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# Water Resources Report

Latigo Trails Filing No. 10

Tech Contractors  
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PCD Project No.: SF-24xxx

## INTRODUCTION

### Purpose

This document addresses the water resources by the Meridian Service Metropolitan District (MSMD) as it relates to the Latigo Trails development and the Trails Filing No. 10 final plat in particular. MSMD is the entity responsible to ensure the continuing operation and maintenance of the potable water delivery improvements. MSMD has been providing treated water to the Latigo Trails and Meridian Ranch developments since 2003. Treatment of the water consists of disinfection of the water as required for all community water systems in addition to addressing iron, manganese and turbidity commonly found in Denver basin ground water wells. Monthly reporting is provided to the Colorado Department of Public Health and Environment (CDPHE) as required, to date there have been no deficiencies.

### *Description of the Service Area*

MSMD provides water and wastewater services to Meridian Ranch which encompasses 2,620 acres of existing and proposed residential, commercial, and business development. Latigo is not located within the taxing boundaries of MSMD, but MSMD does provide water service to Latigo as an as an out of district user per a 2001 Intergovernmental Agreement to provide water service to a maximum of 292 SFEs. Project is located approximately 19 miles northeast of downtown Colorado Springs, 4.5 miles north of the town of Falcon and immediately north of the Meridian Ranch development. The development is located within portions of Sections 9, 16, and 17 of Township 12 South, Range 64 West and consists of residential and open space/park uses. The water system that serves Meridian Ranch and Latigo is classified as a “public water system” (PWSID# CO0121455) and meets the applicable requirements of the Colorado Department of Public Health and Environment.

The project is situated in the Upper Black Squirrel Creek Designated Groundwater Basin which is managed by the Upper Black Squirrel Creek Management District. MSMD currently provides service to over 17,000 in equivalent population in several filings within Meridian Ranch and portions of the Latigo Trails development as an out of district user.

## QUANTITY OF WATER

The land use information shown below is derived from the approved Meridian Ranch Sketch Plan and the MSMD-Latigo IGA and provides a permanent resident and employment forecast for MSMD expected to be obtained for the ultimate build-out. By applying the El Paso County unit water demand factors to the land use forecasts, the quantity of water required for the development may be forecast for the proposed project and the ultimate development. The estimated service population and land use can be found in Table 1 - Land Use/Population below.

**Table 1 - Land Use/Population**

Land Use	MSMD Master Plan 5,443 SFEs Total				Existing/Approved Projects: Meridian Ranch Filings 1 - 11 Estates 2 & 3, EHR 1 & 2, Latigo Trails 2A, 7 - 9 RHR 1-3, RHRN1 & 2, Sanctuary, Stonebridge 1 - 4, The Vistas Filing 1, WindingWalk 1 & 3				Proposed: The Trails Filing 10				Projected Total			
	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.	Units/ Acres	Pop.	Emp.	Equiv. Pop.
Meridian SFE <sup>1</sup>	5,000	13,750	-	13,750	5,000	13,750	-	13,750	-	-	-	-	5,000	13,750	-	13,750
Latigo SFE <sup>1</sup>	292	803	-	803	151	415	-	415	43	118	-	118	194	534	-	534
School <sup>2</sup>	113	5,330	506	5,836	83	2,830	268	3,098	-	-	-	-	83	2,830	268	3,098
Commercial <sup>3</sup>	15	-	73	73	10	-	57	57	-	-	-	-	10	-	57	57
Civic	23	-	30	30	14	-	21	21	-	-	-	-	14	-	21	21
Park/ Streetscape	85	-	-	-	85	-	-	-	-	-	-	-	85	-	-	-
Golf Course	174	-	12	12	174	-	12	12	-	-	-	-	174	-	12	12
<b>TOTAL</b>		19,883	621	20,504		16,995	358	17,353		118	-	118		17,114	358	17,471

<sup>1</sup> Maximum of 5000 single family dwelling units in Meridian Ranch, 292 for Latigo Trails. 2.75 persons/single family dwelling unit per El Paso County Falcon-Peyton Master Plan, Chapter 2.3.3 Population Projections

<sup>2</sup>Falcon Schools: High school current enrollment – 2,230, planned expansion - 900, Meridian Ranch Elem. enrollment – 600, Future middle school & elem. – 1,600. Staffing based on 9.5% staff-student ratio. (Source: Falcon School District).

