be able to support this proposed development permanently.

The South Metro Denver area, including Douglas County, had previously developed using only nonrenewable groundwater resources. In the early 2000's, studies indicated that the groundwater levels were declining quickly. This research lead to region-wide efforts to reduce pressure on and preserve this limited and essential resource. The water leaders at that time wanted to avoid negative impacts for present and future inhabitants, as well as any decline in economic development within this area. As you may know, this area is home to many large corporations, some of which are Fortune 500 companies. Without a sustainable water supply, this area simply cannot thrive to its fullest.

These region-wide efforts produced the WISE project and partnership. The WISE project delivers treated renewable reuse water from the Aurora Water's Prairie Waters System to many of the water providers in this area. This partnership consists of ten South Metro water providers, Denver Water, Aurora Water, and East Cherry Creek Water and Sanitation District WISE. One of the original pillars that SMWSA was founded upon is partnerships, with the idea that all communities in this area needed to collaborate in order to solve a region-wide problem in a cost-effective and efficient manner.

These water providers together have invested over $120M in this successful work. Furthermore, for the last twenty years, SMWSA members have invested hundreds of millions of dollars to import and develop local renewable supplies to be able to address the South Platte Basin water supply gap. Douglas County has also invested significant time and money into supporting and promoting the WISE project for the benefit of the County. Additional sole reliance upon nonrenewable groundwater supply for new growth in this area goes against the concept of partnerships, and collaboration. This project will speed up the depletion of this precious resource that is still being relied upon by existing residents of Douglas County. Denver Basin groundwater is a shared finite resource and this application has not proven that it will not impact the water portfolios of the surrounding community.

Approval of this Water Appeal will set an unintended bad precedent for other new communities seeking to develop in Douglas County. We strongly believe that at some point one of our water providers will be required to assist this community in the future, and provide them with the renewable water resources we worked so hard to obtain. We encourage the County to deny the Water Appeal and instead have the Applicant work with one of the existing water providers in the area on obtaining access to a long-term renewable water supply.

Sincerely,

Lisa Darling

Lisa Darling
Executive Director

July 22, 2020 (Amended September 10, 2020)

Mr. Bob Slentz
Ms. Heather Justus, P.G.
Castle Rock Water
175 Kellogg Court
Castle Rock, CO 80109

VIA EMAIL TO: BSlentz@crgov.com and HJustus@crgov.com

RE: Pine Canyon Well Fields Interference Analysis

Dear Mr. Slentz and Ms. Justus,

LRE Water (LRE) is supporting Castle Rock Water (Town) with the evaluation of potential groundwater drawdown impacts from the development of the Pine Canyon Well Fields. LRE reviewed the Jehn Water report titled "*Water Supply Plan Report, Pine Canyon, Douglas County, Colorado*", dated April 22, 2020 (Jehn Report). We reviewed preliminary well field planning from the Jehn Report and performed an independent evaluation of potential impacts to Castle Rock's nearby wells.

Introduction

The Jehn Report includes an evaluation of future well interference from the development of the two well fields (**Figure 1**). Each well field includes wells planned to be completed in the Lower Dawson, Denver, and Arapahoe aquifers. The Jehn Report evaluates the impacts on one nearby well in each aquifer that is closest to the well fields. The Jehn Report does not describe the drawdown evaluation methodology or the aquifer property input data. The information provided does not allow for repeating or validating the reported drawdown estimates.

The sections below describe a well impact analysis LRE completed based on common methodology, publicly available data, and data provided by Castle Rock Water.

Interference Analysis

The Jehn Report presents the results of well interference estimates for a "worst-case" pumping scenario simulating pumping all of the available water in each aquifer over a

100-year period. The total pumping rate estimated was 709.9 AF/YR total pumping from the two well fields, for 100 years. The interference was estimated with both well fields pumping equal amounts:

- Lower Dawson aquifer - 158.9 AF/YR (98.5 GPM)
- Denver aquifer - 314 AF/YR (194.7 GPM)
- Arapahoe aquifer – 236.7 AF/YR (146.7 GPM)

No aquifer parameters were provided by the Jehn Report to compare well interference, however Castle Rock provided LRE storage and transmissivity parameters of local wells. The average parameters for each aquifer considered are provided in **Table 1.**

To estimate drawdown in each aquifer, LRE used a Theis drawdown solution provided in Rockworks (Rockware, Inc., 2020) that allows for multiple pumping wells. We made the following assumptions:

1) Pumping is simulated from a single fully penetrating well in the center of each proposed well field within a given aquifer;
2) No wells other than the proposed Pine Canyon wells pump during this simulation; and,
3) Wells pump for 100 years (36,500 days) at a constant rate.

Initially, we analyzed a similar scenario as described in the Jehn Report by pumping a single well field at the full appropriation for the given aquifer. The closest wells to that well field in each aquifer were assessed for drawdown interference. **Table 2** shows the drawdown calculated from a Theis solution using the parameters in **Table 1** compared to the same wells referenced in the Jehn Report. **Table 2** shows the drawdown impacts from pumping only one well in an attempt to most closely match the suspected methods used by Jehn Water. The drawdown referenced in the Jehn report underestimates drawdown compared to LRE's calculation of drawdown.

Colorado State University (CSU) analyzed multiple pumping datasets within the Arapahoe and Denver and Dawson aquifers within the Castle Rock area (Lewis, 2014). A novel approach was used to calibrate aquifer storage from multiple pumping wells interfering within one another. CSU reported that aquifer storage parameters in the range of 2.0×10^{-4} to 9.4×10^{-4} best represent each of these Denver Basin aquifers. The storage parameters in **Table 1** used by LRE to represent the lower Dawson, Denver, and Arapahoe aquifers are within the range of storage found by CSU.

Figures 2, 3 and 4 show the regional aquifer response for the lower Dawson, Denver, and Arapahoe aquifers based on the parameters in **Table 1**. **Figures 2-4** show a pumping scenario where the full appropriation is split between the two proposed well fields (Well Fields 1 and 2) for a given aquifer, pumping constantly for 100 years. These figures show that many wells are affected by greater than 40 feet of drawdown which extends over a mile from the proposed Pine Canyon Well fields.

Pumping Cost Impact Analysis

LRE Water computed the approximate increase in the yearly operational pumping costs after 100 years based on the computed 100-year drawdown spatial distributions from the Pine Canyon pumping. These calculations were assumed to incorporate two cost components (use and instantaneous demand) and based on a continuous, 100-year pumping stress. The additional drawdown predicted at the Town's wells closest to Well Fields 1 and 2 were assumed to represent the change in total dynamic head (TDH) after 100 years.

We assumed motor efficiency of 70% and that the wells would be pumped at the permit reported design capacity. The increase in annual use cost after 100 years was approximated with the change in TDH at each location and an estimated 2020 cost per kilowatt-hour ($0.05/kWh). The increase in annual instantaneous demand cost after 100 years was approximated from the change in TDH at each location and an estimated 2020 cost per kilowatt of $17.25/kW (billed monthly). The approximate cost per kWh ($0.05/kWh) and cost per kW ($17.25/kW, billed monthly) was estimated from historical data provided by the Town. The increase in annual use and instantaneous demand costs after 100-years of pumping associated with each well are detailed in **Table 3**.

Based on the six (6) selected wells owned by the Town (2 per aquifer, closest well to each Well Field 1 and 2), the total increase in annual use and instantaneous demand costs after 100 years of Pine Canyon pumping was estimated to be $14,650 per year in 2020 dollars, and $22,850 per year in predicted 2120 dollars for all six (6) wells included in this analysis. The 2120 currency was estimated by assuming a linear increase in industrial energy costs based on historical data from 1990-2020 from United States Energy Information Agency. It is important to note that the Town owns at least 6 wells completed in the Lower Dawson Aquifer, 18 wells completed in the Denver Aquifer, and 16 wells completed in the Arapahoe Aquifer that are within the 40 foot drawdown contour after 100 years of pumping of the proposed Pine Canyon wells from Well Fields 1 and 2. The increased pumping costs calculated only represent the six (6) wells discussed above, and the Town's total increased pumping costs would be higher.

This type of analysis, although a good starting point to understand future cost impacts, has limitations. In reality, the cost for energy use and instantaneous demand with operating the well field are likely to increase due to increases in cost over time. It is important to note that over time, however, as the water level in the aquifer decreases, the wells will produce less water with the same energy input. At a certain point in time the production of the wells will be reduced to the point of necessitating new, additional wells to compensate for the reduction in yield assuming the same energy input. This additional cost is not considered in our analyses here, but is recommended in future analyses.

Conclusions

LRE Water concludes the following based on our analysis and review of the Jehn Report:

- The Jehn Report does not describe the drawdown evaluation methodology or the aquifer property input data and does not allow for repeating or validating the reported drawdown estimates.
- LRE's estimated drawdown in the Town's wells due to 100 years of Pine Canyon well field pumping is over 56 feet in the Arapahoe aquifer, 69 feet in the Denver aquifer, and 82 feet in the Dawson aquifer.
- The Jehn Report underestimates the interference impacts of Pine Canyon well field pumping and reports 8.5 to 10.5 feet of drawdown in Town wells within the three aquifers.
- There are at least 6 Town wells completed in the Lower Dawson Aquifer, 18 wells completed in the Denver Aquifer, and 16 wells completed in the Arapahoe Aquifer that are within the 40 foot drawdown contour after 100 years of pumping of the proposed Pine Canyon wells from Well Fields 1 and 2.
- The increase of operational costs for the closest Town of Castle Rock well to both Well Fields 1 and 2 (including use and instantaneous demand charges) will be approximately $14,650 per year in 2020 dollars, and $22,850 per year in predicted 2120 dollars for the six (6) wells included in this analysis.
- The increase in annual operational costs of the Town's well fields (use and instantaneous demand) is likely much higher after 100 years of the proposed Pine Canyon pumping as the Town owns more production wells in the Lower Dawson, Arapahoe, and Denver aquifers than were analyzed in this analysis.

Sincerely,

Dave Colvin, P.G., P.M.P.
Groundwater Team Leader
LRE WATER

DCC/dcc

September 10, 2020 Amendment

LRE reviewed Jehn Water's "*Response to Douglas County's Initial Review Letter Concerning the Water Supply for Pine Canyon*", dated July 7, 2020. In their analysis of well interference, Jehn Water used a specific yield value which represents unconfined aquifers in the well interference calculation. We believe the aquifers evaluated are better represented as semi-confined, based on the layering of the sandstone and siltstones. In our analysis of well interference, LRE Water used a specific storage value that represents semi-confined aquifer conditions. We feel that it is more appropriate to use a specific storage value rather than a specific yield value as it better represents observed drawdowns in Castle Rock Water wells. The specific storage values are also similar to those values used by CSU (Lewis, 2014) and the USGS (Paschke, 2011).

