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New Document:	Old Document:
FinalEIS	Appendices
31 pages (1.75 MB)	34 pages (2.31 MB)
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Appendix O
Costs

1. COST OF REALLOCATION

1.1 Purpose

The purpose of this appendix is to describe and analyze the alternatives chosen for detailed analysis in Chapter 2. It will identify the National Economic Development (NED) and locally preferred plans as well as the non-federal cost of the reallocated Chatfield storage. The Fiscal Year (FY) 2013 interest rate of 3.75 percent and a period of analysis of 50 years will be used to capitalize annual values or to annualize present values. The 50-year period of analysis covers the period of benefits accrual over the planning period.

Exhibit A contains information provided by the water providers. The table in the exhibit presents the demand figures for each water provider for each decade from 2010 to 2050. Not shown in the table is the amount of water supplied by renewable sources. Table 1 below shows the 2017 demand net of the renewable water.

Table 1.
Demand in Acre Feet Net of Sustainable Yields

Water Provider	Demand	Unmet	Increase in Demand above Unmet			
	2010	2010	2010-2020	2020-2030	2030-2040	2040-2050
Lower South Platte Gravel Pit User Group[2]						
Central Colorado WCD	70,750	70,750	0	0	0	0
Western Mutual Ditch Company	15,000	15,000	0	0	0	0
Other User [3]						
Denver Botanic Gardens at Chatfield	16	16	0	0	0	0
Penley Reservoir User Group[1,4]						
Mount Carbon Metropolitan District	0	0	800	200	21	6
Centennial WSD	10,000	0	3,000	0	0	0
Town of Castle Rock	6,759	0	3,300	3,500	0	0
Castle Pines North Metropolitan District	2,290	0	228	0	0	0
Castle Pines Metropolitan District	437	0	153	0	0	0
Center of Colorado WCD	197	197	0	58	50	50
Colorado Parks and Wildlife	1,800	1,800	0	2,000	0	0
Colorado Water Conservation Board	76	76	0	0	0	0
Other SMWSA*	5,527	0	5,317	2,130	3,170	0

*SMWSA=South Metro Water Supply Authority
[1]As defined in Section 2.4.1.1.
[2]As defined in Section 2.4.1.2.
[3]As described in Section 2.4.1.3, other storage would include storage on Deer Creek or near Chatfield Reservoir
[4]Surface water from Penley Reservoir would replace NTGW in 2032, assuming a 15-year construction period starting in 2017.

Most of the water providers will meet their current demand. Surplus contingency supplies or Denver Basin groundwater for initial service for new growth could be used to meet this demand. Central Colorado Water Conservancy District (WCD) and Western Mutual Ditch provide augmentation and irrigation water respectively. Augmentation is the provision of water to an affected stream to allow out-of-priority diversion from the stream, with the augmented water preventing injury to senior water rights holders on the stream. In this instance, these two agricultural water providers need to

augment surface water in order to draw on tributary groundwater that is connected to and depletes surface water. Such augmentations must be approved by the water court. They are not planning to issue additional shares in the future, so the demand will not change over time. Even as growing municipalities purchase participating farms, their demand is expected to change from agriculture to municipal and industrial (M&I) demand such as for parks, lawns, and golf courses. Not all the unmet water needs of these two water providers can be met by the alternatives presented here. In a worst-case scenario land would be converted to dryland farming if additional augmentation water is not available. The Denver Botanic Gardens at Chatfield will have an unmet need of 16 acre-feet that would allow expansion of its operation; growth beyond 2020 is not anticipated at this time.

Most of the upstream water providers use groundwater and will meet their current demand from that source. Seventy-six acre-feet are currently unmet. Center of Colorado WCD expected an increase in demand for augmentation water in Park County by 2010 but no increase between 2010 and 2020.

Table 2 shows the average year yield from Chatfield (20,600 acre-foot) and the number of years water from Chatfield Reservoir would meet each water provider's demand. The number of years for most of the water providers was estimated from the average annual demand increase between 2010 and 2020. The average year yield from Chatfield was divided by the annual increase to determine the number of years. For entities with unmet demand in 2010, and which is currently unmet, the average year yield from Chatfield was divided by the unmet demand. The Chatfield allotment for Castle Pines North Metropolitan District is greater than the future (2010–2020) demand for this entity, so it would meet the growth for the time period.

Table 2.
Chatfield Yield and Years Supplied

Water Providers	Average Yield Chatfield (20,600 acre-foot)	Number of Years Met by Chatfield
Central Colorado WCD	1,181	.02
Western Mutual Ditch Company	591	0.04
Colorado Parks and Wildlife[1]	415	0.2
Denver Botanic Gardens at Chatfield	16	1.4
Mount Carbon Metropolitan District	166	2.1
Centennial WSD	2,178	7.3
Town of Castle Rock	420	1.3
Castle Pines North Metropolitan District	341	15.0
Castle Pines Metropolitan District	274	17.9
Colorado Water Conservation Board	41	0.5
Center of Colorado WCD	54	0.3
Other SMWSA	588	1.1

Table 3 indicates the most prevalent water source and the use of Chatfield water for each water provider. The uses indicate that Chatfield water could be used immediately.

[1]On July 1, 2011, Colorado State Parks and the Colorado Division of Wildlife merged to form Colorado Parks and Wildlife.

Table 3.
Water Supply and Use

Water Use	Predominant Water Supplies	Use of Chatfield Water
Central Colorado WCD	Surface Water	Augmentation, Retiming wells
Western Mutual Ditch Company	Surface Water	Well augmentation
Colorado Parks and Wildlife	Surface Water	Maintain Recreation Experience
Denver Botanic Gardens at Chatfield	Surface Water	Expansion Projects
Mount Carbon Metropolitan District	Surface Water	Develop Water Rights
Centennial WSD	SW* & NTGW	Reduce groundwater pumping
Town of Castle Rock	NTGW	Conjunctive use, reuse
Castle Pines North Metropolitan District	NTGW	Reduce groundwater pumping, injection
Castle Pines Metropolitan District	NTGW	Reduce groundwater pumping
Colorado Water Conservation Board	Surface Water	Recreation
Center of Colorado WCD	Surface Water	Augmentation, Retiming wells
Other SMWSA*	NTGW	Reduce groundwater pumping

* - NTGW=non tributary groundwater; SMWSA=South Metro Water Supply Authority; SW=Surface Water

1.2 Alternatives

The water providers seeking storage space in Chatfield Reservoir are the Penley Reservoir User Group (Upstream Group) and the Lower South Platte Gravel Pit User Group (Downstream Group). The Penley Reservoir User Group includes Mount Carbon Metropolitan District, Town of Castle Rock, Centennial WSD, Castle Pines Metropolitan District, Castle Pines North Metropolitan District, the South Metro Water Supply Authority (SMWSA) (a group of 13 water providing entities in the south metro area), Colorado Parks and Wildlife, Center of Colorado Water Conservancy District (WCD), and the Colorado Water Conservation Board (CWCB). The Lower South Platte Gravel Pit User Group is composed of Central Colorado WCD and Western Mutual Ditch Company. The Penley Reservoir User Group in general is located upstream from Chatfield Reservoir. They currently use nontributary groundwater (NTGW), and seek to develop alternatives to NTGW that include storage such as Penley Reservoir. The Lower South Platte Gravel Pit User Group is located downstream from Chatfield Reservoir, and they do not rely on NTGW. Even though these groups seek to reallocate Chatfield flood control storage, they have different no action alternatives. Alternatives must supply the same quantity and quality of water, so the no action alternatives must combine the No Action components from both groups.

The alternatives considered in detail in this analysis are:

1. No Action—Penley Reservoir combined with Gravel Pit Storage
2. NTGW combined with Downstream Gravel Pit Storage—Least Cost Alternative to Chatfield Reservoir storage reallocation
3. Reallocation to allow an additional 20,600 acre-feet of Water Supply Storage
4. Reallocation to allow an additional 7,700 acre-feet of Water Supply Storage combined with NTGW and Gravel Pit Storage

These alternatives all have an estimated average year yield of 8,539 acre-feet when the alternatives are completed. The average year yield of 8,539 acre-feet was determined from a regional factor that estimates the yield from reservoir storage. The 20,600 acre-feet available at Chatfield converts to 8,539 acre-feet of annual yield. Based on Tables 13 and 14 in the Compensatory Mitigation Plan (Appendix K), all plans would provide the full amount of water eleven years after approval. The average annual yield over the 50-year period of analysis would be 8,112 acre-feet. All alternatives would provide water at a rate equivalent to the rate of storage usage in Tables 13 and 14 of the CMP.

Alternative 1 is comprised of gravel pits for the Downstream Group and Penley Reservoir for the Upstream Group. Because construction of Penley would take 15 years, additional upstream groundwater capacity would be developed. Penley Reservoir's water would be used to reduce groundwater pumping. Because this alternative eventually reduces groundwater usage, it is noted as the locally preferred no action alternative.

Alternative 2 has the gravel pits for the Downstream Group and groundwater for the Upstream Group. It is similar to Alternative 1 except Penley is not developed to replace or reduce the groundwater use.

Chatfield storage reallocation alternatives would convert flood control storage into water supply storage by changing the conservation pool from 5,432 feet mean sea level (msl) for the No Action alternatives to 5,444 feet msl and 5,437 feet msl, respectively, but the reallocation of storage for this project only involves the area between 5,432 and 5,444 feet msl or 5,437 feet msl. Alternative 3, the larger Chatfield reallocation alternative, (5,444 feet msl) has an increase in water supply storage of 20,600 acre-feet.