<sup>3</sup>Commercial building area equals 18% of gross commercial area. One employee/1250 sq. ft. of commercial area.

### **Water Demand**

Unit water demands are based on industry standard factors and MSMD historic water demand figures. Demand is first calculated in acre feet per year (AFY) to determine the water supply needs. This value is then factored to determine the average daily demand (ADD) in gallons per minute (GPM). This figure is used to project the maximum daily demand (MDD) and peak hour demand (PHD) and can be used to estimate revenues and operating costs. The maximum daily demand and the peak hour demand have been determined by applying the accepted peaking factors of 2.5 and 4.0 to the ADD respectively. The MDD is used to determine the storage needs and the PHD is used for modeling the system delivery pressures and to size the distribution mains. See Table 2 - Water Demand below for more information.

MSMD reviewed the records of the single family residential usage over the of 2011-2020 for average annual demand in acre-feet per year. Historically, MSMD has been using 0.33 AFY, however the analysis revealed that the average MSMD resident is using far less water on an annual average. The usage averages approximately 0.285 AFY. This can be attributed to water conservation measures build into the home such as low-flow shower heads and low flush toilets. Therefore, the total water demand for single family residential homes will be based on 0.31 acre-feet per year (includes outside irrigation).

New total water demand calculations are included with this report based on a water demand for single family residential home of 0.31 acre-feet per year (includes outside irrigation), 25 gallons per day for students and staff at the school sites and 45 gallons per day per person for all other uses. The irrigation demand for irrigation is based on 0.0566 acre-feet per year for every 1,000 square feet of irrigated landscape. The irrigation demand for the open space is based on five percent of irrigated land and the

commercial/business at ten percent of irrigated land at 0.0566 acre-feet per year for every 1,000 square feet.

**Table 2 - Water Demand**

Land Use	Master Plan 5,292 SFes Total				Existing/Approved Projects				Proposed: The Trails Filing 10				Projected Current Demand			
	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD	AFY	ADD	MDD	PHD
	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm
<i>Potable</i>																
Meridian SFE <sup>1</sup>	1550	961	2,402	3,843	1,550	961	2,402	3,843	-	-	-	-	1,550	961	2,402	3,843
Latigo SFE <sup>1</sup>	91	56	140	224	47	29	73	116	13	8	21	33	60	37	93	149
School	163	101	253	405	87	54	134	215	-	-	-	-	87	54	134	215
Commercial	4	2	6	9	3	2	4	7	-	-	-	-	3	2	4	7
Civic	2	1	2	4	1	1	2	3	-	-	-	-	1	1	2	3
Paint Brush Hills Metro <sup>2</sup>	85	-	-	-	85	-	-	-	-	-	-	-	85	-	-	-
Golf Course	1	0.4	1	2	1	0.4	1	2	-	-	-	-	1	0.4	1	2
<b>Subtotal</b>	<b>1895</b>	<b>1,122</b>	<b>2,805</b>	<b>4,488</b>	<b>1,773</b>	<b>1,046</b>	<b>2,616</b>	<b>4,186</b>	<b>13.3</b>	<b>8.3</b>	<b>20.7</b>	<b>33</b>	<b>1,786</b>	<b>1,055</b>	<b>2,637</b>	<b>4,219</b>
<i>Irrigation</i>																
Single Family Residential	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
School	37	23	57	91	27	17	42	67	-	-	-	-	27	17	42	67
Commercial	4.9	3.0	7.5	12.0	3.4	2.1	5.2	8.3	-	-	-	-	3.4	2.1	5.2	8.3
Civic	7.4	4.6	11.5	18.5	4.4	2.7	6.8	10.8	-	-	-	-	4.4	2.7	6.8	10.8
Park/ Streetscape	28	17	43	68	28	17	43	68	-	-	-	-	28	17	43	68
Regional Park <sup>3</sup>	25	15	39	62	25	15	39	62	-	-	-	-	25	15	39	62
Golf Course <sup>4</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Subtotal</b>	<b>101</b>	<b>63</b>	<b>157</b>	<b>251</b>	<b>87</b>	<b>54</b>	<b>135</b>	<b>216</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>87</b>	<b>54</b>	<b>135</b>	<b>216</b>
<b>Total</b>	<b>1,996</b>	<b>1,185</b>	<b>2,962</b>	<b>4,739</b>	<b>1,860</b>	<b>1,101</b>	<b>2,751</b>	<b>4,402</b>	<b>13.3</b>	<b>8</b>	<b>21</b>	<b>33</b>	<b>1,874</b>	<b>1,109</b>	<b>2,772</b>	<b>4,435</b>