References

Lewis, Allan. 2014. A METHOD USING DRAWDOWN DERIVATIVES TO ESTIMATE AQUIFER PROPERTIES NEAR ACTIVE GROUNDWATER PRODUCTION WELL FIELDS. Department of Geosciences Colorado State University. Fort Collins, Colorado

Paschke, S.S. ed., 2011, Groundwater availability of the Denver Basin aquifer system, Colorado: U.S. Geological Survey Professional Paper 1770, 274 p.. https://pubs.usgs.gov/pp/1770/

Robson et al. 1987. Bedrock Aquifers in the Denver Basin, Colorado A Quantitative Water-Resources Appraisal. https://pubs.usgs.gov/pp/1257/report.pdf

Rockware, Inc., 2020. Rockworks, https://www.rockware.com/product/rockworks/

United States Energy Information Agency. 2020. https://www.eia.gov/outlooks/steo/data/browser/#/?v=8

Tables

Table 1: Averaged aquifer parameters from local Castle Rock wells used in Theis Drawdown analysis.

Aquifer	Well Field	Transmissivity (gpd/ft)	Storage (-)	Pump Rate (gpm)
Arapahoe	1	2707.8	2.54E-04	146.7
	2	3275.4	2.07E-04	146.7
Denver	1	3237.6	3.53E-04	194.7
	2	2909.1	2.25E-04	194.7
Lower Dawson	1	1226.3	3.93E-04	98.5
	2	1226.3	3.93E-04	98.5

Table 2: Drawdown comparison from Jehn Report and LRE Theis analysis.

Aquifer	Well Field Pumping	Well Permit No.	Jehn Report Estimated Drawdown (100 years pumping, feet)	LRE Estimated Drawdown (100 years pumping of one Pine Canyon well, feet)
Arapahoe	1	68742-F	9.9	56.4
	2	66696-F	8.5	46.6
Denver	1	68741-F	22	69.6
	2	67253-F-R[a]	24.8	69.6
	2	66697-F	-	58.5
Lower Dawson	1	26267-F[a]	9	76.1
	1	55976-F	-	56.5
	2	24620-[a]	10.5	82.7
	2	51753-F	-	69

[a]Wells that Jehn Water analyzed, but are not owned by Town of Castle Rock

Table 3: Estimated Well Pumping Cost Increase Due to Interference from Pine Canyon Well Fields

Well Field No.	Well ID	Owner	Design Q (GPM)	Assumed Constant Operational Q (GPM)	Aquifer	Approximate Change in TDH after 100 years of pumping from Pine Canyon Interference (feet)	Increase in Instantaneous Demand after 100 years w/70% Pump Efficiency[b] & $0.05/kWh[a] (kW)	Increase in Use Cost after 100 years w/70% Pump[b] Efficiency & $0.05/kWh[a] ($/Day)	Annual Use Cost Increase @ 100 years ($/Year)	Annual Use Cost Increase @100 Years **in 2120 Dollars**[d] ($/Year)	Increase in Demand Cost after 100 years $17.25/kW[a] ($, Billed Monthly)	Annual Demand Cost Increase @ 100 years ($ for 12 months)	Annual Demand Cost Increase @ 100 years **in 2120 Dollars**[d] ($ for 12 months)	Total Annual Cost Increase @ 100 years[g] ($/Year)	Total Annual Cost Increase @ 100 years **in 2120 Dollars**[d,g] ($/Year)
1	68742-F	Town of Castle Rock	400	400	Arapahoe	56.4	6.1	7.3	2,662.7	4,153.8	104.7	1,256.8	1,960.5	14,647.3	22,849.8
2	66696-F	Town of Castle Rock	650	650	Arapahoe	46.6	8.2	9.8	3,572.1	5,572.5	140.6	1,687.4	2,632.3		
1	68741-F	Town of Castle Rock	200	200	Denver	69.6	3.7	4.5	1,643.6	2,564.1	64.6	775.4	1,209.7		
2	67253-F-R[e]	Douglas County School District	230	230	Denver	69.6	4.3	5.2	1,888.3	2,945.8	74.3	891.8	1,391.2		
2	66697-F	Town of Castle Rock	250	250	Denver	58.5	3.9	4.7	1,724.0	2,689.4	67.9	814.7	1,271.0		
1	26267-F[e]	Castle Oaks Corporation	155[c]	155	Lower Dawson	76.1	3.2	3.8	1,391.6	2,170.9	54.8	657.1	1,025.1		
2	24620-[e]	Centennial Properties Inc.	7	7	Lower Dawson	82.7	0.2	0.2	69.4	108.3	2.7	32.3	50.3		
1	55976-F	Town of Castle Rock	30[f]	30	Lower Dawson	56.5	0.5	0.6	200.9	313.4	7.9	94.4	147.3		
2	51753-F	Town of Castle Rock	18	18	Lower Dawson	69	0.3	0.4	146.1	227.9	5.8	69.2	107.9		

[a]Estimated from Pump Use Only of Castle Rock Well Pumping Operations

[b]Assumed pump efficiency

[c]Calculated from Annual Appropriation

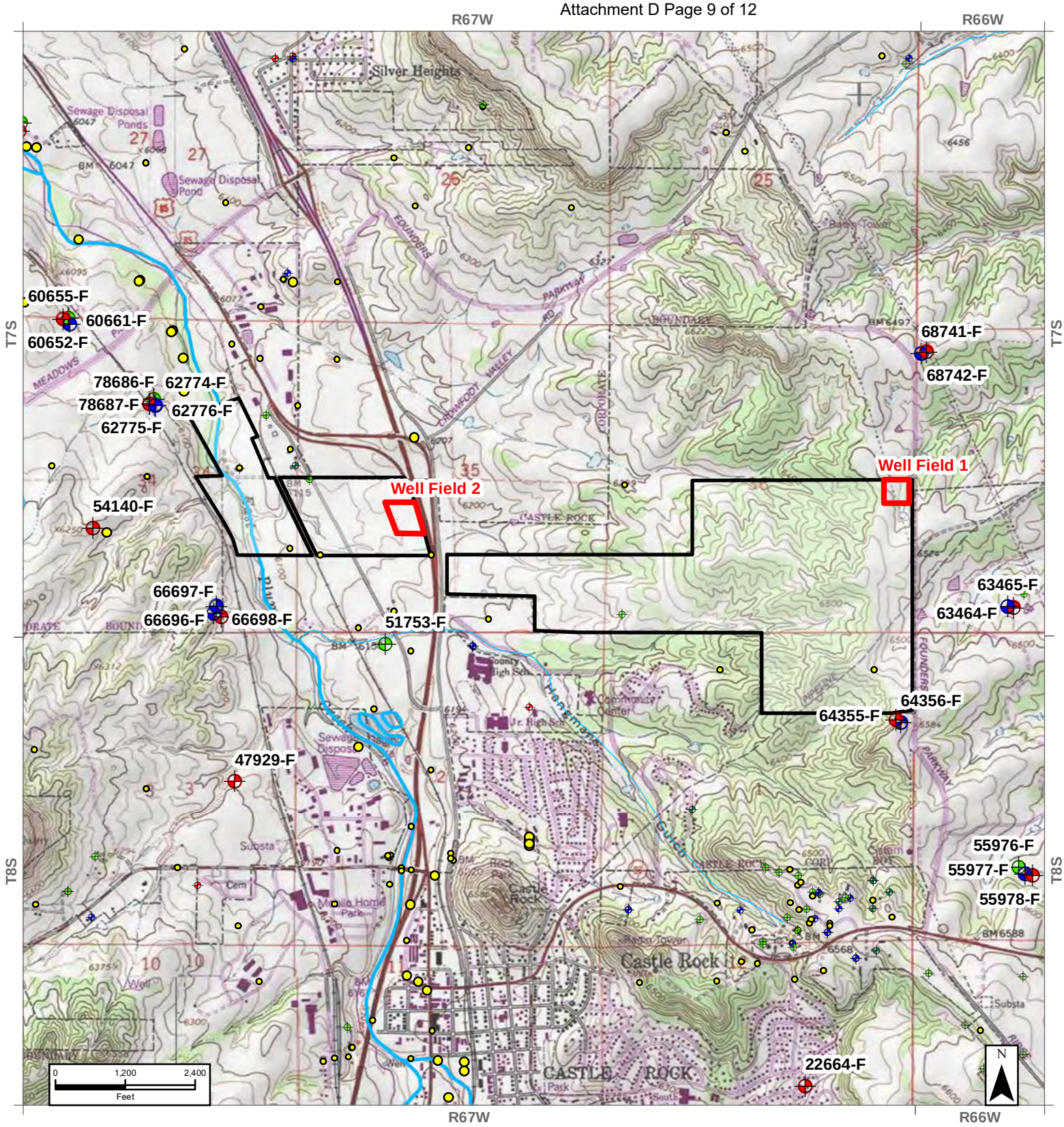
[d]Calculated Increase of Energy Costs of 156% in 2120 based on USEIA historical data assuming linearty

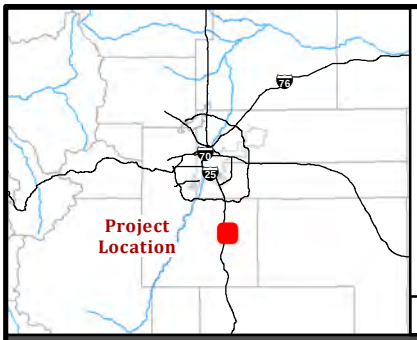
[e]Wells analyzed by Jehn Water that are not owned by the Town of Castle Rock

[f]Pump Rate determined from 4-hour conducted pump test

[g]Total Cost Increase from Closest Wells Owned By Town of Castle Rock Impacted from Pine Canyon Wells

Note: All calculations based on the assumption that TDH changes by the Additional Drawdown Due to Pine Canyon Wells. There are additional Town of Castle Rock Wells that will be impacted by Pine Canyon Pumping, this analysis only incoporates the closest wells to Well Fields 1 and 2





