# WATER FEASIBILITY REPORT —STERLING RANCH SKETCH PLAN AMENDMENT NO 4

## **TOPICAL REPORT RSI-3232 A**

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PREPARED FOR

Falcon Area Water and Wastewater Authority

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## 1.0 INTRODUCTION

The purpose of this study is to provide a preliminary feasibility of the water resources needs that would be necessary for the Sterling Ranch Sketch Plan Amendment No 4.

#### 1.1 DEVELOPMENT DESCRIPTION

This sketch plan amendment 4 appears to generally be consistent with the original sketch plan at least in regard to water requirements, so this submittal is considered equivalent to the approved plan.

Appendix A contains the Overall Service Area Map for FAWWA, which includes the sketch plan area.

Appendix B-1 contains the proposed Sterling Ranch Sketch Plan Amendment No 4

## 2.0 BASIS OF WATER NEEDS

#### 2.1 UNIT USER CHARACTERISTICS

It is expected that the residential lots on central water will be developed with varying densities of development with an upper limit of 4800 residential units which is the same as the existing sketch plan. From a water standpoint, more of the higher density units are expected which would actually lower the water needs from the original sketch plan.

For the last five years, there has been a trend in land use that provides for much smaller lots and much denser development in certain areas. Lots smaller than 7,000 square feet are anticipated in certain areas. This is resulting in much lower water needs for these types of developments. The standard SFE adopted in FAWWA has been 0.353 annual acre-feet. However, this is for the formerly typical household anticipating 1500 square feet or more of landscaping. In order to adjust for such increases in density, we are adopting a scaled down equivalency to meet the changes in lot sizes. For instance, lot areas less than 3500 sf have reduced water use that roughly is equivalent to apartments or townhomes where water use is indoor only.

In order to address this trend towards high-density development, we have established a SFE equivalency factor scale as follows for these smaller lot sizes;

Effective Annual Lot Size SFE Ratio Demand Lots < 2000 SF 0.65 0.23 Lots < 3500 SF 0.75 0.265 Lots < 7000 SF 0.90 0.318 Lots > 7000 SF 1.0 0.353

Table 1. SFE Equivalency for High Density Lots



#### 2.2 FEASIBILITY OF WATER SUPPLY

It is expected that the residential lots on central water will be developed with varying densities of development with an upper limit of 4800 residential units which is the same as the existing sketch plan. From a water standpoint, more of the higher density units are expected which would actually lower the water needs from the original sketch plan.

For the last five years, there has been a trend in land use that provides for much smaller lots and much denser development in certain areas. Lots smaller than 7,000 square feet are anticipated in certain areas. This is resulting in much lower water needs for these types of developments. The standard SFE adopted in FAWWA has been 0.353 annual acre-feet. However, this is for the formerly typical household anticipating 1500 square feet or more of landscaping. In order to adjust for such increases in density. This feasibility report is a submittal for the Sterling Ranch Sketch Plan Amendment No 4. The land is anticipated to be provided central water and sewer services through the Falcon Area Water and Wastewater Authority (FAWWA), which will become the overall service entity for, not only the Sterling Ranch Metropolitan District, but also the Retreat, and the future Ranch.

It is expected that an urban residential home in Sterling Ranch will require an average of 0.353 annual acre-feet, which is the adopted user characteristic for FAWWA. This is consistent with historic needs for nearby developments. Note that for the very small high-density lots, FAWWA has adopted an SFE equivalency ratio to account for substantially reduced water needs, although this is partially offset by estimation of common area irrigation needs.

The maximum number of residential units for Sterling Ranch Sketch Plan Amendment remains 4800 per the original sketch plan. A minor amount of commercial and other water uses is expected. The Retreat represents only 177 additional residential units. Jaynes parcel or Prairie Ridge might include another 450 residential units. In total overall sketch plans include about 5427 residential units at full SFE, but fewer SFE are anticipated due to high density lot development

This is a rather large sketch plan, so a buildout period of 20-30 years is reasonable. *The current available water supply for FAWWA or SRMD is now 1963.54. acre-feet 300 year* which would allow for over 5562 SFE. Since many of the maximum residences will be high density, the SFE requirement will be substantially lower than the water available. Without any additional water acquisitions, which would be likely anyway, FAWWA is in a very feasible position to be able to easily provide for the water needs of the Sterling Ranch Sketch plan as modified by Amendment 4.