Alternative 4, the smaller Chatfield reallocation alternative, has an increased water supply volume of 7,700 acre-feet. Because the water supply storage is smaller than Alternative 3, the yield is not equal to the other alternatives without adding components from Alternative 2. The added components are gravel pits for the downstream water providers and groundwater for the upstream water providers.

1.3 Alternative Analysis

This section will present the economic and financial evaluation of the four alternatives. It identifies the NED benefits and identify the NED plan. The financial analysis determines the least expensive alternative for the water providers.

1.3.1 Methodology

The methodology for evaluating water supply storage reallocation alternatives is set forth in the U.S. Corps of Engineers Planning Guidance Notebook (PGN) (ER 1105-2-100) (PGN). Each alternative is comparable in quality and quantity of water supplied. These criteria represent the benefit level of the alternatives. The quantity considered is 8,539 acre-feet of average year yield per year when the alternatives are fully operational. This yield corresponds to the larger Chatfield alternative. The water supply would be treated to levels appropriate for its final use. The basic costs for each alternative are presented in Appendix Y.

This appendix performs an National Economic Development (NED) analysis and economic feasibility analysis. It estimates NED costs and financial costs. NED costs include interest during construction (IDC). Financial costs estimate the cost the water providers would pay for each alternative. NED costs of the alternatives are compared to determine the NED plan. The financial costs are compared to determine the financial feasibility of the alternatives. These comparisons necessitate combining annual OMRR&R costs with annualized construction cost or capitalized OMRR&R cost with the construction costs so a single cost represents an alternative.

The Chatfield yield is based on the Compensatory Mitigation Plan (CMP) mitigation milestone approach. The storage available for use at Chatfield for Alternative 3 comes available over eleven years at the rates in Tables 13 and 14 in the CMP (Appendix K). This is a more conservative approach than the escrow approach where all the storage would be available immediately. Storage is assumed to be related to yield at the rate of 0.41 yield to storage. All alternatives would bring water on line at the same rate. The NED Plan is defined as the alternative that maximizes net NED benefits (NED benefits less NED costs, including mitigation).

The period of analysis is 50 years. Construction costs (first costs), interest during construction (IDC), operation and maintenance costs, repair, rehabilitation, and replacement costs (OMRR&R), mitigation costs, and recreation modification costs (Appendix M) are included over this period for all alternatives. Corps interest rate of 3.75 percent for FY 2013 and FY 2013 price levels are is used for all present and annual value calculations when comparing the four alternatives. Construction of various segments of each alternative would begin each year for nine years. Each segment would end two years after starting. IDC was computed for costs incurred prior to the start of the period of analysis. Interest incurs during each year until the construction is finished. IDC is compounded forward in time to the start of the period of analysis. Cost incurred prior the start of the period of analysis were not compounded forward to the start of the period of analysis. IDC was not computed for costs incurred after the start of the period of analysis. Costs incurred after the start of the period of analysis were discounted to the start of the period of analysis.

Construction of Chatfield infrastructure or specific costs would take place over two years, recreation modification would be completed over a 2-year period, environmental mitigation would be complete in eleven years, gravel pits and NTGW would be completed during two year periods (for IDC) and staged to be fully on line in eleven years, and Penley Reservoir would be constructed over 15 years. Annual OMRR&R costs are present valued using the Corps interest rate of 3.75 percent. The base year for the 50-year period of analysis is 2017.

The water providers supplied the costs for the gravel pits, Penley Reservoir, and specific costs for Alternatives 3 and 4. The costs used for the groundwater component were developed from the South Metro Water Supply Study (SMWSS), 2003. For entities that participated in the SMWSS and are participating in this study, their costs from SMWSS were scaled based on the ratio of the yields and updated to the first quarter of fiscal year 2013 (FY 2013) price levels using a factor developed by the water providers to reflect the regional price increase. For water providers using groundwater but not in the SMWSS, costs were based on average SMWSS costs.

1.3.2 Alternative NED Costs

The NED Plan is defined as the alternative that maximizes net NED benefits (NED benefits less NED costs, including mitigation). The value of the benefit base is defined as the cost of the most likely least-costly No Action alternative (Alternative 2) to be implemented. This implies that the most likely least-costly No Action alternative has net benefits of zero. Since the benefits are equal for all alternatives, other alternatives have either positive or negative net NED benefits based on their costs. The NED costs include first costs for infrastructure, environmental mitigation, and recreation modification, IDC, OMRR&R, and NED recreation benefits lost.

Table 4 summarizes the NED costs for the first or construction cost and the investment costs (first and IDC costs), respectively, for the alternatives at FY 2013 price levels and interest rates. Alternative 3 has the least cost of the alternatives.

Table 4.
Chatfield Reservoir Reallocation Feasibility Study (FY 2013 Price Levels)

	National Economic Development (NED) Costs for Alternatives			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
First Costs				
Specific (Infrastructure)				
Chatfield Reservoir	$0	$0	$0	$0
Additional Chatfield Costs[1]	$0	$0	$709,200	$709,200
Wells	$33,795,049	$68,831,840	$0	$25,728,406
Gravel Pits	$76,669,431	$76,669,431	$0	$58,134,041
Penley Reservoir	$133,843,029	$0	$0	$0
Other User (Denver Botanic Gardens)	$607,757	$607,757	$75,565	$458,517
Total Specific	$244,915,266	$146,109,028	$784,765	$85,030,164
Recreation Modifications	$0	$0	$47,303,435	$23,535,167
Environmental Mitigation	$0	$0	$58,545,585	$21,883,544
Total First Cost	$244,915,266	$146,109,028	$106,633,785	$130,448,875
Investment Cost				
Total First Cost	$244,915,266	$146,109,028	$106,633,785	$130,448,875
Interest During Construction (IDC)				
Chatfield Reservoir	$0	$0	$0	$0
Chatfield Additional	$0	$0	$13,847	$13,847
Wells	$654,888	$1,286,566	$0	$480,901
Gravel Pits	$1,433,062	$1,433,062	$0	$684,882
Penley Reservoir	$809,121	$0	$0	$0
Other User (Denver Botanic Gardens)	$7,160	$7,160	$890	$5,402
Recreation Modifications	$0	$0	$1,954,590	$972,479
Environmental Mitigation	$0	$0	$1,310,349	$489,791
Total IDC	$2,904,230	$2,726,787	$3,279,677	$2,647,302
Total Investment Cost	$247,819,496	$148,835,816	$109,913,462	$133,096,177

[1] Additional costs include dam safety instrumentation (15 piezometers), Master Plan supplement, update area capacity tables and review and real estate requests.

The total annual NED costs are shown in Table 5. The NED benefits forgone represent the lost recreation benefits at Chatfield Reservoir. Alternative 3 is the least costly plan and is the NED Plan. Alternative 2 is the **most likely least costly** no action plan.

Table 5.
Annual NED Costs (FY 2013 Price Levels)

	Annual Costs			
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Annualized Investment Cost	$11,046,360	$6,634,240	$4,899,307	$5,932,658
OMRR&R				
Chatfield Reservoir	$0	$0	$1,421,428	$582,167
Additional at Chatfield*	$0	$0	$47,226	$47,226
Wells	$437,143	$1,230,918	$0	$460,101
Gravel Pits	$549,962	$549,962	$0	$474,961
Penley Reservoir	$727,950	$0	$0	$0
Other User (Denver Botanic Gardens)	$0	$1,521	$0	$1,937
Recreation Modifications	$0	$0	$0	$0
Environmental Mitigation	$0	$0	$858,147	$317,390
Total Annual Costs	$12,761,415	$8,416,642	$7,226,108	$7,816,440
NED Benefits Foregone	$0	$0	$697,100	$587,400
Total Annual NED Costs	$12,761,415	$8,416,642	$7,923,208	$8,403,840

* Includes costs for additional OMRR&R and monitoring activities.

Table 6 summarizes the alternative's first costs, investment costs and annual cost. The annual costs include the annualized investment costs and the annual OMRR&R costs. Alternative 3 has the least amount for each of these costs.

Table 6.
National Economic Development (NED) Costs for Alternatives (Summary Table)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
First Costs	$244,915,266	$146,109,028	$106,633,785	$130,448,875
Investment Cost	$247,819,496	$148,835,816	$109,913,462	$133,096,177
Annual Cost	$12,761,415	$8,416,642	$7,923,208	$8,403,840

Table 7 compares the four alternative's benefits and costs. The benefits are defined as the cost of the most likely least costly no federal action alternative. Alternative 3 maximizes net annual NED benefits at $493,400 per year.

Table 7.
NED Comparison (FY 2013 Price Levels)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Annual Benefits	$8,416,642	$8,416,642	$8,416,642	$8,416,642
Annual Costs	$12,761,415	$8,416,642	$7,923,208	$8,403,840
Net Annual Benefits	-$4,344,773	$0	$493,434	$12,802

The estimated first cost of Alternative 3 updated to FY 2013 price levels using the 3.75% interest rate is $106.6 million. The investment cost including interest during construction of $3.4 million is

$109.9 million. The total annual costs including lost recreation benefits of $0.7 million/year are $7.9 million.

1.4 Alternative 3 Cost of Storage

To determine the financial costs of Alternatives 3 and 4, the cost of storage must be estimated. The cost of storage is the non-federal water providers' cost for the reallocated storage. The non-federal cost is the greatest of benefits or revenues forgone, the replacement costs, or the updated cost of storage (ER 1105-2-100, Appendix E, Section VIII, paragraph E-57.d.(2), April 22, 2000). The cost of storage is part of the cost of the 20,600 acre-foot reallocation alternative used in the analysis of alternatives. The cost of storage will be determined for the 20,600 acre-foot alternative, however, the 7,700 acre-foot reallocation alternative cost of storage will be prorated from the 20,600 acre-foot alternative amount based on the ratio of their respective reallocated storage. A detailed analysis is presented for Alternative 3 for FY 2013 using rates from Economic Guidance Memorandum 13-01. The Federal discount rate for FY 2013 is 3.75%. The water supply discount rate is 2.875% for 2013.