Alluvial
Dawson
Upper Dawson
Lower Dawson
Denver
Arapahoe

Pine Canyon Well Fields
Pine Canyon Development
Major Streams
Streams

Non-Castle Rock owned wells are smaller and not labeled

PROPOSED PINE CANYON WELL FIELDS WITH CASTLE ROCK WELLS

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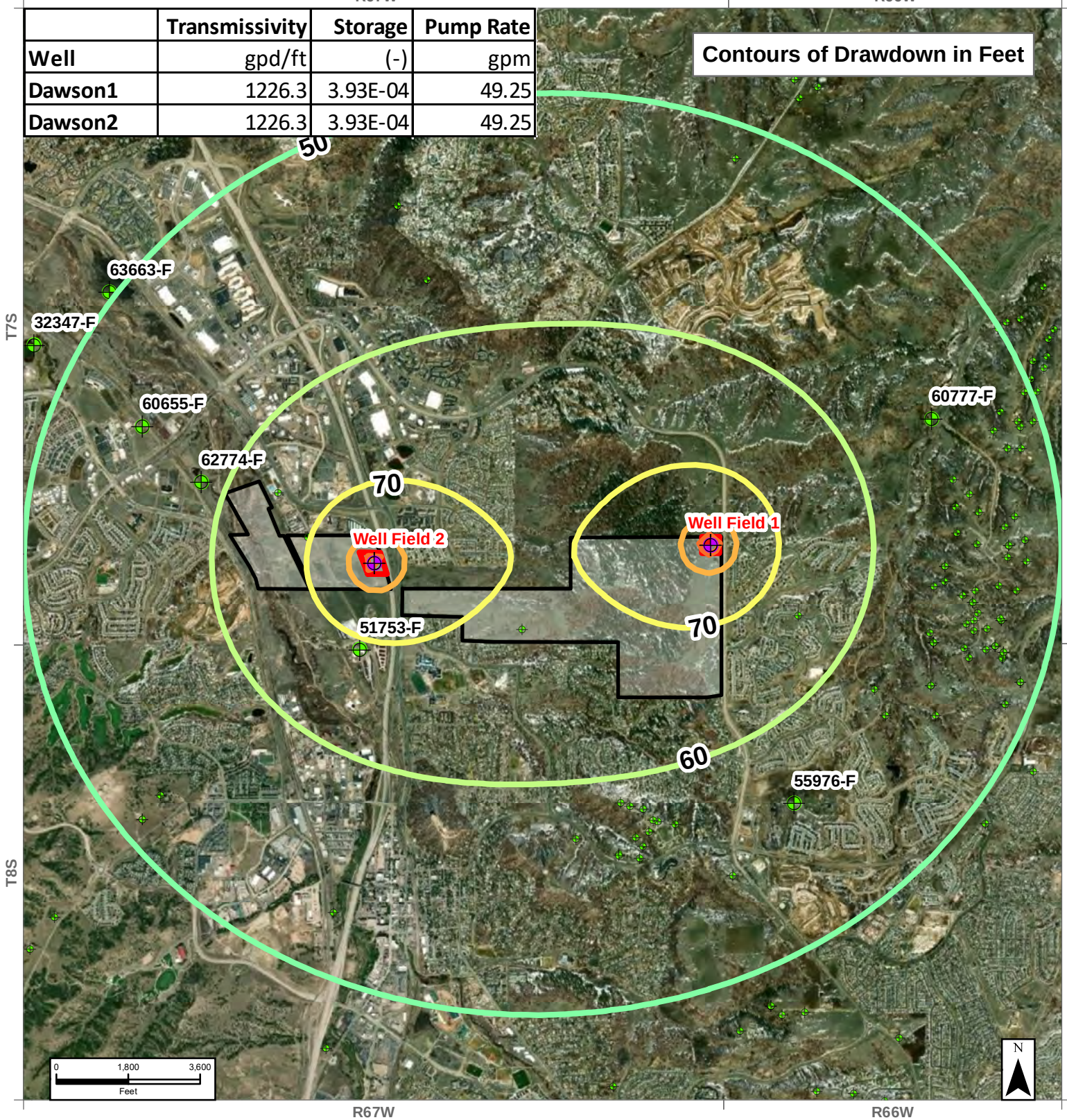
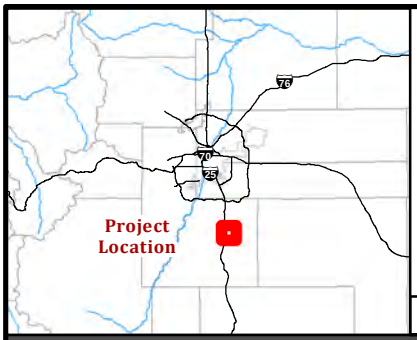
1423CRK18
June 2020

	Transmissivity	Storage	Pump Rate
Well	gpd/ft	(-)	gpm
Dawson1	1226.3	3.93E-04	49.25
Dawson2	1226.3	3.93E-04	49.25





Proposed Pine Canyon Dawson Well

Constructed Lower Dawson Well

Pine Canyon Well Fields

Pine Canyon Development

Non-Castle Rock owned wells are smaller and not labeled

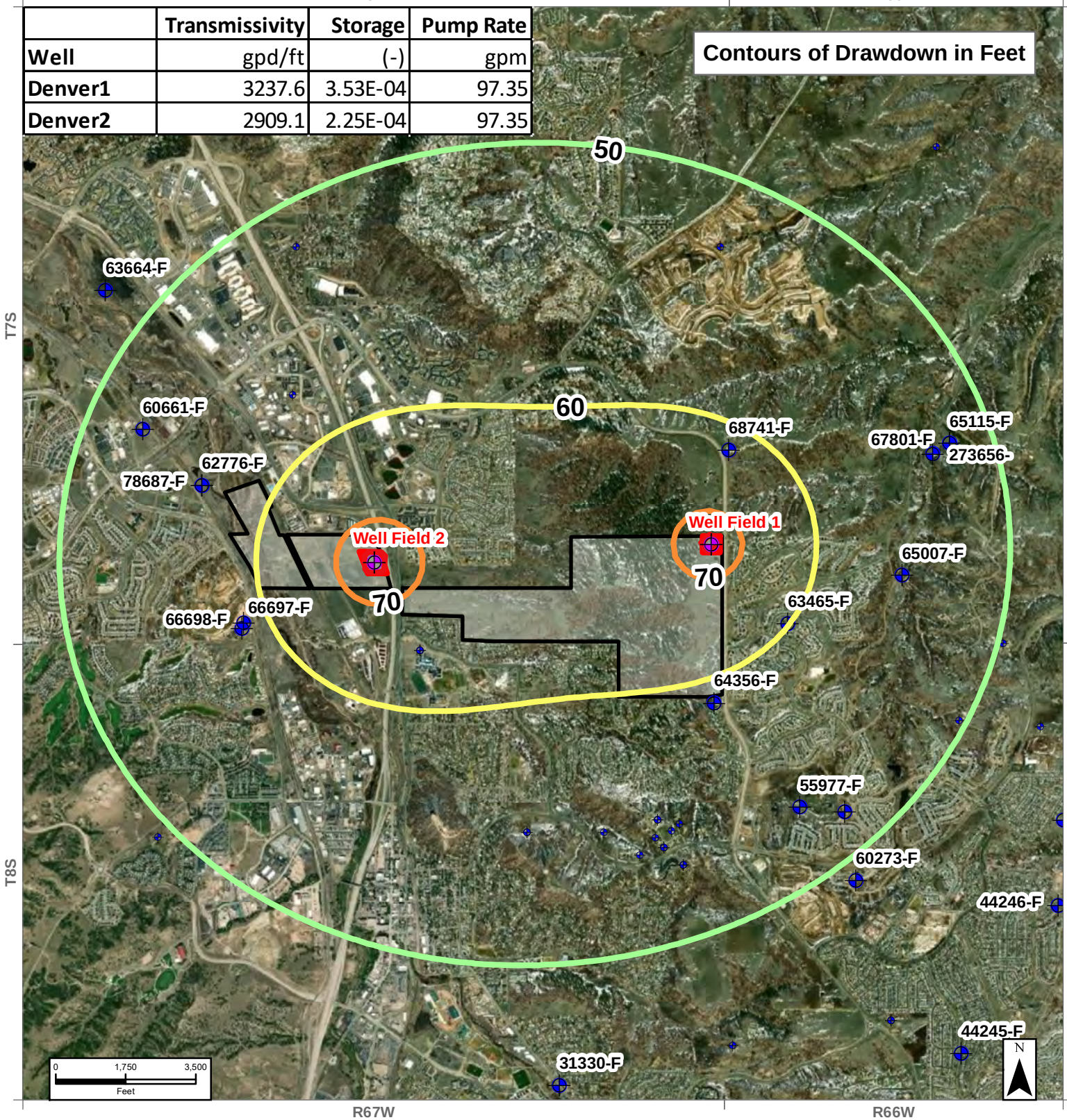
This product is for reference purposes only and is not to be construed as a legal document or survey instrument.

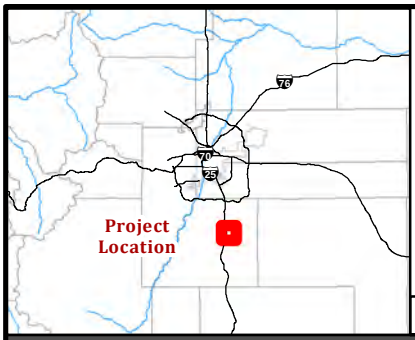
CUMULATIVE DRAWDOWN FROM PINE CANYON WELLS IN LOWER DAWSON AQUIFER AFTER 100 YEARS OF PUMPING

LRE WATER
CONNECTING WATER TO LIFE

1423CRK18
June 2020

	Transmissivity	Storage	Pump Rate
Well	gpd/ft	(-)	gpm
Denver1	3237.6	3.53E-04	97.35
Denver2	2909.1	2.25E-04	97.35





Proposed Pine Canyon Denver Well

Constructed Denver Well

Pine Canyon Well Fields

Pine Canyon Development

Non-Castle Rock owned wells are smaller and not labeled

This product is for reference purposes only and is not to be construed as a legal document or survey instrument.