## 3.0 WATER RIGHTS AND SYSTEM FACILITIES

#### 3.1 WATER RIGHTS OVERVIEW

Water rights adjudications have been decreed by the State of Colorado, Water Division 2 District Court, Water Division 1 District Court, and the Colorado Groundwater Commission. The comprehensive rights for the FAWWA service include both decrees. Local groundwater rights are associated with the service area components, Sterling, and the Retreat. Each of these sites has existing decrees outlining the rights associated with the development lands.

Table 2 on the following page details all of the water rights currently available for the FAWWA service area.



Update August 9, 2024

Table 2
Falcon Area Water and Wastewater Authority
Comprehensive Water Supply Inventory
Current Legal Stavely

Lond Formation/Aquifer				Armuel	An				Saturated			
Formation Aquifer	Reference Firsting/ Determination/	Tolkutury	Volume	Allecation.	Armon al Allocation	Reference Beed	Notes	Sand	Subtrated Specific Vield			
	Becree	Status	Acts-Float	100 Year A-F/You	300 Year A-F/Year			Thidness	Yald			
			-Site Sterling Wa	aer Legal Source	ı							
Laramie Fox Hills	86-CW-19 68 CW113	NT NT	53,900 40	539.00 0.40	179.67 0.13	PANNA Assissance	Under 1410 acres Under 41.44 acres	255	15%			
						FAWWA Assignment from SR Water	refused to 1.44 acres					
Arapahoe	86-CW-18	NT	57500	575.00	191.67		Under 1410 acres	240	1796			
Laramie Fox Hills	91 CW35	NT	3623	36 23	12.08	Quit Claim	Ray ger Water	183	15%			
Arapahoe	91 CW35	NT	4996	49.36	16.45	Outt Claim	Rayest Water	220	15%			
	91 CW 35		****			Our Caum	Ay pa waa	220	1370			
Total NT On-Site					400.00							
Laramie Fox Hills	20CW 3059	20 CW 3059.	Additional On-Si 2780	ir and Au omente. 27 20	Storěny Water. 927	Legel Sairces	97.54 acres S.R. Quarry	190				
Arapahoe	20 CW 2059	NNT	4311	4311	1437		(Hom 5) 97.54 acres S.R. Quarry	260.5				
Denver	20 CW 3059	NNT	4556	45.56	1519	FAWWA Assignment	(H+m 3)	295.2				
Juliu .						from SR Water See Bur-X belowfor Fost Pumping Depletions	97.54 acres S.R. Quarry (Now 3)	2002				
Deriver	64 CWH3 Aug 20 CW 3059	NNT	72893	728.93	242.96	Furning Depletions	Starling Runch, 1410 acres	0.158228464				
	Aug 20 CW 3059											
Arapahoe	68 CWH3 Aug 20 CW 3059	NNT	60	0.60	0.20		StarlingRanch #1.44 reduced to 1.44 acres					
Fatal flow 20 CW 9059	hag room sus	84600			282.00		Schall varieties I water					
Japan Parel Water (Perindelly) of sel Blatnic												
Laramie Fox Hills	67 CW56	NT	3850	38.50	12.83	el Water (Previelbäge) and	Altestano 135 Acres Parcel A	190	15%			
	07 CW56	NT					135 Acres Parcel B					
	24 CW 3007 Pending	NT	-480	-4.00	-1.60		As grantation for 6 private single family wells					
	24 CW 3007 Fending	NT	873	8.73	291		Under Michaele					
Arapahoe	67 CW 56	NT	5810	50 10	19.37		135 Acres Percel A	253	17%			
	07 CW56 24 CW3007 Pending	NT NNT		1291	0.00	Not Augmented	135 Acres Purcel B Under Medonic					
Benver	67 CW56	NNT	1291 6920	12 91 69 20	0.00	Net sugmented	135 Arres Parcel A	301.7	17%			
	67 CW56						135 Acres Percel B					
	24 CW 3007 Fending	NNT	1591	1591	0.00	Not augmented	Under Phetoric					
Daywoo	67 CW56	NNT	3490	34.90	0.00	Not compared 12 AT	135 Acres Parcel A	173.8	20%			