Table 8 presents a summary from the four subsections below. The updated cost of storage is the greatest cost of the four categories at 2013 price levels and thus will be the basis for the amount to be repaid by the non-federal water providers. The final cost of storage will be determined when the Water Supply Agreement is signed and will be repaid over the following 30 years at the water supply discount rate in effect at the time of signing. The water providers would also be responsible for paying normal Chatfield OMRR&R costs and additional OMRR&R costs that would be incurred because of the alternative.

Table 8.
Cost of Storage Analysis

	Cost In Millions (FY 2013$)
Benefits Foregone	$15.64
Revenue Foregone	$0
Replacement Cost	$0
Updated Cost of Storage*	$16.0

*The cost of storage is $39.1 million. The number $16.0 Million is the amount after the ASA(CW) exemption to adjust the cost closer to the national average for cost of storage.

1.4.1 *Benefits Foregone*

The benefits foregone due to the 20,600 acre-foot alternative are the NED benefits forgone. The recreation benefits under Alternatives 1 and 2 would remain at the current level because no recreation change would occur at Chatfield Reservoir. The estimated benefit with the 20,600 acre-foot storage reallocation is expected to grow for the first three years and remain constant for the remainder of the period of analysis. The lost recreation benefit from the reallocation of storage at 2013 price levels is $697,100 per year or $15,639,000 present valued using the Federal discount rate of 3.75% for Fiscal Year 2013. The hydrology analysis of the downstream flood control showed no significant impacts for Alternative 3. The lost recreation benefit for Alternative 4 at 2013 price levels and Federal discount rate is $13,178,100 ($587,400 per year) over the 50-year planning period.

1.4.2 Revenue Foregone

Revenue foregone is the loss or gain of revenue to the U.S. Treasury due to the storage reallocation. Currently the income to the Treasury is $ 0 per year.

1.4.3 Replacement Cost

Storage reallocation of flood control storage from U.S. Army Corps of Engineers reservoirs may require restoration of lost flood control benefits. The hydrology analysis of the downstream flood control showed no significant impacts for Alternative 3 therefore the Replacement Costs would be $0.

1.4.4 Updated Cost of Storage

The updated cost of storage represents the project construction, OMRR&R costs associated with the reallocated storage. The process, referred to as the Use of Facilities Method, identifies joint-use cost for each category and a storage ratio related to the reallocated storage. Joint-use costs are defined as total project costs less all specific costs. Specific costs are costs of identifiable project features serving only one purpose. The storage ratio is the ratio of the reallocated storage to the total usable storage. The total usable storage at Chatfield Reservoir is the storage below the spillway (234,932 acre-feet) less the inactive/sediment storage pool (5,670 acre-feet) or 229,262 acre-feet. The ratio applied to the construction, OMRR&R joint-use costs is 20,600 acre-feet/229,262 acre-feet. The ratio applied to the construction, OMRR&R joint-use costs for Alternative 3 is 20,600 acre-feet/228,105 acre-feet or 0.0899. The ratio for Alternative 4 is 7,700acre-feet/229,262 acre-feet or 0.034.

The algorithm for project construction costs is: (total project construction costs less all specific construction costs) x storage ratio. Costs for specific purposes such as flood control and recreation would need to be removed from the total costs before applying the storage ratio. The algorithms for OMRR&R would be similar to the construction algorithm; however, OMRR&R cost are not included in determining the updated cost of storage.

Because construction was completed in the past, construction costs associated with the reallocated storage are calculated at the time of construction and then updated from the midpoint of the physical construction period to the beginning of the fiscal year in which the contract for the reallocated storage is approved. Interest during construction is not considered using this procedure. The construction costs are updated to current price levels using the Engineering News Record's Construction Cost Index (CCI) for costs expended prior to 1967 and the U.S. Army Corps of Engineers Civil Works Construction Cost Index System (CWCCIS) for costs expended beginning with 1967.

The midpoint of Chatfield reservoir construction is 1973 so only CWCCIS indices are used to update costs. The as-built construction costs are updated from 1973 to the second quarter of FY 2013 for a current price level presentation of cost of storage. CWCCIS for FY 2013 contain indices used to update costs from 1973 to 2013 price levels. The indices are shown below in Table 9.

Table 9.
CWCCIS Indices

		FY 1973	FY 2013
01	Lands and damages (acquisition started May 1967)	150.38	777.47
02	Relocations	153.85	788.37
03	Reservoir	167.43	851.4
04	Dams	149.41	773.09
08	Roads, rail roads, and bridges	153.85	788.37
09	Channels and canals	146.21	807.51
11	Levees and floodwalls	149.31	799.54
14	Recreation facilities	149.36	772.89
15	Structures	150.83	758.2
19	Buildings, grounds, and utilities	149.36	772.89
20	Permanent operating equipment	149.36	772.89
30	Engineering and design	150.38	782.64
31	Supervision and administration	150.38	782.64

The updated joint-use costs for 2013 are shown in Table 10. The specific costs for Recreation Facilities are removed from the construction costs to yield the joint-use costs for Chatfield Reservoir. These joint-use costs are the basis for determining the updated cost of storage associated with Alternative 3.

Table 10.
Updated Joint Use Costs

Code	CONSTRUCTION COMPONENT/ACTIVITY	Joint-use Cost	CWCCI 2013 Factor 1973-2013	Joint-use Cost 2013 FY13/1Q
01	Lands and damages (acquisition started May 1967)	$15,595,200	5.17	$80,627,184
02	Relocations	$15,161,300	5.12	$77,690,699
03	Reservoir	$1,121,300	5.09	$5,701,934
04	Dams	$31,398,900	5.17	$162,466,874
08	Roads, rail roads, and bridges	$112,000	5.12	$573,919
09	Channels and canals	$6,803,600	5.52	$37,575,918
11	Levees and floodwalls	$4,300	5.35	$23,026
14	Recreation facilities	$11,148,500	5.17	$57,689,905
15	Structures	$10,500	5.03	$52,782
19	Buildings, grounds, and utilities	$1,715,300	5.17	$8,876,126
20	Permanent operating equipment	$70,700	5.17	$365,850
	Subtotal	$83,141,600	5.19	$431,644,217
30	Engineering and design	$7,864,100	5.20	$40,927,659
31	Supervision and administration	$3,974,900	5.20	$20,686,837
	Total Construction	$94,980,600	5.19	$493,258,713
	Less Specific Recreation Facilities	$11,148,500	5.17	$57,689,905
	Total Joint-use Storage Construction Cost	$83,832,100	5.20	$435,568,808

The updated cost of storage is derived from the updated joint-use cost and the ratio of reallocated storage to usable storage. The usable storage at Chatfield Reservoir is the total storage less the

inactive/sediment storage pool or 234,932 acre-feet. The reallocated storage for Alternative 3 is 20,600 acre-feet. The storage numbers and ratios for Alternatives 3 and 4 are in Table 11.

Table 11.
Storage Analysis

	Alternative 3	Alternative 4
Total storage AF	234,932	234,932
Sediment storage AF	5,670	5,670
Usable Storage	229,262	229,262
Reallocated storage AF	20,600	7,700
Cost of storage ratio	0.0899	0.034
Percent of usable storage	8.99	3.36

The cost of storage (COS) ratio is calculated from the formula reallocated storage/usable storage or 0.0881=20,600/ (234,932-5,670) where 234,932 – 5,670 is the usable storage. In terms of percent the ratio is 9.03%. The ratio is multiplied by the joint-use costs to obtain the updated COS. The FY2013 updated cost of storage is currently estimated to be $ 39.1 million and an estimated $3.8 million (capitalized value) for OMRR&R. The Assistant Secretary of the Army for Civil Works (ASA) granted an exemption of the policy for the determination of the updated COS. Based on the high costs for riparian habitat impacts, recreation modifications, low dependable water yield, and the updated COS, the cost per acre-foot was shown to be about four times greater than the next highest cost for a Corps reallocation project. The ASA(CW) exempted Chatfield Reservoir reallocation from the existing policy and established a one-time reduction of the estimated updated COS. The COS to be paid by the water providers is 41% of the estimated COS. See Table 12.

Table 12.
Updated Cost of Storage

	FY 2013
Updated Cost of Storage Alternative 3	$39,137,400
Cost of Storage with exemption Alternative 3	$16,046,300
Updated Cost of Storage Alternative 4	$14,629,000
Cost of Storage with exemption Alternative 4	$5,997,900

The exemption reduced the FY 2013 COS to $16.0 million which is closer to the national average cost per acre-foot. The FY 2013 annual cost excluding OMRR&R over thirty years at the water supply rate of 2.875% is $805,500.

The annual OMRR&R was estimated from actual figures incurred at Chatfield Reservoir between 1997 and 2006.The actual amounts were updated to FY2006 price levels and then averaged. This average amount was updated to FY 2013 price levels using CWCCIS factors. Additional OMRR&R would be incurred at the reservoir for Alternatives 3 and 4. OMRR&R detail is shown below in Table 13.