CUMULATIVE DRAWDOWN FROM PINE CANYON WELLS IN DENVER AQUIFER AFTER 100 YEARS OF PUMPING

LRE WATER
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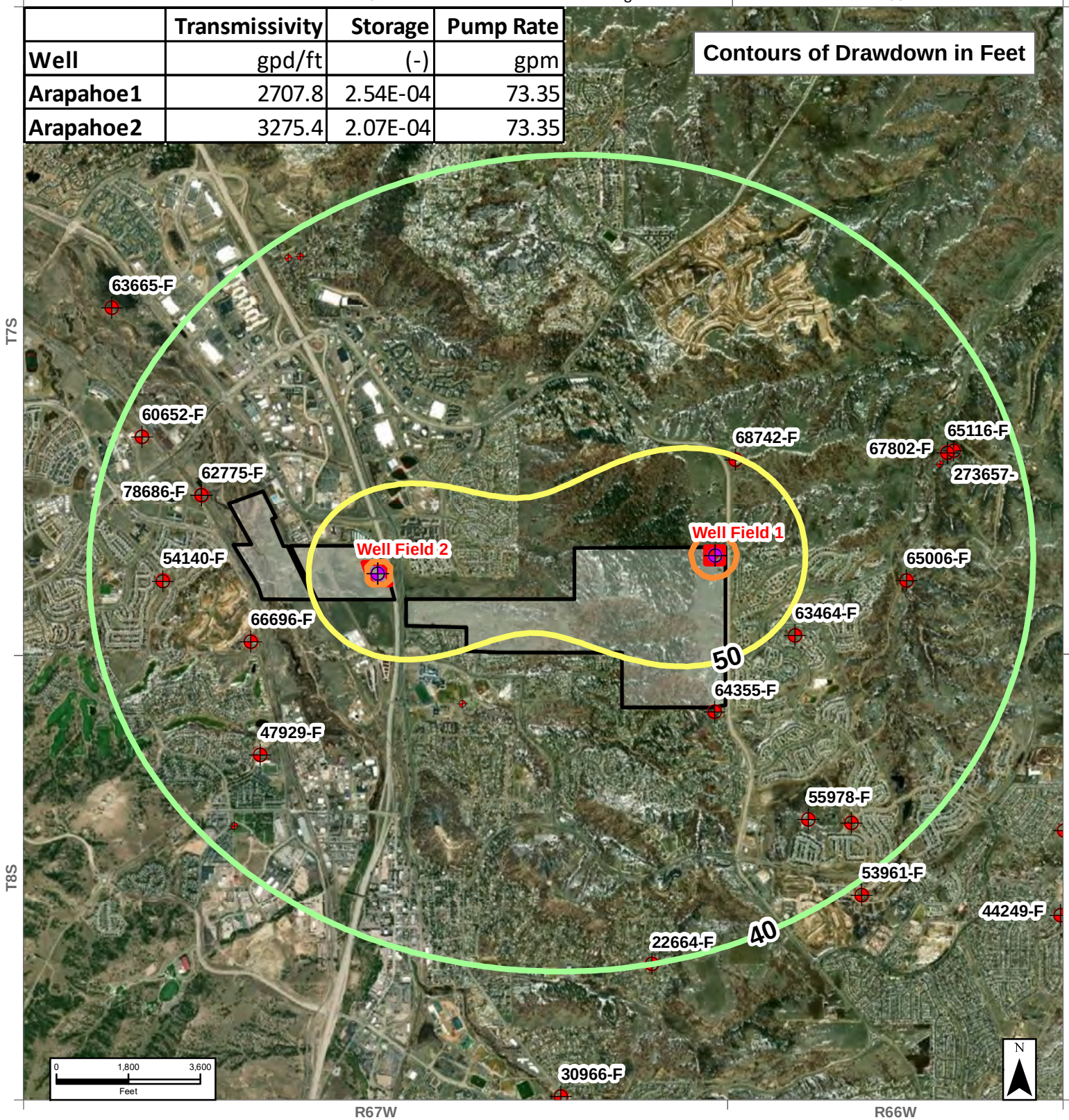
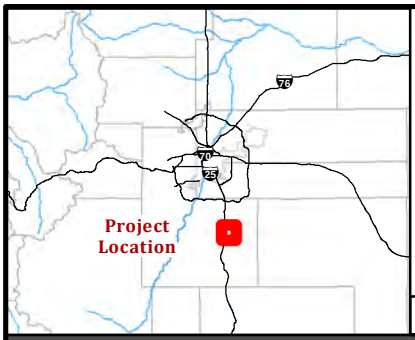
1423CRK18
June 2020

	Transmissivity	Storage	Pump Rate
Well	gpd/ft	(-)	gpm
Arapahoe1	2707.8	2.54E-04	73.35
Arapahoe2	3275.4	2.07E-04	73.35





Proposed Pine Canyon Arapahoe Well

Constructed Arapahoe Well

Pine Canyon Well Fields

Pine Canyon Development

Non-Castle Rock owned wells are smaller and not labeled

CUMULATIVE DRAWDOWN FROM PINE CANYON WELLS IN ARAPAHOE AQUIFER AFTER 100 YEARS OF PUMPING

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June 2020

CASTLE ROCK Water
Securing our future drop by drop

April 12, 2023

Douglas County Community Development
Attn: Curt Weitkunat, AICP
100 Third Street
Castle Rock, CO 80104

Re: Referral Request - MI2020-009 Pine Canyon PD Water Appeal

Dear Mr. Weitkunat,

This letter is being written in response to Douglas County's request for referral comments on the revised information provided as part of the Water Appeal by the JRW Family Limited Partnership (Applicant) under Douglas County Zoning Resolution 1808A on the above referenced planned development in Douglas County. The Town of Castle Rock continues to strongly recommend Douglas County denial of the Water Appeal. This letter will primarily respond to the January 11, 2023, letter from James Walker written to respond to the original comments provided by the Town on the Water Appeal in October of 2020 and the revised Water Supply Plan and Water Efficiency Plan.

Mr. Walker indicates that the vast majority of Castle Rock's comments relate to the concern that no renewable water supply is included for this development. The applicant indicates that the Pine Canyon Water and Sanitation District has added a new renewable water fund to the financial structure of the district to solve this concern. This does not address the concern. Creating a renewable water fund is not a plan to obtain renewable water supplies. In fact, Castle Rock's experience is that financial capability alone is not enough to ensure that you secure renewable water supplies. There are huge infrastructure and permitting challenges once renewable water has been acquired that must be overcome by any entity trying to bring this resource to its customers.

Mr. Walker did not provide any details in his letter on the amount of financial resources being raised for renewable water supplies, what the costs of the renewable water supplies will be, what kind of infrastructure will be required to bring these renewable water resources to the development, what permitting hurdles will be faced, what the costs to potential residents of the proposed development will be or how specifically the district will acquire these renewable water resources. He does indicate that he has been discussing renewable water supply opportunities with local water providers, but he does not specifically indicate which providers and what opportunities are available.

TOWN OF CASTLE ROCK COLORADO

Mr. Walker goes on to state that the renewable water fund will allow them to comply with Policy 7-1C.1, which "*encourages development to seek water supply from existing water providers.*" Simply having a fund does not mean that they will seek water supply from existing water providers. In order to get supplies from existing water suppliers, they will need infrastructure. Castle Rock Water is the only water supplier likely to have infrastructure close enough to the development to allow for the economical delivery of renewable water supplies. PCWSD has not approached Castle Rock Water to discuss how they might acquire renewable water through our system. Mr. Walker also asserts that the WISE project is not viable for PCWSD because it is interruptible. Many of the currently available renewable water supplies are interruptible, if not by contract then by drought or nature.

This is the reason that a conjunctive use system is necessary. Douglas County Policy 7-1C.2 promotes the use of "*conjunctive-use water systems.*" Mr. Walker states that they have met this requirement by creating a renewable water fund. PCWSD has not provided any data about how their system will be a conjunctive use system other than the fact that they have or will establish this renewable water fund. This does not give them a renewable water supply or provide a plan on how they will obtain this supply. It also does not show how they will use the non-renewable groundwater and the renewable water supply in a true conjunctive use system (e.g., by developing aquifer storage and recovery systems).

Contrary to the Applicant's statement, Castle Rock is still willing to provide water and wastewater service to the development if it annexes into the Town. In fact, on June 13, 2022, Castle Rock removed a requirement for the development to bring renewable water to Castle Rock Water as a requirement of annexation despite the fact that other potential annexations surrounding the Town have this requirement. For a development the size of PCWSD's service area, this could easily be a savings of $10M if the Applicant decided to annex into the Town (see **Attachment A**).

CDPHE did not determine that service from Castle Rock was infeasible, only that the Applicant had shown they had adequately explored wastewater service from Plum Creek Water Reclamation Authority and made a strong enough argument that the consolidation evaluation required by CDPHE had been completed. As such, CDPHE approved their site application for a new wastewater treatment facility. CDPHE did not weigh in on water supply concerns regarding service from Castle Rock Water.

Mr. Walker also states this in his letter, "*Despite CRW's claim of an ability to serve Pine Canyon, on December 21, 2022, PCWRA filed a statement with the Water Quality Control Commission (copy attached). In this statement, PCWRA stated its discharge permit has not been renewed since 2017 and "PCWRA currently projects that it could exceed the organic design capacity in the discharge permit in 3-5 years." The Applicant believes this confirms that PCWRA does not have the ability to treat effluent from the Pine Canyon project, thus CRW cannot provide service to Pine Canyon.*" This statement simply shows that CDPHE is way behind on providing updated permits to many wastewater providers in the State. PCWRA has an administratively-extended approval and is awaiting a new permit that incorporates the recently constructed additional capacity at the facility. This permit will be provided as CDPHE catches up on their overall permitting. It in no way implies or confirms that PCWRA and Castle Rock cannot provide Pine Canyon with service.

175 Kellogg Court, Castle Rock, Colorado 80109 / Office 720-733-6000 / CRgov.com/water

The Applicant responded to Castle Rock's concerns regarding the wastewater facility by developing a plan for a "no discharge" system. Mr. Walker plans to use a wastewater treatment system that will not discharge water to East Plum Creek, groundwater or the Chatfield Watershed and will instead use a Land Application Management Plan (LAMP). While CDPHE did indeed provide approval of the Site Application in March of 2022, the facility has not yet received a permit. It is still not clear how the Applicant will ensure that the landscape professional that will be tasked with managing all of the irrigation systems will not discharge irrigation water to the gutter or the groundwater when irrigating their residential lawns to maintain the "no discharge" system. In Castle Rock's experience with landscape professionals and residential customers, they all end up putting runoff into the gutters when irrigating. This is true even though landscape professionals in Castle Rock are required to have Qualified Water Efficient Landscaper certification and Castle Rock specific registration and training. The fact that CDPHE has issued approvals does not mean that the Applicant will not discharge to surface water or groundwater. It simply means that their permit will not allow them to discharge to surface water or groundwater. The Applicant has not provided anything in their plans that shows how this will be done from a practical standpoint, other than the statement that "The Pine Canyon Water and Sanitation District will have control over irrigation use for future residents and businesses as a means of ensuring that water demand calculations are followed." Castle Rock will require the Applicant to apply for and obtain a Matters of State Interest permit as the PCWSD water and wastewater facilities are likely to have a direct impact on Castle Rock's water and wastewater resources.

Castle Rock agrees with the Applicant that reuse is an important and well-respected method of extending water supplies utilized by water providers throughout Colorado. Castle Rock is a leader in reuse. Unlike the PCWSD plan to reuse water supplies for irrigation, Castle Rock reuses water supplies for all purposes and is working to limit future use of water supplies for irrigation. Reuse for irrigation means the water supply can only be reused once. Castle Rock's system allows water to be reused over and over again to extinction. It should be clarified in PCWSD's Water Efficiency Plan that their reuse system will need to be Category 3 plus, not just Category 3. Castle Rock does not know of any Category 3 plus systems in the State. Castle Rock is concerned that a new water and sanitation district with no experience operating systems will have difficulty meeting the requirements of a Category 3 plus system.

Mr. Walker states in his letter that they have addressed all of the concerns of the South Metro Water Supply Authority and other water providers. Castle Rock's remaining concerns as identified in this letter will likely be the same as the South Metro Water Supply Authority's concerns as well as other south metro water providers. The Applicant has not provided proof that they have addressed these concerns.