Davson	67 CW56	MMI	340	3494	***	Net sugmented 12 AF viilled for exempt wells	135 Arres Parcel B	1/3.0	407-			
	24 (NF 886) Berling	690	.680	4%0	3.60	Not comped in Total	Face, single formity promite wells	0715 WJ 186	22.037612			
	MINE MATERIALS	890	300		3.0	FAWWA Central Supply	bace in dictorally promote colls  Will Forms 28601	Peri	ek ya kwanenina			
Total from Jaymes/Rhetoric Purce					33.51							
		00011 70 11	· · · · · ·	41 - 1								
Laramie Fox Hills	22 000 000 000 100	Off site Bank NT	42,760	427.00	142.33		Water purchasel in First Transhefrom Bar-X	200	15%			
Arapahoe	93-CW-018(85 CW 445)	NT	12,500	125.00 742.50	4.67		Special Warrandy Shumarock/Bur-X Rights Special Warrandy Shumarock/Bur-X Rights	1840 acres 260	17%			
	93-CW-018 (05 CW 445)		4800	48.00	16.00		Water purchased in First Tranche from Bur-X	1840 acres	****			
Benver	93-CW-018 (85 CW-445)	NT NT	119900 6100	1199.00 61	399.67 20.3		Special Warrandy Shumredt/Bur-X Rights Water purchased in First Transhefrom Bar-X	435 1840 acres	17%			
		NT	-82167	-821.67	-273.89	He S et Acid of a Shorting East	ch PortPumping Depletions (20 CW3059)					
Desson	93-CW018	HNT	128800	1288.00	0.00		Need Joggs entation Plan	490	20%			
Fotal Net Supply from Bar-X			178,683	1780.83	593.61							
Desson	85 CW131	Shawrook HNT	West Ground Wi 49,800	498	0.00		Needs Augmentation					
	85 CW[3]	HNT	105,700	1057	0.00		Needs Augmentation					
Denver HNT	60 C 11131		18,760	187	62.33	Special Warrardy Beel Bar-X Shanwock West						
Benver NT	85 CW131	NT			0.00		Needs Augmentation					
		NT NNT	2,500 47,460	25 474	158.00		The regardent					
Benver NT Ampahos HMT	85 CW131 85 CW131	HNT	2,500	25 474 661.00	158.00 220.3							
Bawar NT Arapshos NAT Arapshos NT Fatal Shamoook West	85 CW1R 85 CW1R1 85 CW1R	NHT NT	2,500 47,400 66,100	661.00	158.00 220.3							
Benver MT éropaine 1947 Armp shee MT	85 CW1R 85 CW1R1 85 CW1R	NHT NT	2,500 47,460	661.00	158.00		900.52 acres					
Bawar NT Arapshos NAT Arapshos NT Fatal Shamoook West	85 CW1R 85 CW1R1 85 CW1R	NHT NT	2,500 47,400 66,100	661.00	158.00 220.3	Special Warrandy Deel						
Benver MT Sexpaines 198T Army shee NT Fetal Shanooch West Laranie Fox Hills	85 CW131 85 CW131 85 CW131 85 CW131	NT NT Off site M «Cun	2,500 47,400 66,100 e Ground Water 26,300	661.00 Sources (Note 5) 263.00	2203 87.67	Special Warrardy Beel McCline	900.52 kares					
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Benoor MT Arapahoe MT Arapahoe MT Arapahoe MET Arapahoe MET Lurunia Fox Mills Arapahoe	85 CW1R1 85 CW1R1 85 CW1R1 1649-BD	NT NT OF the McCan	2,500 47,460 66,100 e Grand Water 26,300 39800	661.00 Sources (Note 5) 263.00 398.00	220 3 220 3 87.67 132.67	Special Warranty Deel McOane	900 52 wares 900 52 wares 900 52 wares					
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Benoer MT Stepphon 181T Anguken MT Fani Shannook West Laranie Fox Mills Anguken Benoer	85 CW1R1 85 CW1R1 85 CW1R1 1649-BD	NT NT OF the McCan	2,900 47,400 66,100 e Ground Water 26,300 39800 51300	661.00 Sources (Notes 5) 263.00 398.00 513.00	2203 87.67 132.67 171.00	Special Warranty Deed. McCane	900 52 wares 900 52 wares 900 52 wares	190	15%			
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JDS-Hydio Coast Basts, I