Table 13.
Updated Chatfield Reservoir OMRR&R

	Actual	Update factor	Updated (September 30, 06)
1997	$791,429	1.367	$1,081,601
1998	$954,737	1.357	$1,295,859
1999	$794,914	1.324	$1,052,424
2000	$826,005	1.296	$1,070,796
2001	$1,305,317	1.282	$1,673,331
2002	$1,332,604	1.239	$1,651,753
2003	$1,519,705	1.211	$1,840,932
2004	$2,717,043	1.090	$2,962,270
2005	$1,102,830	1.045	$1,152,311
2006	$1,501,161	1.000	$1,501,161
Average Annual O&M Sep 06 $			$1,528,244
Average Annual O&M Dec 2013$		1.2414	$1,897,220

The water providers would pay 8.99% of Chatfield OMRR&R plus additional Corps costs resulting from the implementation of Alternative 3. Additional Chatfield first costs (present valued at $709,200 and annualized at $31,600 per year) are for dam safety instrumentation, Master Plan Supplement, review of real estate requests, update area capacity tables, and water release and calculations. Chatfield OMRR&R is the water provider's share of Chatfield's OMRR&R. The additional operations cost of $47,200 per year provides for additional operations and monitoring. Below in Table 14 is a summary of Chatfield OMRR&R costs and additional annualized first costs, and additional annual operation costs for Alternative 3.

Table 14.
Water Providers' Share of Chatfield-Related Annual OMRR&R, Alternative 3

	Chatfield	Additional Operations	Total
Annual OMRR&R	$170,500	$47,200	$217,700
Additional First Cost			$709,200

1.4.5 Water Provider Costs Alternative 3

This section presents the water provider's financial costs for Alternative 3. They would repay the COS over a 30-year period and the OMRR&R costs over the 50-year period of analysis. FY 2013 price levels are presented using a federal water supply discount rate of 2.875%. The cost allocated to the non-federal water providers (i.e., the price to be charged for the capital investment for the reallocated storage) will normally be established as the highest of the benefits or revenues foregone, the replacement cost, or the updated cost of storage in the Chatfield project. The updated cost of storage is the highest of these amounts both before and after applying the ASA exemption described above using 41% of the COS. The non-federal water providers shall also be responsible for an appropriate share of the annual costs that include specific and joint-use OMRR&R costs.

The cost of storage is described above in the Cost of Storage section. The cost of storage contains estimates for OMRR&R costs as well as the updated cost of storage. The water providers must repay the updated cost of storage over 30 years, starting when the water supply agreement is signed, at the water supply interest rate in effect at the signing. The actual OMRR&R costs are

indeterminate at this time, but will be estimated and paid at the beginning of each year. At the end of the year, the actual amount will be reconciled with the payment made at the beginning of the year. The OMRR&R would be paid over a longer period than 30 years. Estimates of the annual costs are shown in Table 15. The planning horizon of 50 years is broken into the first 30 years when payments are made for COS and OMRR&R and the remaining 20 years when only OMRR&R payments are made.

Table 15.
Annual Costs Of Storage

	FY 2013
Annual Cost Of Storage, Years 1–30, using ASA(CW) Exemption	$805,500
Additional Chatfield First Costs*	$31,600
Annual Chatfield-related OMRR&R	$217,700
Total Annual Chatfield Costs, Years 1–30	$1,054,800
Annual Chatfield Cost, Years 31–50**	$249,300

*Assumes that $709,200 would be paid over the 50-years at 3.75%($31,600 per year)
Includes $31,600 and $170,500

Additionally, the water providers would be responsible for infrastructure, environmental mitigation, and recreation modifications. These are itemized in Table 17 at FY 2013 price levels. The total annual cost for Alternative 3 is shown in Table 16. The costs in Table 16 are presented for the period when COS is being repaid (years 1–30) and for the remainder of the period of analysis, after COS has been repaid (years 31–50). These are estimates since costs will be determined when the Water Supply Agreement is signed and the years following.

Table 16.
Financial Costs (FY 13 Price Levels)

	Years 1–30	Years 31–50
Annual Cost of Storage (COS)	$805,500	$0
Annualized First Costs w/o COS	$4,753,100	$4,753,100
Annual OMRR&R	$2,497,300	$2,497,300
Total Annual Costs	$8,055,900	$7,250,400

1.4.6 Financial Costs

The financial costs include the updated cost of storage, environmental mitigation, and recreation modification, and infrastructure or specific costs needed to deliver the water. These costs are the Participant's responsibility and include OMRR&R costs. The financial costs presented above for Alternative 3 are tabulated separately for years 1-30 and 31-50 because they include estimates made for repaying the COS to the U.S. Treasury over a maximum of 30 years. The analysis below presents the financial costs for Alternative 3 to compare with the other alternatives over the 50-year planning period for the test for financial feasibility.

One purpose of this study is to determine the financial feasibility of the alternatives. The financial feasibility test compares alternative costs to the least costly no-action alternative (Alternative 2). An alternative is financially feasible if its costs are less than Alternative 2. Table 17 shows the implementation cost of the alternatives excluding OMRR&R costs for the alternative's

implementation cost. The implementation costs are the cost of storage and first costs for each alternative.

Table 17.
Financial Costs for Alternatives (FY 2013 Price Levels)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Initial / Implementation Costs				
Cost of Storage	$0	$0	$16,046,300	$5,997,900
Specific (Infrastructure)	$244,915,266	$146,109,028	$784,765	$85,030,164
Recreation Modifications	$0	$0	$47,303,435	$23,535,167
Environmental Mitigation	$0	$0	$58,545,585	$21,883,544
Total Implementation Costs	$244,915,266	$146,109,028	$122,680,117	$136,446,776

Table 18 presents the implementation costs and the annual OMRR&R costs at FY 2013 price levels. It includes the financial feasibility test using annual costs. Alternative 3 is financially feasible when compared to Alternative 2. Alternative 3 is the cheapest alternative for the water providers.

Table 18.
Financial Costs for Alternatives (Summary Table)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Initial / Implementation Costs	$244,915,266	$146,109,028	$122,680,117	$136,446,776
Annual OMRR&R Costs	$1,715,055	$1,782,401	$2,497,273	$1,947,679
Financial Test				
Annualized Implementation Costs	$10,916,907	$6,512,696	$5,468,370	$6,082,008
Annual OMRR&R Costs	$1,715,055	$1,782,401	$2,497,273	$1,947,679
Total Annual Costs	$12,631,961	$8,295,097	$7,965,643	$8,029,687
Net Annual Benefits	-$4,336,864	$0	$329,454	$265,410

Table 19 presents the cost per acre-foot (($/yr)/(acre-feet/yr)) for the average year yield of 8,539 acre-feet for the annual implementation costs, OMRR&R, and the total annual financial costs.

Table19.
Financial Cost per Acre-Foot of Yield (FY 2013 Price Levels)

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Yield (acre-feet)	8,539	8,539	8,539	8,539
Annualized Implementation Costs	$1,278	$763	$640	$712
Annual OMRR&R Cost/acre-foot	$201	$209	$292	$228
Total Annual Cost/acre-foot	$1,479	$971	$933	$940

Exhibit A
Water Provider Information

Water Providers Water Supply and Demands

This section discusses the existing water supplies, growth and population trends, water demands, and the need for water for each water provider.

Table 1.
Water Demands

	Water Demands* (acre-feet)				
Water Provider	2010	2020	2030	2040	2050
Lower South Platte Gravel Pit User Group[2]					
Central Colorado WCD	89,000	89,000	89,000	89,000	89,000
Western Mutual Ditch Company	30,000	30,000	30,000	30,000	30,000
Other User (Denver Botanic Gardens)					
Denver Botanic Gardens at Chatfield	40	40	40	40	40
*Penley** Reservoir User Group[1]*					
Mount Carbon Metropolitan District	15	800	1000	1021	1036
Centennial WSD	19,500	22,500	22,500	22,500	22,500
Town of Castle Rock	8,600	11,900	15,400	15,400	15,400
Castle Pines North Metropolitan District	2,290	2,518	2,518	2,518	2,518
Castle Pines Metropolitan District	1,467	1,620	1,620	1,620	1,620
Center of Colorado WCD	267	267	325	375	425
Colorado State Parks	3,000	3,000	5,000	5,000	5,000
Other SMWSA**:					
Pinery Water and Wastewater District (WWD)	3,833	4,729	4,729	4,729	4,729
ACWWA **	3,680	5,200	7,330	10,500	10,500
Cottonwood	1,264	1,996	1,996	1,996	1,996
Stonegate	2,644	4,813	4,813	4,813	4,813
Totals	165,600	178,383	186,271	189,512	189,577

* Provided by the water providers in October 2007.
** SMWSA=South Metro Water Supply Authority; ACWWA=Arapahoe County Water & Wastewater Authority
*** data not available at present

Central Colorado Water Conservancy District

The Central Colorado Water Conservancy District (WCD) covers approximately 475,000 acres located from Commerce City north along the South Platte River to Greeley and East to Fort Morgan. The purpose of Central Colorado WCD is to develop, promote, and implement water conservation, augmentation and management strategies to protect water resources for the benefit of the citizens, economy and environment of the District. One major objective of Central Colorado WCD is to provide surface water supplies to downstream senior water users for the purpose of allowing the operation of approximately 1500 out of priority junior irrigation wells in the South Platte River Alluvial Aquifer. The principal crops grown in the district are corn, vegetables, alfalfa, sugar beets, and wheat. Central's portion of the proposed 20,600 acre-foot Chatfield reallocation would be 2,849 acre-feet of storage with the projected firm annual yield of 968 acre-feet.

Water Supply

The firm water sources in Central Colorado WCD include approximately 18,690 acre-feet in junior and senior water rights along with numerous water storage and recharge facilities.

Growth and Population Trends

Despite large growth estimates in the district boundaries, Central Colorado WCD water demand will not be affected. It is a policy of the Board of Directors to not allow any new water allotment contracts and the role of Central Colorado WCD is not to be the provider of new water supplies for increased growth. That responsibility would belong to local municipal water providers such as water and sanitation districts, municipalities, developers, etc.

Current Water Demand

The current water demand is 89,000 acre-feet. This number will remain constant in future years. As farms are sold for development, these contracts will not decrease as there will still be many non-potable uses like parks, lawns, golf courses, etc. Since it is against policy to issue new water allotment contracts the current water demand will not increase.