<sup>1</sup> Single Family Residential water demand is based on 0.31 AFY (10-yr ave. residential consumption per SFE is 0.29 AFY). This amount includes both domestic indoor use and outside irrigation.

<sup>2</sup> Perpetual lease to Paint Brush Hills Metropolitan District

<sup>3</sup> Perpetual lease to El Paso County for Falcon Regional Park

<sup>4</sup> Golf Course irrigation is provided by surface water diversion. Absolute Decree Case No. 2005CW43

## WATER SUPPLY

The service area is located in the Upper Black Squirrel Creek Groundwater Management District and the water bearing formations in descending stratigraphic order are the Dawson, Denver, Arapahoe, and Laramie Fox Hills. These four aquifers are collectively known as the Denver Basin aquifers and are found approximately at depths of 500, 1,400, 1,900, and 2,500 feet below the ground surface.

Table 3 Water Supply (below) shows the maximum annual yield of water currently appropriated by the Colorado Ground Water Commission for use within the MSMD.

The Meridian Ranch development has water rights and appropriation for the Denver Basin groundwater and renewable alluvial ground water. The above table has been updated and corrected to reflect the various annual replacement obligations of some rights and the removal of a Guthrie water right that has been inadvertently included as available for use by MSMD.

Table 3 Water Supply

Well No.	Permit No.	Appropriation	State Maximum Annual Appropriation (100-yr) (AFY)	El Paso County Maximum Annual Appropriation (300-yr) (AFY)	Replacement Obligation (AFY)	Net El Paso County Maximum Annual Appropriation (AFY)
<b>Meridian Ranch</b>						
DA-1	60140-F	157-BD	31.9	10.6	0.2	10.4
FUTURE DAWSON			820.0	273.3	26.0	247.3
D-3	64496-F	156-BD	1171.0	390.3	15.6	374.7
A-1	56516-F	155-BD	942.0	314.0	6.3	307.7
A-2	56517-F					
A-4	59680-F					
A-5	84844-F					
A-6	82765-F					
A-7	84556-F					
A-8	84557-F					
A-9	59681-F					
LFH-1	56513-F					
LFH-2	56514-F					
LFH-3	56515-F					
LFH-4	59678-F					
LFH-5	84845-F					
LFH-6	82766-F					
LFH-7	84558-F					
LFH-8	84559-F					
LFH-9	59679-F					
<b>TOTAL</b>	<b>Meridian Ranch</b>		<b>3719.9 AFY</b>	<b>1239.9 AFY</b>	<b>53.1 AFY</b>	<b>1186.8 AFY</b>
<b>Guthrie Ranch</b>						
G LFH-1 <sup>3</sup>	61234-F <sup>2</sup>	228-BD	289.5	96.5	1.9	94.6
G LFH-2 <sup>3</sup>	61235-F <sup>2</sup>	4436-BD				
G A-1 <sup>3</sup>	61236-F <sup>1</sup>	229-BD	241.6	80.5	1.6	78.9
G A-2 <sup>3</sup>	61237-F <sup>1</sup>	4437-BD				
G No. 1 <sup>4</sup>	612-RFP-R	Permit Date 8/26/03	170.0	170.0		170.0
G No. 2 <sup>4</sup>	27554-FP-R	Permit Date 7/28/05	30.0	30.0		30.0
<b>TOTAL</b>	<b>Guthrie Ranch</b>		<b>731.1 AFY</b>	<b>377.0 AFY</b>	<b>3.5 AFY</b>	<b>373.5 AFY</b>
<b>Latigo Trails</b>						
FUTURE ARAPAHOE		568-BD	124.6	41.5	0.8	40.7
FUTURE DENVER		569-BD	276.9	92.3	3.7	88.6
			92.7	30.9	0.6	30.3
DA-2	74410-F	570-BD	130.0	43.3	0.9	42.4
DA-3	74409-F					
FUTURE DAWSON						
LFH-1	46406-F	Permit Date 8/07/06	453.0	151.0	3.0	148.0
<b>TOTAL</b>	<b>Latigo Trails</b>		<b>1301.1 AFY</b>	<b>433.6 AFY</b>	<b>9.4 AFY</b>	<b>424.2 AFY</b>
<b>Hart Ranch</b>						
FUTURE LARAMIE FOX <sup>3</sup>		2099-BD	125.0	20.8	0.4	20.4
FUTURE ARAPAHOE <sup>3</sup>		2100-BD	103.0	17.2	0.3	16.9
<b>TOTAL</b>	<b>Hart Ranch</b>		<b>228.0 AFY</b>	<b>38.0 AFY</b>	<b>0.8 AFY</b>	<b>37.2 AFY</b>
<b>TOTAL WATER AVAILABLE TO MSMD</b>			<b>5980 AFY</b>	<b>2089 AFY</b>	<b>67 AFY</b>	<b>2022 AFY</b>