Mr. Walker further states in his letter, "*The Applicant's CDPHE-approved advanced treatment facility and reuse proposals are combined with resources for renewable water purchases from existing water providers to create a robust, long-term water supply. The plan grants flexibility by allowing renewable purchases and participations from sources other than those who utilize the interruptible WISE system deemed non-viable for Pine Canyon*." Renewable water is not a resource that you simply pull off of the grocery store shelf when and where you want it because you have put away some money to buy it. Renewable water resources may or may not be available for purchase from existing water providers. The Applicant provides

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no information on what water providers they have discussed buying renewable water from. They have not approached Castle Rock. Further, just purchasing the supply does not ensure its delivery. There are no plans provided by the Applicant on what infrastructure will be needed to deliver these renewable water resources which they think are available for purchase or what the cost of that infrastructure will be. Castle Rock Water has significant experience in this area having already invested $236M. We are planning additional investments of over $500M in the coming decades.

The Applicant further states that Jehn Water Consultants, Inc. updated the Water Supply Plan to address our comments. There is no data regarding renewable water supply in the Jehn Water report dated January 27, 2023.

According to Zoning Resolution 1808A, the Douglas County Planning Commission (Commission) and the Douglas County Board (Board) are required to consider the Water Appeal based upon evidence 1) the request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County and 2) the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality and dependability. Castle Rock does not believe that adequate evidence exists regarding a plan for renewable water supplies to support a finding that the Applicant has shown the Water Appeal will not be detrimental to the health, safety or welfare of the present or future inhabitants of the County.

While Mr. Walker's team has shown that their alternate demand criteria of 0.17 acre feet per year may be reasonable for indoor use, they do not show how the reuse irrigation supply can be provided in a practical manner that will not violate the "no discharge" requirement for their LAMP. If there is a problem with the wastewater reuse or if they don't meet permit requirements, they do not have another water supply to meet the proposed outdoor irrigation demand. With the outdoor irrigation demand, the demand criteria would be significantly larger. If the Applicant is to rely on this reuse supply to comply with "2) the application provides sufficient supporting data of alternate water demand criteria so that the water supply is still considered sufficient in terms of quantity, quality and dependability", then significantly more details on how the reuse system will work are needed especially regarding quality and dependability. In fact, CDPHE has not provided the final permit requirements for the proposed "no discharge" Category 3 plus wastewater treatment facility yet, so we do not know if they will be able to meet the permit requirements with the proposed wastewater treatment facilities. It is reasonable to also assume that CDPHE will put management requirements in the permit on how the Applicant will be required to handle residential irrigation while avoiding runoff or discharge. PCWSD has no experience operating any water and wastewater facility, so it is important to have more details since, as Mr. Walker notes, this will have to be a very advanced facility, one which may prove challenging for a new utility with no experience operating anything.

Mr. Walker's team does not address the piece of 2) above that deals with "quality". The Jehn Water report simply states, *"As the Denver Basin aquifers, in the vicinity of Pine Canyon, are utilized by individual homeowners and Towns, including the Town of Castle Rock and Castle Pines North as examples, the quality of the water contained in the Denver Basin aquifers are*

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not of issue to meet the demands within Pine Canyon." Castle Rock treats all of its Denver Basin groundwater for iron and manganese as well as other constituents like radium. Contrary to the conclusion of the Jehn Water report, the quality of water in the Denver Basin groundwater varies with location and sometimes does not meet State and Federal water quality requirements. Castle Rock has wells where radium, without treatment, will not meet regulated maximum contaminant levels. There is a small provider in this very situation now and Douglas County has had to come to the rescue of that provider with millions of dollars to address the radium issue in one of their Denver Basin groundwater wells. In addition, Douglas County has approved and will be funding an emergency waterline for $4.5M to provide a backup renewable water supply to that provider in case their wells fail.

In Douglas County's recent community survey, water supply continues to be identified as a high concern for residents. This is just another reason it is critical that any new development have a renewable water supply to ensure long term sustainability especially if they are going to request special consideration with respect to the demand standards that are in place.

Sincerely,

Mark Marlowe, Director
Castle Rock Water

Attachment A – Letter to Jim Walker Regarding Removing Renewable Water Requirement

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CASTLE ROCK Water
Securing our future drop by drop

June 13, 2022

Mr. James Walker
Rothgerber Johnson
& Lyons LLP Attorney
at Law
One Tabor Center,
Suite 3000 1200
Seventeenth Street
Denver, CO 80202-5855

Re: Revisions to Town Code Related to Renewable Water Dedication for Pine Canyon Property

Dear Mr. Walker:

This letter is a follow up to a letter sent to you on changes to Town Code in May of 2019. Council recently made another change which impacts your Pine Canyon property. All of your property has been included in "infill" property for purposes of the renewable water requirements in Title 4, Section 4.04 of the Water Dedication Code. The key changes to Section 4.04 of Water Dedication Code were approved by Council on May 3, 2022 and are as follows:

1. Language related to annexations moving forward before December 31, 2020 being exempt from the renewable water dedication code was removed as it is no longer applicable.
2. The map showing "infill" properties that are exempt from the renewable water dedication code was revised, ***see Attachment A***.

If annexation of your property is considered, the property will be defined as infill and will not be subject to the renewable water requirements in the Title 4, Section 4.04. We have enclosed an updated copy of the map referenced in Title 4 of the Castle Rock Municipal Code from our Water Resources Strategic Master Plan.

Please call me at 720-733-6001 if you have additional questions.

Sincerely,

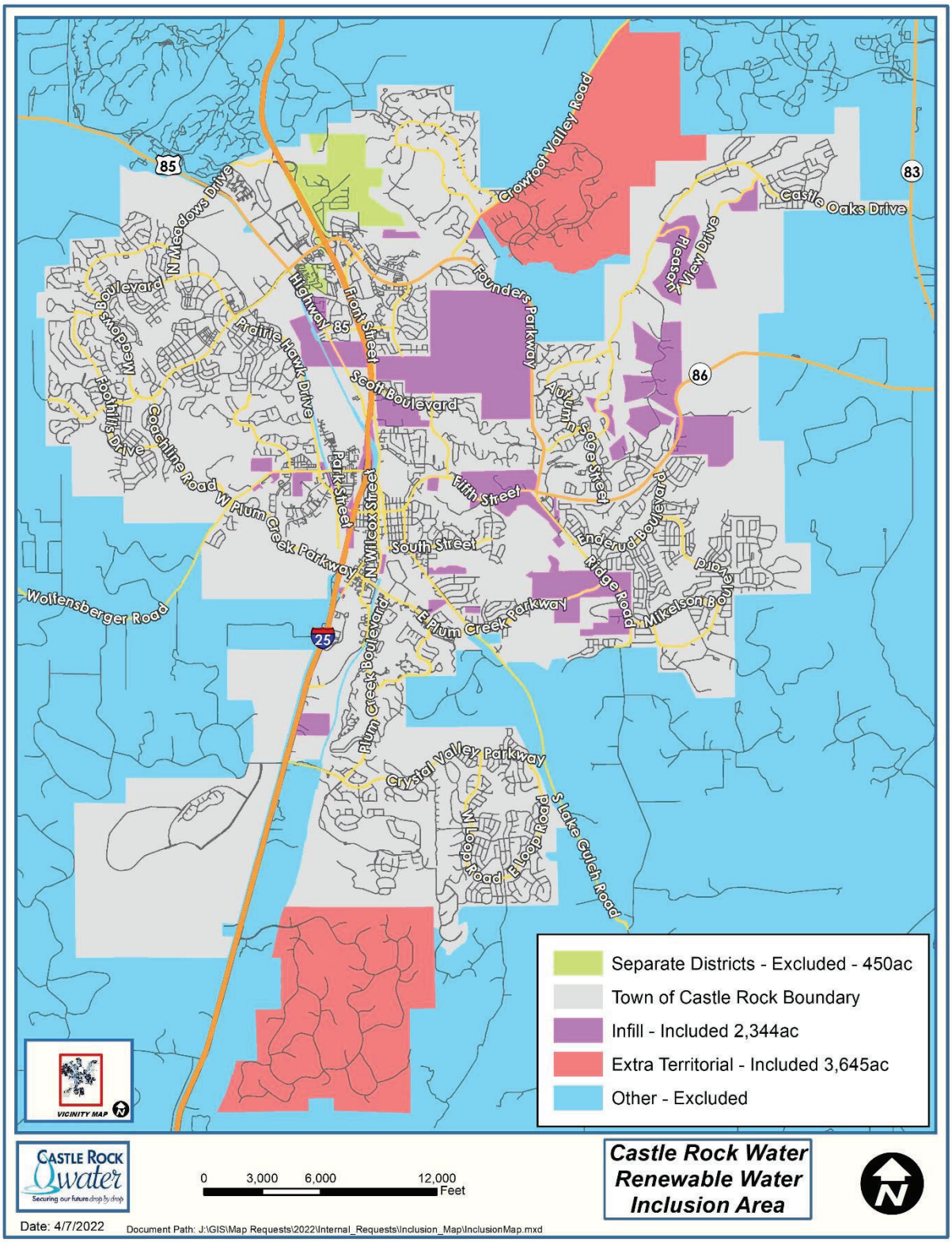
Mark Marlowe, PE
Director of Castle Rock Water

Enclosure: Attachment A: Map of Exclusion Areas

C: Dave Corliss, Town Manager
Mike Hyman, Town Attorney
Tara Vargish, Development Services Director

TOWN OF CASTLE ROCK COLORADO

Figure 3-6: Castle Rock Water Inclusion and Exclusion Area



Pine Canyon Water Appeal
DCZR Section 18A - Water Supply Overlay District

SECTION 18A WATER SUPPLY OVERLAY DISTRICT

Section Contents

1801A Intent

To ensure that development in all areas of Douglas County provides for a water supply that is sufficient in terms of quantity, quality, and dependability. *[§30-28-133 (3)(d), C.R.S.]*

Compliance with the following standards permits a presumption that a proposed water plan meets the standards set forth in these regulations. Any landowner may appeal these standards to the Board to prove a sufficient water supply, as set forth in Section 1808A.

1802A Applicability

The Water Supply Overlay District shall be applied as a supplemental regulation to those set forth in the underlying Zone District and to all applications submitted pursuant to the following regulations. Unless otherwise appealed as set forth in Section 1808A, the Board shall determine the adequacy of a water supply to meet the demand for a proposed development within a Preliminary Plan, Minor Development, or Use by Special Review application as applicable.

1802A.01 Douglas County Zoning Resolution:

- Planned Development
- Rezoning
- Site Improvement Plan – legal unplatted parcels
- Use By Special Review

1802A.02 Douglas County Subdivision Resolution:

- Preliminary Plan
- Final Plat
- Minor Development – Single-Family, Multifamily and Nonresidential

1802A.03 Douglas County Building Code, as described in the Pike-Rampart or Margin A Water Supply Zone Standards

1802A.04 County Review of Special District Applications

All of the restrictions and requirements set forth in other applicable regulations remain in full force and effect. In the case of overlapping or conflicting requirements, the most restrictive provision shall apply.

1803A Approval Standards

The Planning Commission and the Board of County Commissioners shall utilize these standards when evaluating land use applications.

Based upon the Documentation Standards described in Section 1806A, the Planning Commission and the Board of County Commissioners shall determine if:

1803A.01 The applicant has demonstrated that the water rights can be used for the proposed use(s).