Projected Water Demand

The water demand of 89,000 acre-feet will not increase as Central Colorado WCD does not allow for new allotment contracts. Based on projections for 2010, Central Colorado WCD was expected to only be able to meet the needs of 21 percent (18,690 acre-feet) of the district's total demand of 89,000 acre-feet.

Chatfield Storage

The 20,600 acre-foot Chatfield reallocation would result in 2,849 acre-feet of storage with a firm annual yield of 968 acre-feet. Central Colorado WCD's portion of the Chatfield reallocation is a small but important piece in the development of water supplies to meet the gap in needed water supplies.

Western Mutual Ditch Company

The Western Mutual Ditch Company provides surface water supplies to approximately 7,900 irrigated acres from Platteville to LaSalle. The Western Mutual Ditch Company played a major role in the development of the local economy in Weld County as the ditch was dug and first utilized in the mid 1860's. The primary crops irrigated by Western Mutual Ditch Company are corn, vegetables, alfalfa, sugar beets, and wheat.

Water Supply

Currently Western Mutual Ditch Company's firm water sources are senior surface water rights which are diverted from the South Platte River.

Growth and Population Trends

While there might be large population increases in the Western Mutual Ditch Company's boundaries, this will not affect the water supply or demand aspects of the Company. As farms are sold to development or Western Mutual Ditch Company water rights are sold to other municipal interest, the consumptive use portion of the water rights will continue to be utilized.

Current Water Demand

The current demand is for 30,000 acre-feet.

Projected Water Demand

The current demand of 30,000 acre-feet will not increase as additional shares in Western Mutual Ditch Company will not be issued. Currently, Western Mutual Ditch Company will only have sustainable water supplies to meet the needs of 50 percent (15,000 acre-feet) of the total demand of 30,000 acre-feet.

Chatfield Storage

The 20,600 acre-foot Chatfield reallocation would result in 1,425 acre-feet of storage with a firm annual yield of 485 acre-feet. Western Mutual Ditch Company's portion of the Chatfield reallocation is a small but important piece in the development of water supplies to meet the gap in needed water supplies.

Colorado Parks and Wildlife

Chatfield State Park is located approximately 25 miles southwest of Downtown Denver and is located in portions of three counties—Douglas, Jefferson, and Arapahoe. Chatfield is owned and operated by the U.S. Army Corps of Engineers. The recreation rights to the reservoir are leased by Colorado Parks and Wildlife. Chatfield State Park is about 5,300 acres in size and currently includes approximately 1,500 surface-acre of water. More than 1.5 million visits occur at the park each year and the most popular recreation activities are centered around the reservoir, including fishing, swimming, boating, and aquatic wildlife viewing. Major water-based recreation facilities include three major boat ramps, a swim beach complex, and the Chatfield Marina. Colorado Parks and Wildlife's portion of the proposed 20,600 acre-foot Chatfield reallocation would be 1,000 acre-foot of storage with the projected firm annual yield of 340 acre-feet.

Water Supply:

The current firm water sources for Chatfield State Park include approximately 1,200 acre-feet in junior surface water rights.

Growth and Population Trends:

Currently, an estimated 1.5 million people visit Chatfield State Park every year. Due to its close proximity to the Metro Denver area and increased population growth throughout the entire Front Range, it is expected that this park will remain a popular destination for those seeking a water-based recreational experience close to home and visitation will increase.

Current Water Demand:

The current water demand is approximately 3,000 acre-feet. This number will remain constant in future years until 2030. This water is used to maintain a recreational pool in the Chatfield Reservoir to support water-based recreation at the Park.

Projected Water Demand:

The projected water demand for Colorado Parks and Wildlife is currently 3,000 acre-feet per year, and by 2030 will be 5,000 acre-feet per year.

Chatfield Storage

The 20,600 acre-foot Chatfield reallocation would result in 1,000 acre-feet of storage with a firm annual yield of 340 acre-feet. Based on projections for 2010, Colorado Parks and Wildlife was expected to only have sustainable water supplies to meet approximately 51 percent of the Parks' total water demand of approximately 3,000 acre-feet. Colorado Parks and Wildlife's portion of the Chatfield reallocation is a small but important piece in the development of water supplies necessary in order to maintain a sufficient recreational pool at Chatfield Reservoir.

Denver Botanic Gardens at Chatfield

Denver Botanic Gardens at Chatfield is a picturesque nature preserve among the grasslands, ponds and cottonwood banks of Deer Creek. The property is a former farm owned by the Hildebrand family and still contains mostly restored old farm houses, barns, out-buildings and a one-room school house. The mission of the Denver Botanic Gardens at Chatfield is education and preservation. Many of the farm facilities have been preserved for historic purposes as working museums, while others have been restored for active education and income purposes. In addition, future uses include prairie restoration and research, which is an environmental resource that is disappearing in the Denver Metropolitan area.

Water Supply

The Denver Botanic Gardens at Chatfield's water supply comes from two sources, one for domestic use and another for irrigation. Domestic water supply comes from a 4" tap on the Denver Water Department's 54-inch Conduit 12, which runs through the site. Irrigation water is obtained from a shallow (less that 30-foot) groundwater well, which is augmented by water from the Last Chance and Nevada Ditches and the Fairview Reservoir.

Current Water Demand

Denver Botanic Gardens at Chatfield is using approximately 30 acre-feet of irrigation water per year.

Future Water Demand

One of the primary sources of income to support the education mission is the annual "corn and pumpkin" festival to celebrate harvest time tradition in the farming community. Another source of income is the entrance fees for visitors who come to see how farming was done in the 1800's and early 1900's, as well as to view the wildlife in the preserved riparian corridor along Deer Creek and the prairie area on either side of Deer Creek. To ensure that these income sources prevail, having water to grow corn and pumpkins and to establish prairie vegetation growth is a must.

Without the current water owned by the Denver Botanic Gardens at Chatfield, the farm would lie dormant resulting in decay and loss of a historic resource. Therefore, the Denver Botanic Gardens at Chatfield has already made a substantial investment to meet water demands, but more water is needed. Based on projections for 2010, the Denver Botanic Gardens at Chatfield was expected to need 40 acre-feet of water per year. As of now, Denver Botanic Gardens at Chatfield has an average year sustainable water supplies of 28 acre-feet, which is well short of its current demand. However, if Denver Botanic Gardens at Chatfield can get an average 14 acre-feet of water per year from the Chatfield reallocation its water demands will be met.

Mount Carbon Metropolitan District

Mount Carbon Metropolitan District (Mount Carbon) is located primarily within the Town of Morrison, with additional portions of the district within the City of Lakewood and unincorporated Jefferson County. Mount Carbon is largely undeveloped at this time, but future development is expected to be commercial, mixed use, and residential. Commercial development will be focused near the C-470 and Morrison Road interchange (an area known as Red Rocks Centre), north and east to the proposed McIntyre Street alignment. Residential development will be in the northeast portion of Red Rocks Centre (north and east of the proposed McIntyre Street).

Water Supply

Mount Carbon currently has an infiltration gallery, pump, and gas chlorination facility adjacent to Bear Creek. All of Mount Carbon's water rights are surface water rights on Bear Creek or the South Platte River. The current raw water storage is 21.6 acre-feet in the Soda Lakes Reservoir.

An evaluation of Mount Carbon's water rights indicate that to fully utilize their capacity, Mount Carbon would need to have an upgraded diversion system, 400-450 acre-feet of raw water storage, a new surface water treatment plant, and reuse the return flows to Bear Creek. With these improvements, Mount Carbon could have an estimated yield of 1,000 acre-feet per year.

Growth and Population Trend

Mount Carbon currently has only one residential customer. The area has been re-zoned and the build out populations (in 2036) for employees and residents are estimated to be 6,949 and 2,256, respectively. At this time, service to additional areas outside the district is not anticipated.

Current Water Demand

The current water demand in Mount Carbon is approximately 15 acre-feet per year. The water use is associated with the one residential customer and contracted water agreements for construction purposes.

Projected Water Demand

The projected water demand in Mount Carbon is approximately 1,036 acre-feet per year at build out.

Renewable Water Supplies

Mount Carbon will rely solely on surface water diversion for their water supply. In addition, the district anticipates the use of return flows to Bear Creek to further extend their water service capacity.

Chatfield Storage

Mount Carbon seeks to obtain the required raw water storage in Chatfield Reservoir. The 400 acre-feet of storage would satisfy the requirements of their water rights portfolio and help to meet the needs of future development within the district.

Centennial Water and Sanitation District

The Centennial Water and Sanitation District (WSD) provides water and wastewater services to the Highlands Ranch community in northern Douglas County along C-470 from Santa Fe Drive to

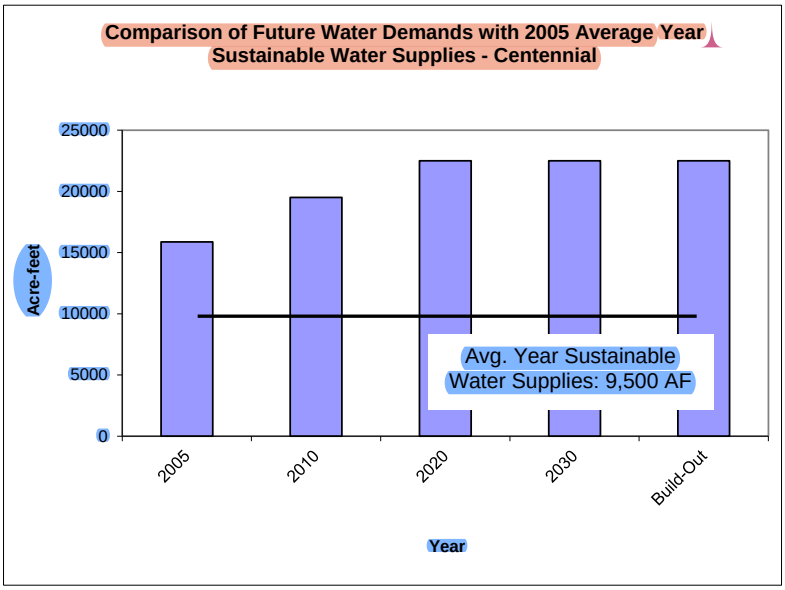
Quebec Street. The service area includes primarily residential development and associated light commercial business use. Highlands Ranch had its first resident in 1981 and since that time has been part of the noticeably fast growth occurring in northern Douglas County.