<sup>1</sup> Well permit number for well appropriation 229-BD (Total appropriation of 483.2 AFY).

<sup>2</sup> Well permit number for well appropriation 228- BD (Total appropriation of 579 AFY).

<sup>3</sup> Total appropriation is an equal split of ground water with Woodmen Hills Metropolitan District (WHMD).

<sup>4</sup> Total appropriation is split with WHMD, 69% Meridian Ranch, 31% Woodmen Hills

The annual replacement water obligations are connected to the Denver Basin aquifers located on Guthrie Ranch where 2% of the water withdrawn is to be relinquished to the Alluvial near the withdrawal point. The Dawson wells of the future to be located within the boundary of Meridian Ranch and Latigo Trails (157-BD & 570-BD, respectively) are to

be replaced per the approved 2008 Replacement Plan. The replacement obligations will increase over time capping at year 300. The obligation has been estimated using the average annual obligation over the 300-year span.

It should also be noted that although the Guthrie Denver Basin Aquifers (228-BD & 229-BD) are listed above in the full portfolio of MSMD water rights, water from these sources are not to be used when determining sufficiency since the other sources listed are more than sufficient to serve current and future development within Latigo Trails.

MSMD is currently extracting groundwater from 17 wells located within the MSMD boundary, three (3) off-site wells located within the Latigo Trails development, and six (6) wells from the offsite area known as Guthrie Ranch.

### *Water System Improvements*

The MSMD water system is classified as a “public water system” and meets all the applicable requirements of the CDPHE. The developer will be required to construct and convey to MSMD a central water distribution system to service the Property, including underground piping, valves, pressure reducing vaults, and fire hydrants, at the developer’s sole expense. The developer shall install any raw or treated water pipelines necessary to connect the development and the wells on the Property to MSMD’s facilities at the Property’s boundaries.

The water system uses groundwater as its primary source of supply. Filtration and disinfection facilities have been constructed at a central location to ensure good water quality. Elevation differences that exist throughout the property require that the distribution system is divided into two pressure zones to ensure that the water is delivered at no less than 40 psi during peak hour flow and at no more than 120 psi during periods of low use. Storage facilities and distribution piping are provided to ensure that the residual pressure requirements are achieved both during peak hour demands and during maximum day demands with a superimposed fire flow of 1500 GPM for the residential areas and up to 3500 GPM for commercial areas. The upper pressure zone (Zone 1) is a closed loop distribution system served by pumps that provide the required pressures, these are in the same location as the filtration and disinfection facilities. The lower pressure zone (Zone 2) is a conventional gravity system served by storage tanks to provide the required pressures.

MSMD currently provides water service to 151 Latigo Trails home sites as out of district users. The proposed 43 additional lots puts the total Latigo SFEs at 194, below the 292 SFEs maximum allowed per the 2001 Water Service Agreement, as amended. MSMD has sufficient water resources and facilities to provide water for the Latigo Trails Filing No. 10.