#### 3.2 PHYSICAL WATER SYSTEM

The FAWWA water system is currently being operated and supplying existing customers. Over the years, expansions of the source of supply will routinely require raw water line extensions, additional wells, and additional storage and treatment. The most major system expansion element already has an approved 1041permit. These facilities are outlined and will be needed from time to time as Sterling Ranch develops. Almost all of the FAWWA's growth will continue easterly and distribution extensions, will simply connect to the existing system at most every road and street extension.

#### 3.3 MASTER PLANNING AND LONG-TERM AND FUTURE SOURCES OF SUPPLY

The FAWWA water system has only been in operation for five years, so little-to-no usable historic information would be reliable for unique, long-term planning. However, substantial nearby data from the Falcon area is available for use. As of the end of 2023, the system had approximately only 450 active users. Therefore, initial projections have been based on area-wide water user characteristics and a linear buildout rate. This rate is considered to be an average annual rate that might be reasonably maintainable over a 10-year period. The average growth rate is projected as 180 units added per year.

- 2040 Scenario: Based on the above factors, the FAWWA system might conservatively anticipate serving 3,710 SFEs in the year 2040. This number is a service area projection and includes the Retreat and The Ranch, as well as the main Sterling Ranch residents. This would require no additional water.
- 7,310 SFEs within its expanded service area, which includes the Retreat and The Ranch. This would be substantially greater than the actual Sterling Ranch. The annual acre-foot requirement might be 600 annual AF, but supply would include water from The Ranch.

<u>Long-Term Planning:</u> Future water supply has already been contracted for and plans for implementation are underway. The first project recently completed provides augmentation for certain on-site NNT water, so that that water may be used in existing and expanded well fields on-site.

- 1. Bar-X Northern Delivery Project: To extend supplies beyond 1,975 SFEs, the McCune and Bar-X contracts for water acquisition will require a major pipeline to be extended northerly to Hodgen Road. This pipeline system will allow for the physical, as well as legal, availability and acquisition of both McCune and Bar-X water to Sterling. Preliminary routing, environmental assessments, and 1041 applications are presently underway for this facility. As discussed previously, development beyond 1,975 SFEs will require the addition of this pipeline.
- 2. Regionalization Opportunities: FAWWA's main supply source is centralized at a point that both Cherokee Metropolitan District and Woodmen Hills Metropolitan District have adjacent major storage and delivery facilities. There are currently no arrangements in place to make connections, but in the future, SRMD may seek to have interconnections and possibly share supply.

The second element is a much broader regionalization: conducting cooperative actions with Colorado Springs Utilities (CSU), which FAWWA has been open to. CSU is potentially also open to shared physical facility utilization, which would enable Sterling to expand its



- scope in seeking water rights. While it is not expected that FAWWA will provide actual water, the access to facilities opens greater doors for FAWWA.
- 3. Indirect, Reuse, Lawn Irrigation Return Flows (LIRF) Credits, Aquifer Storage/Recharge, and Direct Reuse: Regarding return flows, initial development is being planned around sourcing available physical supplies. These supplies are all fully-consumable and ultimately result in potential return-flow capabilities. Since FAWWA wastewater will be partially discharged to the Meridian system, which in turn has the potential to convert some reusable flows to available physical supplies, those options will be available and considered by FAWWA. With regard to LIRF credits, Sterling has already initiated a case that will make augmentation use of its potential LIRF credits.

#### 3.4 SYSTEM INTERCONNECTS

FAWWA currently has no system interconnections. However, as discussed previously, FAWWA's main supply source is centralized at a point that both Cherokee Metropolitan District and Woodmen Hills Metropolitan District have adjacent major storage and delivery facilities. It is possible that future agreements could be made.

#### 3.5 SOURCE OF PHYSICAL SUPPLY

Municipal water demand would be met using primarily Arapahoe and Laramie-Fox Hills formation wells in the FAWWA area. The first well sites are completed as LFH-1 and A-1.Additional wells have been drilled and are expected to come on line in 2025.

Off-site water to the north of the FAWWA service area is generally in the Denver and Arapahoe formations.

#### 3.6 WATER QUALITY AND TREATMENT

FAWWA has filed Consumer Confidence reports for the last two years. The quality is generally consistent with Denver Basin water typically encountered in the Falcon area. The quality of water in these aquifers in this area has typically been suitable for potable use with the addition of iron and manganese treatment.

#### 3.7 WATER STORAGE, DISTRIBUTION, AND TRANSMISSION LINES

An initial 1.0-million-gallon tank has already been constructed at the FAWWA site.

For the purpose of fire protection, we recommend eight-inch lines throughout the residential subdivision. The lines should be looped wherever the street layout allows. A transmission line of 24-inches in diameter has been extended south-southwesterly along one of the major roadways from the storage tank into Phase One of the development.





#### 3.8 PUMPING FOR SERVICE PRESSURES

Ground elevations within the development service area range from approximately 6,970 feet to 7,320 feet. Adequate service pressures are generally considered to be 60 psi for residential service. The tank site is on the FAWWA property at a base elevation of approximately 7,310 feet, which would be capable of supplying acceptable service pressures to ground elevations of approximately 7,190 feet. A direct feed pump station is online at the FAWWA central site that provides adequate pressures for above 7,190 feet.