Water Supply

Centennial has developed both surface water supplies and the nontributary Denver Basin groundwater resources underlying the service area. Raw surface water, with an estimated average year yield of 9,500 acre-feet per year, is pumped from diversion facilities along the South Platte River to either the McLellan or South Platte Reservoirs. Groundwater resources are developed from Denver Basin aquifers underlying the Highlands Ranch service area. Approximately 33 percent of Centennial WSD's existing build-out water supply is from nontributary Denver Basin aquifers.

Growth and Population Trends

The Centennial service area is approximately 85 percent built out. The remaining residential and commercial development to a population of 100,000 is anticipated to occur by 2015.



Current Water Demands

In 2005, Centennial provided 15,876 acre-feet of water to its service area.

Future Water Demands

Centennial's projected water demands are 22,500 acre-feet per year by 2020. Centennial will continue its policies of aggressive water conservation, reuse and injection of surface water into the Denver Basin aquifers.

Town of Castle Rock

The Town of Castle Rock is located midway between Denver and Colorado Springs (central part of Douglas County) and is home to slightly more than 42,000 people. Castle Rock encompasses 33 square miles and sits in East Plum Creek Valley at the base of the Rocky Mountains.

Water Supply

Currently, almost all of the water needs of the Town of Castle Rock are supplied by groundwater. Approximately 98 percent of the Town's demand is met with deep, non-tributary groundwater wells and the remaining supply by other sources such as surface water rights and not nontributary groundwater. Castle Rock overlies the Denver Basin, a geologic formation with four principal aquifers: the Arapahoe, Denver, Dawson, and Laramie-Fox Hills. The Town owns surface water rights with an average year yield of 1,841 acre-feet per year that can be utilized following the development of an alluvial well field.

Growth and Population Trend

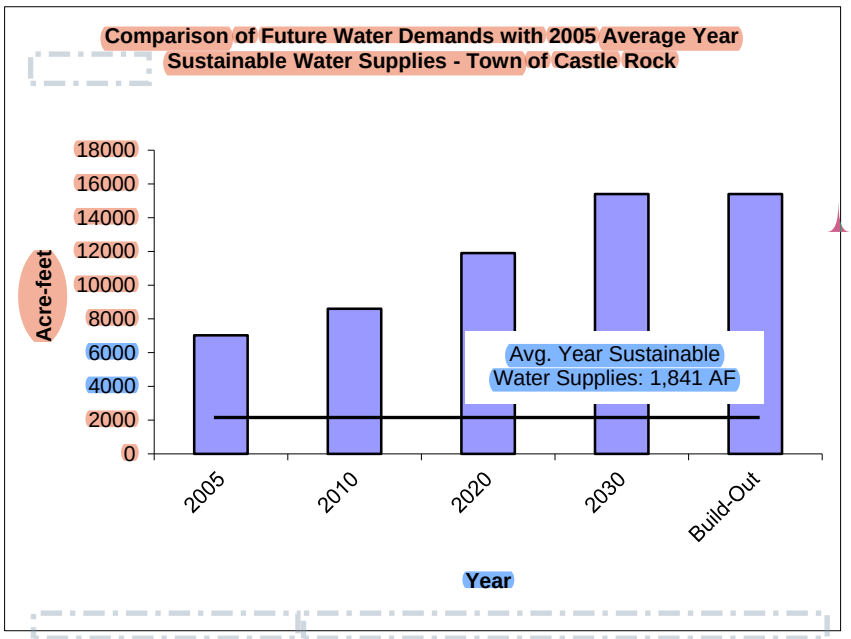
The Town of Castle Rock has experienced significant growth as the I-25 corridor in central Douglas County has developed as both a commuter center to the south metropolitan area and as a service center in itself. Around the year 2000 the population was just over 20,000 and as of January 1, 2007, the population was recorded at 42,241. For the years to come, it is expected the population will continue to rapidly grow eventually reaching 100,000 residents.

Current Water Demand

The Town of Castle Rock used 7,030 acre-feet of water in 2005 to meet its demands.

Projected Water Demand

The Town of Castle Rock will continue to grow. It is estimated that an additional 800 (single family equivalents) SFEs will be added per year, and with a finite source of water, it is extremely important that the Town of Castle Rock pursue other sources of water. Estimates show that the current Town of Castle Rock water demand is approximately 8,600 acre-feet per year and by 2030 over 18,000 acre-feet of water per year (15,400 acre-feet with an aggressive conservation program in place).



Castle Pines North Metropolitan District

The Castle Pines North Metropolitan District is a quasi-municipal government entity that was established in 1984. It is located immediately north of Castle Pines and west of I-25. The District currently serves the Castle Pines North population of approximately 9,000, and has more than 3,000 residential and business customers for water and service. The District is currently at 95 percent build out. The District also serves commercial, open space, parks, schools, and a golf course. In recent years, residential demands have comprised about 80 percent of the District's total water use.

Water Supply

The District's water supply currently is 100 percent from nontributary wells with adjudicated rights in the Upper and Lower Dawson, Denver, Arapahoe and Laramie-Fox Hills aquifers. Pumping six Arapahoe Aquifer wells, two Denver Aquifer wells and two Lower Dawson Aquifer wells currently meet all water uses in Castle Pines North. Reclaimed treated wastewater effluent is used to irrigate the Ridge Golf Course. Potable water is treated (iron and manganese removal) and disinfected before delivery to customers.

The District also owns a 1985 water right on East Plum Creek. The average yield of that water right is 1030 acre-feet per year. The District also has pending water court applications for additional renewable supplies and storage. Renewable water, effluent from renewable and nonrenewable

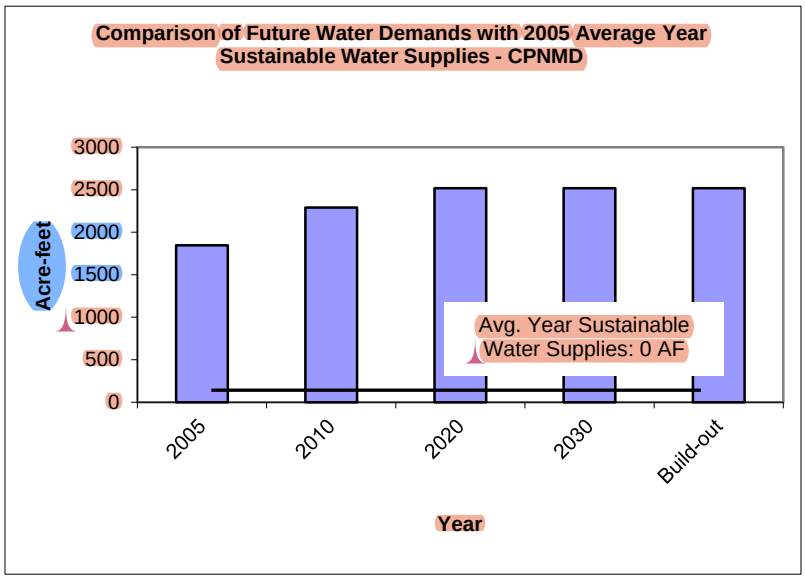
sources, lawn irrigation return flows and other leased water from renewable sources would be stored in the Chatfield reallocation space by this District.

Growth and Population Trend

Castle Pines North experienced rapid growth in population and employment from 1995 through 2005. The population went from about 1,400 in 1995 to about 9,000 in 2006. The current population has peaked at nearly 10,000.

Current Water Demand

In 1996, Castle Pines North used 561 acre-feet of water. By 2000, the annual water demand had increased to 1,369 acre-feet and reflects significant growth in demands that have been met by expanding the pumping of the Denver Basin aquifers. Extensive residential and some commercial development have occurred in the last 5 years and the District currently serves over 3000 SFEs. As a result, the current annual water demand has increased to approximately 1,565 acre-feet per year.



Projected Water Demand

Build-out of the District was expected to occur by 2011 with a total of 3,400 SFEs. An estimated 2,240 acre-feet per year of water is required to meet build out conditions. If adjacent areas elect to be served by Castle Pines North, they would be required to dedicate adequate water supplies to meet the projected water demands of the zoned urban densities.

Castle Pines Metropolitan District

Castle Pines Metropolitan District established in 1973 for the purpose of providing water, wastewater treatment, operation and maintenance of street improvements and storm drainage services to Castle Pines Metropolitan District. The Castle Pines Metropolitan District community is located immediately south of Castle Pines North and west of I-25 and extends south to U.S. Highway 85.

Water Supply

Currently, the water provided to Castle Pines Metropolitan District originates as non-renewable ground water in the Denver Basin aquifers. At present, there are nine wells that extract water from the aquifers and pump it to the water treatment plants.

Castle Pines Metropolitan District also owns a 1985 water right on East Plum Creek. The average yield of that water right is 1,030 acre-feet per year. Castle Pines Metropolitan District also has

pending water court applications for additional renewable supplies and storage. Renewable water, effluent from renewable and nonrenewable sources, lawn irrigation return flows and other leased water from renewable sources would be stored in the Chatfield reallocation space by this District.