1803A.02 The reliability of a renewable water right has been analyzed and is deemed sufficient by the County based on its priority date within the Colorado System of Water Rights Administration.

1803A.03 The Water Plan is deemed adequate and feasible by the County to ensure that water supply shortages will not occur due to variations in the hydrologic cycle.

1803A.04 The Water Plan is sufficient to meet the demand applicable to the project based on the minimum water demand standards in Section1805A herein.

1804A Water Supply Zones, Boundaries, and Standards

The Water Supply Overlay District encompasses the entire area of Douglas County. The District is divided into zones identified as Pike-Rampart, Margin A, Margin B, and the Central Basin, as depicted on the Water Supply Overlay District Map, attached hereto and incorporated herein with this reference.

Compliance with these standards shall be demonstrated through the Documentation Standards set forth in Sections 1806A.

1804A.01 Pike-Rampart Water Supply Zone

1804A.01.1 Groundwater from Granitic Fractures

A well in the granitic metamorphic fractures may only be allowed as the source of water in the Pike-Rampart Water Supply Zone, when required for issuance of a building permit, for a principal or accessory use currently allowed by zoning on a legally created parcel as follows:

(1) The applicant must submit evidence of a well test in one of two forms, as follows:

(a) A minimum 4-hour, constant-discharge test that would require the well to be pumped at a constant rate commensurate with the ability of the aquifer to yield not less than 1 gallon per minute (gpm), with water level measurements being made throughout the duration of the test. To conduct an acceptable well test, the pump shall be valved to maintain a constant rate, a calibrated flow meter used to measure flow, and a means to obtain water levels from the pumped well provided. The well test results must be signed by a licensed water well contractor or professional geologist or engineer.

(b) A statement signed by a licensed well contractor that the average yield of the well is greater than 10 gpm after 4 hours of airlifting, which is indicative of a sustained pumping rate of greater than 1 gpm.

(2) If the water flow is less than 1 gpm, the applicant shall install a cistern in compliance with the Douglas County plumbing code, as amended. Further, if the water flow of the well is not sufficient to fill the cistern, as required by the plumbing code, the landowner shall submit an agreement with a water provider for the balance of the water, in a form acceptable to the County.

1804A.01.2 For other land uses proposed within Pike-Rampart, the water supply shall be from one of the following water sources, or any combination thereof:

(1) Renewable water rights

(2) A water supply beneath land located in the Central Basin or Margin B in accordance with Section 1804A.03.2 that has been zoned as Open Space Conservation District, or is subject to a perpetual open space conservation easement. A copy of the conservation easement shall be submitted to the Planning Division, and shall contain provisions which restrict the uses of the land to substantially the same uses and level of development as are permitted on land zoned as Open Space Conservation District, as determined by the Director. A copy of the declaration of restrictive covenants shall be provided, as required.

1804A.02 Margin A Water Supply Zone

1804A.02.1 Nonrenewable Water – Margin A Water Supply Zone

A groundwater well may only be allowed as the source of water, when required for issuance of a building permit, for a principal or accessory use currently allowed by zoning on a legally created parcel as follows:

The applicant must submit evidence of a well test in one of two forms, as follows:

(1) A minimum 4-hour, constant-discharge test that would require the well to be pumped at a constant rate commensurate with the ability of the aquifer to yield not less than 1 gpm, with water level measurements being made throughout the duration of the test. To conduct an acceptable well test, the pump shall be valved to maintain a constant rate, a calibrated flow meter used to measure flow, and a means to obtain water levels from the pumped well provided. The well test results must be signed by

a licensed water well contractor or professional geologist or engineer.

(2) A statement signed by a licensed well contractor that the average yield of the well is greater than 10 gpm after 4 hours of airlifting, which is indicative of a sustained pumping rate of greater than 1 gpm.

If the water flow is less than 1 gpm, the applicant shall install a cistern in compliance with the Douglas County plumbing code, as amended. Further, if the water flow of the well is not sufficient to fill the cistern, as required by the plumbing code, the landowner shall submit an agreement with a water provider for the balance of the water, in a form acceptable to the County.

(3) Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

1804A.02.2 For other land uses proposed within Margin A, the water supply shall be from one of the following water sources, or any combination thereof:

(1) Renewable water rights

(2) A water supply beneath land located in the Central Basin or Margin B in accordance with Section 1804A.03.2 that has been zoned as Open Space Conservation District, or is subject to a perpetual open space conservation easement. A copy of the conservation easement shall be submitted to the Planning Division, and shall contain provisions which restrict the uses of the land to substantially the same uses and level of development as are permitted on land zoned as Open Space Conservation District, as determined by the Director. A copy of the declaration of restrictive covenants shall be provided, as required.

1804A.03 Margin B Water Supply Zone

The water supply shall be from one of the following water sources, or any combination thereof:

1804A.03.1 Renewable water rights

1804A.03.2 Denver Basin aquifers, not exceeding 50 percent of the total annual appropriable water supply contained within the Denver Basin aquifers underlying the subject land associated with the water rights or decree.

1804A.03.3 A water supply beneath land located in the Central Basin or Margin B in accordance with Section 1804A.03.2 that has been zoned as Open Space Conservation District, or is subject to a perpetual open space conservation easement. A copy of the conservation easement shall be submitted to the Planning Division, and shall contain provisions which restrict the uses of the land to substantially the same uses and level of development as are permitted on land zoned as Open Space Conservation District, as determined by the Director. A copy of the declaration of restrictive covenants shall be provided, as required.

1804A.04 Central Basin Water Supply Zone

The water supply shall be from one of the following water sources, or any combination thereof:

1804A.04.1 Renewable water rights

1804A.04.2 Denver Basin aquifers, not exceeding 100 percent of the total annual appropriable water supply contained within the Denver Basin aquifers underlying the subject land associated with the water rights or decree.

1804A.04.3 A water supply beneath land located in the Central Basin or Margin B in accordance with Section 1804A.03.2 that has been zoned as Open Space Conservation District, or is subject to a perpetual open space conservation easement. A copy of the conservation easement shall be submitted to the Planning Division, and shall contain provisions which restrict the uses of the land to substantially the same uses and level of development as are permitted on land zoned as Open Space Conservation District, as determined by the Director. A copy of the declaration of restrictive covenants shall be provided, as required.

1804A.05 The water rights in all Denver Basin aquifers shall be reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

1804A.06 When a new water source is not proposed and the landowner does not own rights to all of the water within the underlying Denver Basin aquifers, a groundwater well may be allowed as the source of water as required for a building permit, for a principal or accessory use currently allowed by zoning, on a legally created parcel.

1804A.07 When a proposed land use overlies two or more of the water supply zones or when a water supply is proposed to be obtained from multiple water supply zones, the water supply shall comply proportionately with the requirements of the zone from which the water is supplied.

The location and standards of these zones will be periodically reviewed by the County, as new data are available, and boundaries adjusted, as needed, to meet changing aquifer conditions.

1805A Water Demand Standards

1805A.01 For service governed by an Existing District, the applicant shall submit a copy of the governing board's resolution establishing minimum water standards for the Existing District.

1805A.02 For service not governed by an Existing District, or when the Existing District has not established its own minimum water standards, the following minimum water demand standards, unless amended through an Appeal Process, shall be demonstrated:

1805A.02.1 Residential: ER, RR, LRR, and A-1 zone districts: 1 acre-feet/year/residence

1805A.02.2 Residential: All other zone districts: 0.75 acre-feet/year/residence

1805A.02.3 Non-residential irrigated lawn, garden, or golf course: 2.50 acre-feet/year/acre

1805A.02.4 Commercial/office/industrial: 0.75 acre-feet/year per 6,695 square feet of building space

1805A.02.5 Other uses: Sufficient water supply for the proposed uses, based on the estimate of the proposed usage and analysis by the County.

1806A Documentation Standards

The following documentation standards are established for the purpose of demonstrating that definite provision has been made for a water supply that is sufficient in terms of quantity, quality, and dependability *[§30-28-133 (3)(d), C.R.S.]* in accordance with the water source standards of the water supply zone in which the proposed development lies.

1806A.01 For individual applicants and non-District entities:

Renewable Water – when service is proposed by renewable tributary water rights the following documentation standards shall apply:

1806A.01.1 For rezonings and Planned Development amendments to increase the number of dwelling units, increase the Planned Development boundary, or change allowed land use categories, the applicant shall submit a letter stating the intent to obtain renewable water rights or a copy of the conditional water right(s) as decreed by the court.

1806A.01.2 For preliminary plan, minor development final plat, use by special review, and site improvement plan applications for legal unplatted parcels the applicant shall submit:

(1) A letter from a qualified attorney stating ownership by the applicant of, or an executed contract granting rights to the applicant for, adjudicated renewable water rights and a copy of the court decree adjudicating the renewable water rights.

(2) An adjudicated Augmentation Plan, if required by the Colorado State Engineer, and a copy of the court decree adjudicating the Augmentation Plan. An adjudicated Augmentation Plan shall be submitted prior to the scheduling of a public meeting or public hearing for the application.

(3) A Water Plan.

1806A.01.3 For final plat applications where the previous preliminary plan review process did not undergo the review in Section 1806A.01.2, the application shall be subject to review under the standards of Section 1806A.01.2. For all other final plat applications the applicant shall submit:

(1) A letter from a qualified attorney reaffirming renewable water rights ownership by the applicant and either verifying that the statements made in the letters and reports for the previous review process are still true and accurate, or identifying what conditions have changed since the previous review process. If proposed changes have the potential impact the applicant's

ability to serve the subdivision, the applicant shall submit updated letters and reports as set forth in Section 1806A.01.2.

Nonrenewable Water – when service is proposed from Margin B and Central Basin Water Supply Zones, the following documentation standards shall apply:

1806A.01.4 A letter from a qualified attorney stating ownership by the applicant of, or an executed contract granting rights to the applicant for, adjudicated water rights and a copy of the court decree adjudicating the water rights.

1806A.01.5 An adjudicated Augmentation Plan, if required by the Colorado State Engineer, and a copy of the court decree adjudicating the Augmentation Plan. An adjudicated Augmentation Plan shall be submitted prior to the scheduling of a public meeting or public hearing for the application.

1806A.01.6 Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

1806A.01.7 A Water Plan.

1806A.02 For District entities:

When service is proposed by a District, the applicant shall submit documentation of the District's ability to serve, the amount of water available, and the feasibility of extending service.

1806A.02.1 For rezonings or Planned Development amendments to increase the number of dwelling units, increase the Planned Development boundary, or change allowed land use categories the applicant shall submit:

(1) A letter from the District referencing the development name (as submitted to the County), stating:

(a) The District's intent and ability to serve the development.
(b) The conditions under which the District will commit to serving the development.
(c) The estimated demand of the development based on the water demand standards as established in Section 1805A.
(d) The proposed uses, the allowed uses of the District's water rights, and that the proposed uses correspond to the allowed uses of the District's water rights.
(e) The feasibility of extending service to the development.

(2) A Water Supply Report from the District.

1806A.02.2 For preliminary plan and minor development final plat applications, the applicant shall submit:

(1) A letter from the District referencing the subdivision name (as submitted to the County), stating:

(a) The District's commitment to serve the subdivision.
(b) That the commitment is irrevocable, or the conditions under which the commitment may be revoked.
(c) That the property that is the subject of the application has been included in the District or is served by contract.
(d) The estimated demand of the subdivision based on the water demand standards as established in Section 1805A.
(e) The amount of water that can be supplied to the subdivision pursuant to deeded water, contracts, and/or IGAs.
(f) The proposed uses, the allowed uses of the District's water rights, and that the proposed uses correspond to the allowed uses of the District's water rights.
(g) The feasibility of extending service to the development.

(2) A Water Supply Report from the District.

(3) Evidence concerning the potability of the proposed water supply for the subdivision. *[§30-28-133(3)(d), C.R.S.]*

(4) Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

(5) When service is proposed though an intergovernmental agreement (IGA), the applicant shall provide evidence that the IGA has been executed by both parties.

(6) When service is proposed by a New Special District, an applicant shall provide evidence that the new special District has been organized.

1806A.02.3 For final plat applications where the previous preliminary plan review process did not undergo the review in Section 1806A.02.2, the application shall be subject to review under the standards of Section 1806A.02.2. For all other final plat applications the applicant shall submit:

(1) A letter from the District reaffirming its commitment to serve and either verifying that the statements made in the letters and reports for the previous review process are still true and accurate, or identifying what conditions have changed since the previous review process. If proposed changes have the potential to impact the District's ability to serve the subdivision, the applicant shall submit updated letters and reports as set forth in Section 1806A.02.2.

(2) Evidence that the water rights to serve the subdivision have been conveyed to the District and are available for the intended uses, and that the water credits to serve the subdivision have been purchased from the District (as necessary) and/or the water supply is the subject of a fully-executed contract or IGA with another water supply provider in which all of the terms and conditions of the contract and/or IGA have been fully satisfied, as confirmed by a signed will-serve letter from the provider of the water supplies.

(3) To the extent that water supplies are to be provided by a separate water supply entity by contract or IGA, evidence that all of the necessary infrastructure is in place and is capable of providing water to the District.

1806A.02.4 For a use by special review application or for a site improvement plan application for legal unplatted parcels, the applicant shall submit:

(1) A letter from the District referencing the development name (as submitted to the County), stating:

(a) The District's commitment to serve the development.
(b) That the commitment is irrevocable, or the conditions under which the commitment may be revoked.
(c) Whether the property that is the subject of the application has been included in the District.
(d) The estimated demand of the development based on the water demand standards as established in Section 1805A.
(e) The amount of water that can be supplied to the development.
(f) The proposed uses, the allowed uses of the District's water rights, and that the proposed uses correspond to the allowed uses of the District's water rights.
(g) A statement regarding the feasibility of extending service to the development.

(2) A Water Supply Report from the District.

(3) Evidence concerning the potability of the proposed water supply for the subdivision. *[§30-28-133(3)(d), C.R.S.]*

(4) Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

1807A New Special District Service Plan Submittal Requirements

The organization of a New Special District to provide water service is authorized by §32-1-201, et seq., C.R.S. The Board is authorized by §32-1-203, C.R.S., to review and approve the service plan.

When a New Special District Service Plan or a Service Plan Amendment to authorize provision of water service is proposed, the applicant shall submit:

1807A.01 An attorney's opinion letter stating ownership by the applicant(s) of adjudicated water rights and a copy of the court decree adjudicating the water rights.

1807A.02 An adjudicated Augmentation Plan, if required by the Colorado State Engineer, and a copy of the court decree adjudicating the Augmentation Plan. An adjudicated Augmentation Plan shall be submitted prior to the scheduling of a public hearing for the application.

1807A.03 A Water Plan.

1807A.04 Water demand standards as established in Section 1805A.

1807A.05 For service plan provisions to use Denver Basin wells in Margin B and Central Basin Water Supply Zones, the service plan shall include a well-field analysis that demonstrates that such wells will not adversely impact existing water rights on adjoining lands, considering the statutory requirement that material injury does not result solely from reductions of hydrostatic pressure or water level in an aquifer.

1807A.06 When a New Special District Service Plan proposes to use a water supply from another District that has not been previously reviewed subject to the requirements herein, the service plan shall include information from the District in accordance with Section 1806A.02.2.

1807A.07 Proof that the water rights in all Denver Basin aquifers have been reserved in perpetuity, for the benefit of future landowners within the proposed development, pursuant to a declaration of restrictive covenants in a form prescribed by the County.

1808A Appeal Process

An appeal to the standards of Section 18A shall be processed as follows:

1808A.01 The applicant shall discuss the appeal informally with planning staff to discuss the procedures and submittal requirements.

1808A.02 The applicant shall submit an explanation in narrative form explaining the appeal and attach any information including site-specific data, for the Board to consider.

1808A.03 The following analyses will be required for appeals to use Denver Basin water underlying land in the Margin A Water Supply Zone and for appeals to use more than 50 percent of appropriable Denver Basin water underlying land in the Margin B Water Supply Zone for the purpose of assessing the suitability of those Denver Basin aquifer supplies:

1808A.03.1 A static analysis to include an evaluation of the volume of the appropriable water supply for the proposed development.

1808A.03.2 A dynamic analysis that evaluates whether the adjudicated and appropriable water supply is sustainable for 100 years, including:

(1) Site-specific aquifer hydraulic characteristics.

(2) Simulation of the current and future pumping effects from all pumping centers in the Denver Basin, using currently accepted estimates of present and future pumping volumes in the Basin.

(3) Simulation of pumping of the applicant's proposed wells to evaluate if, under these pumping conditions, the applicant's wells can satisfy the Minimum 100-year Useful Life.

(4) Simulation of the hydraulic control that is exerted by pumping of other wells in the confined portion of the aquifers. This will require simulation of the layering effects in the aquifers.

(5) Simulation of the elevation differences within each aquifer, e.g., the bowl-shaped nature of the Basin.

1808A.03.3 A well-field analysis to evaluate impacts on neighboring wells using information gained from the dynamic analysis.

1808A.04 Upon receipt of the narrative and attached documents, staff shall submit this information for review by the County's water consultant and any other referral agencies deemed relevant by staff. Staff shall schedule the appeal for public hearing before the Planning Commission and Board for public hearings and notify the applicant of the hearing dates and times.

1808A.05 The applicant is responsible for providing notice of the hearings in accordance with the public notice requirements set forth in Section 1809A, herein.

1808A.06 At a public hearing, the Planning Commission shall evaluate the application based on the technical data, the water consultants' opinions, site-specific data, the water demand standards, the staff report, and public testimony and shall make a recommendation to the Board to approve, conditionally approve, or deny the appeal. The Planning Commission's comments shall be based on the evidence presented.

1808A.07 At a public hearing, the Board shall evaluate the application based on the technical data, the water consultants' comments, site-specific data, the water demand standards, the staff report, the Planning Commission's recommendation, and public testimony and shall approve, conditionally approve, table for further study, or deny the appeal. An appeal shall be approved only upon the finding, based upon the evidence presented in each specific case, that:

1. The request will not be detrimental to the health, safety, or welfare of the present or future inhabitants of the County.

2. For appeals to the Water Demand Standards set forth in Section 1805A or to the Documentation Standards set forth in Section 1806A, the application provides sufficient supporting data of alternate water demand criteria so the water supply is still considered sufficient in terms of quantity, quality, and dependability.

3. For appeals to the timing of determining the adequacy of the water supply, the application identifies the stage at which the determination of adequacy shall be made.

The Board's decision regarding an appeal shall supersede or adjust any conflicting County land use regulation, unless prohibited by law.

1809A Appeal Process Public Notice Requirements

In calculating the required time period for posting and publishing a notice of a public hearing, the day of publishing or posting shall be counted in the total number of days required. The day of the hearing shall not be counted toward the total number of days required for the notification period.

The degree of accuracy required for the information contained in these public notices shall be that of substantial compliance with the provisions of this section. Substantial compliance for these public notices shall be determined by the Planning Commission and the Board of County Commissioners for their respective public hearings.

1809A.01 Published Notice

At least 14 days prior to the Planning Commission hearing and 14 days prior to the Board hearing, the applicant shall:

- Publish a notice in at least one publication of a daily or a weekly legal newspaper of general circulation, printed or published in whole or in part in Douglas County.
- Provide a publisher's affidavit of said published notice to the Planning Division at least 7 days prior to the hearing. The notice shall read:

NOTICE OF PUBLIC HEARING BEFORE THE
PLANNING COMMISSION OR BOARD OF COUNTY COMMISSIONERS
A public hearing will be held on *(date)*, at *(time)*, in the Commissioners' Hearing Room, 100 Third Street, Castle Rock, CO, for an appeal concerning water regulations in the Douglas County Zoning Resolution for the property located at approximately *(distance and direction from nearest major intersection)*. For more information call Douglas County Planning, 303-660-7460.
File #/Name:

When concurrent notice has been approved by staff, the notice shall read:

NOTICE OF PUBLIC HEARINGS BEFORE THE
PLANNING COMMISSION AND BOARD OF COUNTY COMMISSIONERS
A public hearing will be held before the Planning Commission on *(date)*, at *(time)*, and before the Board of County Commissioners on *(date)*, at *(time)*, in the Commissioners' Hearing Room, 100 Third Street, Castle Rock, CO, for an appeal concerning water regulations in the Douglas County Zoning Resolution for the property located at approximately *(distance and direction from nearest major intersection)*. For more information call Douglas County Planning, 303-660-7460.
File #/Name:

1809A.02 Posted Notice

At least 14 days prior to the Planning Commission hearing and 14 days prior to the Board hearing, the applicant shall post a notice on the property that is the subject of the appeal. The sign posting shall consist of at least 1 sign facing each abutting public or private street open for travel, within 10 feet of the lot line abutting such street, placed on posts at least 4 feet above ground level. In the event the staff planner determines a sign cannot be placed abutting such street and be visible from such street or that there is no abutting public or private street open for travel, the staff planner may require an alternate location for a sign. Each sign shall measure not less than 3 feet by 4 feet. Letter size shall be a minimum of three inches high, and a minimum of six inches high for the sentence that

reads, "For more information call Douglas County Planning at 303-660-7460." *(Amended 11/6/2018).* The notice shall read:

> NOTICE OF PUBLIC HEARING BEFORE THE
> PLANNING COMMISSION OR BOARD OF COUNTY COMMISSIONERS
> This land shall be considered for an appeal concerning water regulations in the Douglas County Zoning Resolution. The public hearing is on *(date)*, at *(time)*, in the Commissioners' Hearing Room, 100 Third Street, Castle Rock, CO. For more information call Douglas County Planning, 303-660-7460.
> File #/Name:

When concurrent notice has been approved by staff the notice shall read:

> NOTICE OF PUBLIC HEARINGS BEFORE THE
> PLANNING COMMISSION AND BOARD OF COUNTY COMMISSIONERS
> This land shall be considered for an appeal concerning water regulations in the Douglas County Zoning Resolution before the Planning Commission on *(date)*, at *(time)*, and before the Board of County Commissioners on *(date)*, at *(time),* in the Commissioners' Hearing Room, 100 Third Street, Castle Rock, CO. For more information call Douglas County Planning, 303-660-7460.
> File #/Name:

1810A Definitions

1810A.01 Appropriable Denver Basin Water Supply: The volume of water in storage in the Denver Basin aquifers beneath a parcel of land, exclusive of prior appropriated rights. The volume of appropriable water in storage is calculated based on overlying land area, aquifer saturated thickness, and the specific yield of the aquifer. Under Colorado law, 1/100th of the appropriable water in storage can be extracted on an average annual basis from each Denver Basin aquifer.