Growth and Population Trend

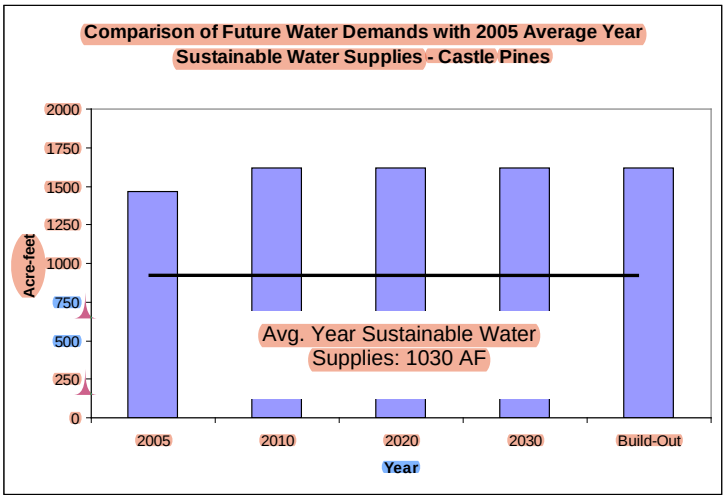
The Castle Pines Metropolitan District currently serves 1,518 taps. Of these taps, 1,390 are for domestic and commercial use. The remaining 128 taps are dedicated for irrigation and community use. This equates to 1,597 equivalent residential units (EQRs). Based on future development plans, it is estimated that build out for the District will be 2,100 EQRs. Build out was expected to be achieved some time between January 2011 and January 2013.

Water Demand

In the water year 2005-2006 CPMD used 1,163 acre-feet of water from its deep non-tributary wells and 552 acre-feet as reuse effluent for irrigation.

Projected Water Demand

Projections for 2010 estimated that Castle Pines Metropolitan District would need 1,620 acre-feet of water to meet its water demands. Due to the fact that Castle Pines Metropolitan District is not expected to grow much in the next 10 years the water demand will not increase.



Center of Colorado Water Conservancy District

The Center of Colorado Water Conservancy District ("Center of Colorado") is a water conservancy district created by vote of the citizens of Park County in 1997. Its boundaries encompass all of Park County. Park County sits at the headwaters of the South Platte River and several of its principal tributaries. Park County is primarily a rural county with approximately 50 percent of the land being held in federal ownership. With a largely decentralized population, much of the water supply is derived from individual wells or smaller, central water systems.

The Center of Colorado's primary purpose is to preserve and develop the water of Park County to meet the present and future needs of Park County and its citizens. The Center of Colorado is not a municipal water supplier providing potable water supply to its customers; rather, it provides bulk water to customers to augment depletions from individual water users.

In 2007, the Center of Colorado joined with the Upper South Platte Water Conservancy District to form the Headwater Authority of the South Platte (HASP). Through HASP, the Center will make augmentation water rights available to its constituents throughout the upper South Platte headwaters area.

Water Supply

Center of Colorado and HASP have developed 230 acre-feet per year of surface water rights on Tarryall Creek and Deer Creek, 37 acre-feet of water rights allocated from the City of Aurora's water rights portfolio in Spinney Mountain Reservoir and approximately 70 acre-feet of storage capacity.

Growth and Population Trends

Census data and population projections from the Pikes Peak Area Council of Governments establish that Park County has grown substantially in the past 15 years and projections for the future are for significant continued growth:

1980 – 5,333 (census data)
1990 – 7174 (census data)
2000 – 14,523 (census data)
2005 – 17,404 *
2010 – 25,289
2015 – 37,129
2020 – 50,932
2025 – 67,588

(*2005-2025 data based upon projections by Pikes Peak Area Council of Governments)

Current Water Demand

The Center of Colorado is in the process of adjudicating a county-wide plan for augmentation after which completion it anticipates a substantial increase in customer demand. Until completion of that project, there is a relatively small demand compared with projected future demands. Current customer demand is approximately 20 acre-feet per year. However, with 267 acre-feet of average annual water rights and only 70 acre-feet of present storage capacity, Center of Colorado needs additional storage space in order to effectively use and control its water rights.

Projected Water Demand

The Center of Colorado Center of Colorado has approximately 267 acre-feet per year of available surface water rights but only 70 acre feet of present storage capacity. This 197 acre-feet shortfall between available water supplies and storage capacity will limit the ability of the Center of Colorado to meet demands for a projected population increase of approximately 260 percent between 2010 and 2025.

Pinery Water and Wastewater District

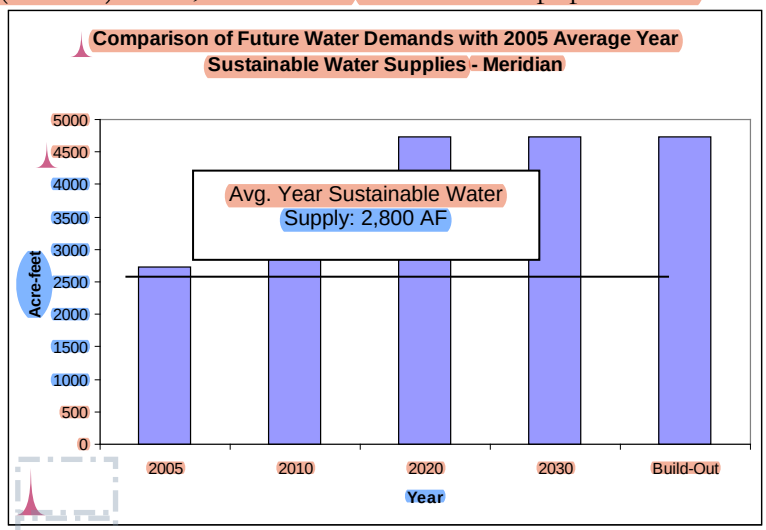
The Pinery Water and Wastewater District (WWD) serves an area south of Parker along Parker Rd. The district currently serves around 4,000 residences and over 75 irrigator or commercial customers.

Water Supply

Pinery WWD draws the majority of its water (around 73 percent) from shallow wells diverting surface water from Cherry Creek. The Pinery also owns a significant amount of water rights in the Denver Basin aquifer.

Growth and Population Trend

The service population for Pinery WWD (PWWD) was 8,334 in 2000. The build out population is 17,650 and will be reached by 2020.



Current Water Demand

The overall water provided in 2010 was approximately 3,833 acre-feet.

Projected Water Demand

With 2,732 acre-feet being provided in 2005, and build out being reached by 2020, PWWD will experience increased need for water over the next 7 years. 4,729 acre-feet are estimated for 2020 and subsequent years.

Arapahoe County Water and Wastewater Authority

Arapahoe County Water and Wastewater Authority (ACWWA) is a political subdivision formed in 1988 by an agreement between Arapahoe County, and the Arapahoe Water and Sanitation District for the purpose of developing water resources, systems and facilities, and wastewater collection and treatment facilities for the ACWWA service area. The Authority serves an area of more than eight square miles in southeastern metro Denver, and provides contract water service beyond its service area.

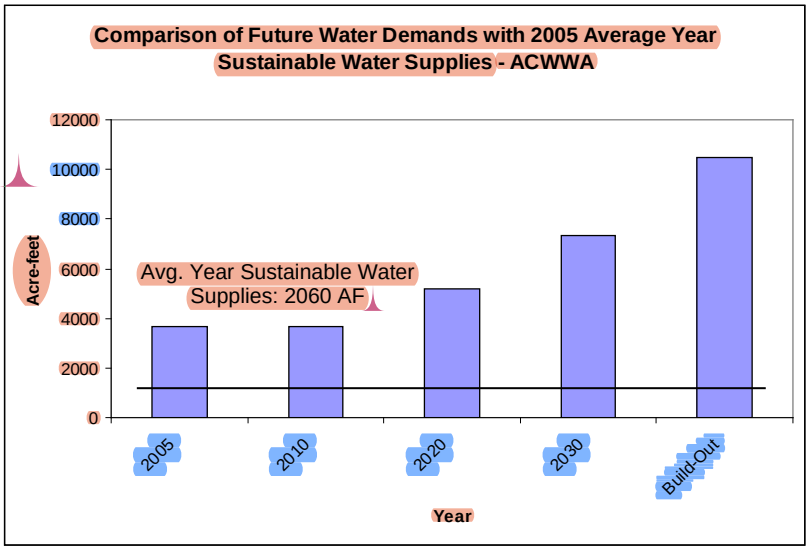
Water Supply

ACWWA meets its water supply needs primarily by pumping nontributary groundwater. ACWWA also depends on alluvial water supplies from Cherry Creek consisting of junior and senior water rights, and return flow credits under its augmentation plan. In order to more effectively use its tributary supplies, ACWWA will start construction later this year on a water treatment plant to treat alluvial groundwater; the plant was completed in 2009. ACWWA is also continuing to develop a nonpotable system consisting of both alluvial raw water and reuse water for irrigation of commercial, industrial and open space areas to reduce demands on the nontributary groundwater resources and potable system.

Growth and Population Trends

ACWWA's service area is primarily in Arapahoe County, but includes some property in northern Douglas County. The service area consists primarily of office complexes, commercial and light industrial areas, and multi-family residential properties. ACWWA also provides water service only to mostly single-family residential customers in the Town of Foxfield, a small area of Aurora, and subdivisions in unincorporated Arapahoe and Elbert Counties.

ACWWA's service area is comprised of an employee population estimated at 25,000 and a residential population estimated at 6,000. In addition, ACWWA provides water service to an estimated population of 1,800 beyond its service area. The service area is expected to build out with high-density uses, primarily commercial and light industrial, by 2040. ACWWA also continues to consider requests for contract water service to existing and proposed development beyond its service area.