1810A.02 Appropriable Tributary Water Supply: The amount of water from either a stream or tributary ground water source that can be appropriated under the Colorado Doctrine of Prior Appropriation and a Water Court decree can be obtained for such water supply.

1810A.03 Augmentation Plan: If a tributary or not-nontributary water right is sought to be appropriated, it is incumbent upon the applicant for these water rights to demonstrate non-injury to existing, vested senior water rights. If such analysis indicates that there is the potential for injury to existing vested senior water rights, an augmentation plan must be adjudicated in Water Court which defines the uses of the water sought in the appropriation, defines the extent of the injury that will occur due to this appropriation, and presents a plan that will fully mitigate injury to all existing vested senior water rights.

1810A.04 Colorado System of Water Rights Administration: Colorado operates under a "first in time, first in right" water rights administration for tributary waters of the state. This means that the most senior tributary water rights

are wholly satisfied first, prior to any junior water rights diverting. If there is insufficient water to meet the water demands of all of the water rights, some water rights will be deemed "out of priority," and will not be allowed to divert any water until sufficient supply is available for all rights senior to that right.

1810A.05 Denver Basin: A large groundwater basin of sedimentary rock formations containing four principal aquifers, the Dawson, Denver, Arapahoe and Laramie-Fox Hills. This water basin extends from Greeley on the north to Colorado Springs on the south, Limon on the east to the foothills on the west. Groundwater contained within the Denver Basin aquifers is considered to be either nontributary or not-nontributary water under the Colorado Water Rights System.

1810A.05.1 Central Basin: The area comprising most of the eastern half of Douglas County that is underlain by the Denver Basin. This is the area of the Denver Basin where the four principal aquifers are present and where the aquifers are located at, or near, the base of the bowl-shaped Denver Basin. Due to the presence of the four principal aquifers and the relative location in the Central Basin, water supplies developed in this zone can provide the Minimum 100-Year Useful Life.

1810A.05.2 Margin B: An area west of the Central Basin of the Denver Basin, where aquifer elevations are comparable in relation to the Central Basin of the Denver Basin. Water supply availability in this zone may not provide a Minimum 100-Year Useful Life.

1810A.05.3 Margin A: An area west of Margin B of the Denver Basin, which is characterized by the westernmost extent of the Denver Basin. Due to the outcrop of the Denver Basin in this area and the relative elevation of the Denver Basin aquifers compared to the remainder of the Basin, water supplies in this zone may not provide a Minimum 100-Year Useful Life.

1810A.06 District: A special district currently offering water service, organized or validated pursuant to the Special District Act, §32-1-101, et seq., C.R.S.; or a non-specified governmental entity including, but not limited to, municipalities, authorities, and public improvement districts, as well as private water companies.

1810A.07 Dynamic Analysis: Water supply availability and reliability evaluation required if an applicant wishes to use Denver Basin water in Margin A or more than 50 percent of the water supply available in Margin B, as estimated from the static analysis. This analysis requires the use of a model that accurately simulates the geologic and hydro geologic characteristics of the Denver Basin and how aquifer parameters and water levels will change over time. A dynamic analysis can evaluate long-

term water supply availability and reliability because it simulates actual conditions and how they likely will change in the future, rather than assuming constant values for all time, as in the static analysis. This analysis is typically completed using a numerical groundwater model.

1810A.08 Dakota Sandstone Formation: An area of the County that is located in the water supply zones between the Pike-Rampart and the Denver Basin. This area consists of older sedimentary formations that generally underlie the Denver Basin aquifers but are uplifted to the surface in this area and are characterized by pronounced hogback and red sandstone features. Water supplies obtainable from these older sedimentary formations are quite limited and closely resemble the water availability of Margin A of the Denver Basin. Therefore, this area is considered part of Margin A for the purposes of the regulations set forth in the Water Supply Overlay District.

1810A.09 Existing District: A special district currently offering water service, organized or validated pursuant to the Special District Act, §32-1-101, et seq., C.R.S., with a service plan or statement of purposes approved by Douglas County prior to August 12, 1998.

1810A.10 Minimum 100-Year Useful Life: A water supply that will reliably provide water for a minimum time frame of 100 years. The County policy to determine useful life requires a showing from both a static and dynamic basis that a proposed water supply will be viable for a minimum 100-year period. The static analysis would include evaluation of the volume of water that is appropriable for the proposed development. The dynamic analysis would evaluate whether the appropriable water supply is sustainable for 100 years, giving consideration to the location within the Basin, as well as impacts caused by both current and future pumping by others in the Basin.

1810A.11 New Special District Service Plan: A document for the organization of a new special district as authorized by §32-1-201, et seq., C.R.S. The service plan generally outlines the services a District will provide and provides a financial plan for the procurement of land and facilities that may be necessary to provide District services.

1810A.12 Non-Renewable Water: Water that is not annually recharged through the hydrologic cycle and development of the water resource relies upon drawing water principally from storage in an aquifer. This is also referred to as a finite water supply.

1810A.13 Nonresidential Equivalent: The quantity of water necessary for light industrial or office uses which corresponds to the residential standard of 0.75 acre-feet per year. The nonresidential equivalent is equal to 0.75 acre-feet per year required for each 6,695 square feet of building space.

1810A.14 Nontributary Water: Waters of the Denver Basin that, when pumped, will not, within 100 years, affect the flow of any natural stream by greater than one-tenth of one percent of the annual pumping volume. This is a non-renewable water supply.

1810A.15 Not-Nontributary Water: Waters of the Denver Basin that, when pumped will, within 100 years, affect the flow of a natural stream by greater than one-tenth of one percent of the annual pumping volume. Because the pumping of not-nontributary water will cause an impact to the surface stream system, an adjudicated plan for augmentation is required prior to the use of not-nontributary groundwater from the Denver Basin aquifers. This is a non-renewable water supply.

1810A.16 Pike-Rampart: The western portion of Douglas County that is characterized by the uplifted granitic mountains west of the Dakota Sandstone Formation and the Denver Basin. Water supplies in this zone are primarily through fractures in the granitic and metamorphic rock. While this water is renewable, due to the relatively low permeability of these fractures, water supply availability is relatively limited in the Pike-Rampart.

1810A.17 Renewable Water: Water from a source that is recharged during one or more stages of the hydrologic cycle, such as streams, and alluvial aquifers associated with streams so that the water supply is reliable over time, subject to physical supply and legal availability within the prior appropriation system.

1810A.18 Reusable water: Water either from fully-consumable tributary water rights or from the treatment of the portion of first-use Denver Basin aquifer water that is reusable to extinction. Reusable water can be part of a water rights portfolio, subject to a showing of its availability, reliability, and quality.

1810A.19 Static Analysis: Water supply availability evaluation required for proposed land uses that plan to use Denver Basin water in Margin B or in the Central Basin. This analysis is based on assumed constant values for the land area, aquifer specific yield and aquifer-saturated thickness. Aquifer specific yield and saturated thickness values are obtained from the Denver Basin Rules, promulgated by the Colorado State Engineer's Office, or, when available, from a decree from the water court or from geophysical logs of wells drilled on, or near, the subject property.

Annual water supply availability is calculated by static analysis as: land area available for appropriation X aquifer specific yield X aquifer saturated thickness / 100 years. A static analysis cannot evaluate the long-term reliability of a water supply.

1810A.20 Tributary Water: Water contained within the surface stream systems, or in groundwater that is hydraulically connected to the stream system.

Tributary waters are considered waters of the state, are available for appropriation through the Colorado Water Rights System, and are subject to the Colorado System of Water Rights Administration. Tributary Water rights are based on the priority of the rights to the extent that they can be relied upon as a water supply and meet the minimum water supply criteria, herein. This is a renewable water supply.

1810A.21 Water Conservation Plan: A description of implementation and enforcement efforts put forth to reduce water losses, waste, or use for both indoor and outdoor uses, dependent upon the land use application.

1810A.22 Water Plan: Documentation provided to Douglas County in support of a land use application which details:

(1) The source(s) of water to be supplied to meet the development demand.
(2) The water supply delivery system, including the structures to be used for the diversion or extraction of the water, the conveyance system, and the required storage facilities.
(3) Demonstration of the reliability of the water supply, both from a physical and legal supply perspective, and including all losses associated with the delivery and storage system to be used.
(4) Proof that the water supply is owned and can be used by the applicants for the purposes intended in the application.
(5) Proof that all necessary decrees, permits, and any other legal requirements are in place that allow the legal use of the water supply.
(6) The timing of the development demands through the build out of the project.
(7) Estimated demand of the development.

1810A.23 Water Supply: The legal and physical delivery of water service that is sufficient in terms of quantity, quality, and dependability to meet the demand of a proposed development.

1810A.24 Water Supply Report: A report documenting the amount of water that can be supplied to the proposed development, containing the following:

(1) A summary or report of the water rights owned or controlled.
(2) A description of fully-executed contracts and/or IGAs with other water providers in which all of the terms and conditions of the contract and/or IGA have been satisfied, as demonstrated by a signed will-serve letter from the provider.
(3) The anticipated yield of these rights in both an average year and a dry year.
(4) The present demand and the anticipated demand on the supplier due to commitments for service entered into that are not yet supplied.
(5) The amount of uncommitted firm supply available for future commitment and development.

(6) A summary of what water rights the applicant will convey to a District and what water credits the applicant must purchase from a District, if any, to serve the development.
(7) A map of the service area.

The information above shall be provided in a manner that demonstrates sufficient water resources to meet commitments in terms of an overall annual water supply and daily availability.

1810A.25 Well-Field Analysis: Evaluation required with proposed land-uses that plan to use Denver Basin water in Margin B or the Central Basin, to assess whether a new proposed well field associated with the proposed land use will create water level change impacts such that the ability of neighboring wells, either on or off the subject property, to produce would be impaired. A change in water level at an adjacent well is not, in and of itself, considered to be an impairment. This analysis is typically completed using an analytical ground water model.

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