Current Water Demand

In 2005, ACWWA used 3,100 acre-feet of water. 1,020 acre-feet, or 33 percent, was nontributary groundwater; 2,060 acre-feet, or 67 percent was alluvial groundwater including reuse/recapture of return flow. The average day demand was approximately 2.76 mgd.

Projected Water Demand

ACWWA projects water demands of 5,200 acre-feet in 2020; 7,330 acre-feet in 2030; and a build-out demand of 10,500 acre-feet by 2040.

Renewable Water Supplies

ACWWA is diversifying its portfolio to reduce dependence on nontributary groundwater. It is focusing attention toward a water conservation program, and has an inclining-block rate structure to encourage efficiency. ACWWA continues to develop its nonpotable water system to make better use of its raw alluvial and reuse supplies, offsetting nontributary groundwater pumping to the extent possible. ACWWA is also participating with Cottonwood WSD in development of the Joint Water Purification Plant (JWPP) to allow extended use of renewable water supplies from Cherry Creek.

ACWWA is also working with Cottonwood WSD, Inverness WSD and Pinery WWD to make use of a block of tributary and nontributary groundwater rights purchased in upper Cherry Creek. This group has formed the Cherry Creek Project Water Authority to develop these supplies. This Authority is pursuing development of storage on upper Cherry Creek and the transport of those supplies to individual district service areas.

Chatfield Storage

With these measures, ACWWA is working toward expanding its renewable supply resources. ACWWA's participation with the South Metro Water Supply Authority in the pursuit of additional supplies in the upper South Platte River and storage in Chatfield Reservoir is consistent with that strategy.

Cottonwood Water and Sanitation District

Cottonwood Water and Sanitation District serves mostly residential developments within or northwest of the Town of Parker and is located in Douglas County between the service areas of ACWWA and the Parker Water and Sanitation District, although recent development has been primarily commercial uses. Future development is expected to be both residential and commercial, but current development includes retail uses and a large Family Fitness Center in the Crown Pointe development at the intersection of E-470 and Parker Roads.

Water Supply

Cottonwood meets its water supply needs today by pumping primarily nontributary ground water. Cottonwood has alluvial water supplies on Cherry Creek as well, including senior water rights, junior water rights and return flow credits under its augmentation plan. In order for Cottonwood to effectively use its tributary supplies, Cottonwood constructed a water treatment plant to treat alluvial groundwater. Cottonwood's available water supplies have been greatly expanded, particularly its renewable water supplies on Cherry Creek of approximately 1,034 acre-feet per year. Cottonwood has also been developing, and will continue to develop a non-potable water system to deliver water for outdoor uses on commercial, industrial and open space areas as a way to reduce the demands on the nontributary groundwater resources.

Growth and Population Trend

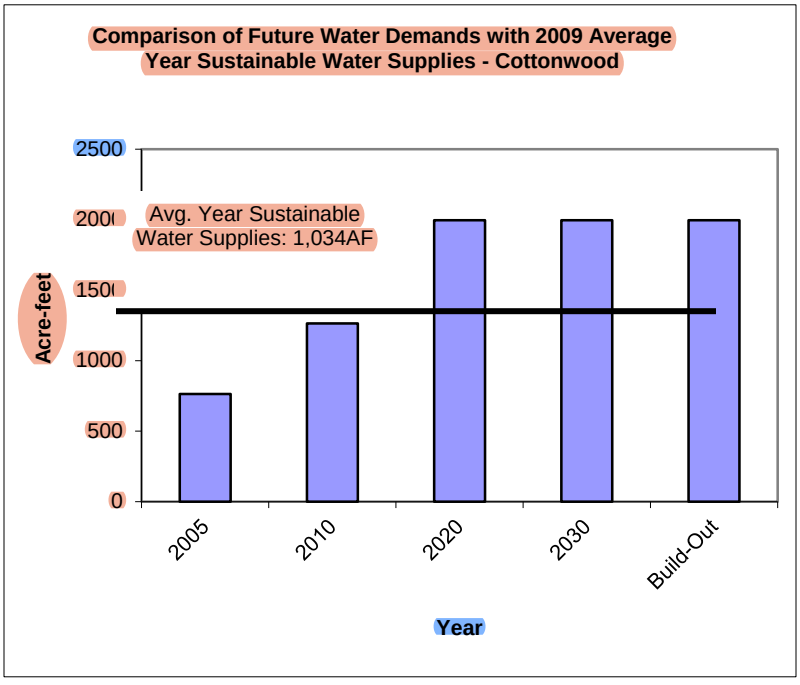
Cottonwood currently has a population about 7,600. Much of the development is currently commercial, although there is still a substantial amount of residentially zoned vacant property within the District. Hence, the District expects population to increase by as much as 3,000 more residents, and to add as much as 1.8 million square feet of commercial development as well. The District is well situated along E-470 and Parker Road, and build-out is expected to occur within the next 10 years.

Current Water Demand

In 2006 Cottonwood had 2,415 SFE connections and delivered 876 acre-feet of water for the year. For an average day, Cottonwood used 800,000 gallons a day of water. The total water use per capita for residents in Cottonwood is approximately 81 gallons per day per person.

Projected Water Demand

Cottonwood's population is projected to peak at about 10,600 by about 2015 and the number of SFEs is expected to reach approximately 4,000. With projected growth in the District,



Cottonwood estimates that it will need to deliver approximately 1,996 acre-feet of water per year at build-out.

Renewable Water Supplies

Cottonwood is taking action to reduce the dependency on nontributary groundwater sources. Cottonwood has had in place a water conservation program that allocates an appropriate amount of water to each customer, and when the allocation is exceeded, rates rise dramatically. In addition, Cottonwood has required non-potable irrigation in its Crown Pointe development, and will require it in the remaining commercial and multi-family areas yet to be developed. This will effectively reuse 300 acre-feet of water supplies thereby reducing nontributary ground water pumping.

Cottonwood is also a participant in the Joint Water Purification Plant ("JWPP") which allows the District to fully utilize its renewable water supplies from Cherry Creek, and to fully reuse both these supplies and nontributary ground water supplies.

Cottonwood has also participated with ACWWA, the Inverness Water and Sanitation District and the Pinery Water and Sanitation District in the purchase of tributary and non-tributary ground water rights in upper Cherry Creek. This group has formed the Cherry Creek Project Water Authority to develop these supplies. This Authority is currently pursuing the development of storage on upper Cherry Creek and the transport of those supplies to individual district service areas.

Chatfield Storage

With these measures, Cottonwood is greatly increasing the percentage of its water supplies that will come from fully renewable resources. Cottonwood's participation with the South Metro Water Supply Authority in the pursuit junior water supplies in the upper South Platte River and in storage in Chatfield Reservoir is one more effort to increase those renewable resources.

Stonegate Village Metropolitan District

Stonegate Village is a planned residential and commercial development in northern Douglas County. Stonegate Village Metropolitan District (District) provides water and wastewater service to Stonegate Village. The District primarily serves residential areas, but there is a rapid developing commercial sector along the E-470 corridor along the District's northern boundary. The District also provides water service to adjacent areas including Lincoln Park Metropolitan District and the E-470 Business Metropolitan District through a Regional Facilities Agreement.

Growth & Population Trends

The District had 2230 SFEs in 2000 and, at build-out, will have 4933 SFEs. Stonegate Village is close to ultimate build-out but surrounding areas that are connected to the water system have additional growth potential.

Water Supply

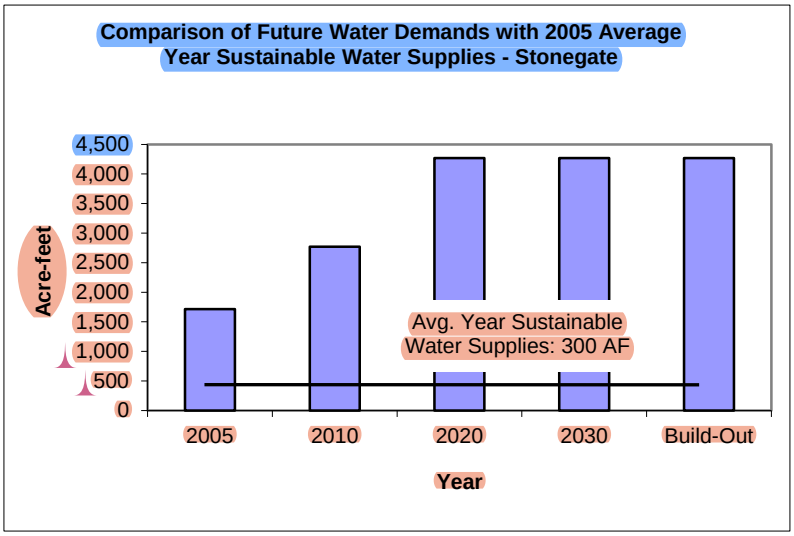
The majority of water supplies are currently developed from the Arapahoe and Laramie Fox Hills aquifers. The District currently has 15 wells into the Denver Basin. Under a decreed augmentation plan, the District exchanges against wastewater discharges using an alluvial well system on Cherry Creek. The District reuses treated effluent for irrigation within the District. As effluent supplies increase with growth, the District will discharge excess wastewater to Cherry Creek.

Current Water Demand

In 2005 it is estimated that Stonegate used 1,715 acre-feet of water of which 300 acre-feet was sustainable water supplies. Currently, the District is estimated to need 2,770 acre-feet of water per year to meet its future water demand.

Projected Water Demand

By 2020, the District needs 4,270 acre-feet of water per year to meet its future water demand.



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