

This report may need to be amended to accommodate Woodmen Hills Metro District comment.

Provided edits to narrative on page two to address comments from WHMD and CMD

h Sketch Plan

Falcon, CO

# WASTEWATER TREATMENT REPORT



**MERIDIAN RANCH**

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## **Executive Summary**

This report presents the results of the engineering study for the wastewater system improvements serving the Meridian Ranch development located in El Paso County, Colorado.

Meridian Ranch encompasses 2,650 acres of proposed residential, commercial and business development. It is located approximately 12 miles northeast of downtown Colorado Springs, three miles north of the town of Falcon and immediately north of the Woodmen Hills development. Meridian Ranch is projected to include a total of 4,500 single family residential units, schools, commercial and business properties. The total treatment demand is projected to be near one million gallons per day (1 MGD)

Meridian Ranch Filing 1 of Meridian Ranch discharges the wastewater via gravity sewer pipe directly into the Woodmen Hills Wastewater Treatment Facility (PBHWTF). The remaining phases of Meridian Ranch discharge the wastewater through the Woodmen Hills development to a lift station located in Falcon, where it is transported to Cherokee Metropolitan District (CMD) for treatment. The CMD wastewater treatment facility (BSWTF) is located south of State Highway 94 near northeast intersection of Drennan Road and Milne Road.

The PBHWTF is located within the Meridian Ranch property by an agreement entered into between the owners and the developers Woodmen Hills and Paint Brush Hills. The agreement provided for a total discharge of 0.868 MGD to be dispersed of which the Meridian Ranch ownership of this discharge is equivalent to 500 residential home sites which equates to 0.0925 MGD at 185 gallons per residential unit.

The Meridian Service Metropolitan District (MSMD), in conjunction with CMD, has constructed treatment of 4.8 MGD of wastewater at the Black Squirrel Wastewater Treatment Facility (BSWTF). MSMD retains a 45.8% ownership in the treatment facility through an inter-governmental agreement with CMD for a total capacity of 2.2 MGD. The total capacity available to MSMD through both wastewater treatment facilities is approximately 2.3 MGD or over 12,000 single family residential equivalents based on 185 gallons per day per residential unit, thus providing more than enough capacity for the full build out of Meridian Ranch.

## Summary of Proposed Subdivision

Meridian Ranch encompasses 2,650 acres of proposed residential, commercial and business development. It is located approximately 12 miles northeast of downtown Colorado Springs, three miles north of the town of Falcon and immediately north of the Woodmen Hills development. The development is located within Township 12 South, Range 64 West, Sections 19-21 and 28-30 and consists of a mixture of residential, commercial, business, school and open space/park uses. The proposed land use breakdown can be found in Table 1 - Land Use as follows:

**Table 1 - Land Use**

Land Use	Master Plan				Existing/Approved Projects				Proposed:			
	Acres/ Units	Pop.	Emp.	Equiv. Pop.	Acres/ Units	Pop.	Emp.	Equiv. Pop.	Acres/ Units	Pop.	Emp.	Equiv. Pop.
Single Family Residential <sup>1</sup>	5,000	14,319	-	14,319	4,216	12,163	-	12,163	784	2,156	-	2,156
School <sup>2</sup>	113	4,000	380	4,380	83	2,740	260	3,000	-	-	-	-
Commercial <sup>3</sup>	15	-	94	94	8	-	47	47	-	-	-	-
Civic <sup>4</sup>	23	-	36	36	14	-	21	21	-	-	-	-
Golf Course	174	-	12	12	174	-	12	12	-	-	-	-
<b>TOTAL</b>		18,319	522	18,841		14,903	340	15,243		2,156	-	2,156

<sup>1</sup> Maximum of 5000 single family dwelling units. 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 - 1,350, planned expansion - 1,750, Meridian Ranch Elem. enrollment – 650, Future middle school & elem. – 1,575. 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.

<sup>4</sup>Civic building area equals 30% of gross civic area. One employee/2200 sq. ft. of building area.

## Projected Sewage Flow

The following unit flow factors were applied to the projected land uses:

1. Residential: 185 gallons/day (GPD)/dwelling<sup>1</sup>
2. Commercial/Business: 1,200 GPD/acre<sup>2</sup>
3. School/Comm./Bus.: 25 gallons/student-employee/day
4. BOD Demand: 0.17 lbs/capita/day

<sup>1</sup> Current Meridian Ranch average daily demand.

<sup>2</sup> Assumed usage for unspecified users. Use 25 gal/employee/day when use defined.

- 80% of potable water demand equals wastewater usage.
- A peak flow factor of 2.5 (peak hour) was applied to the calculated average flows.

According to the above criteria, the projected wastewater demand is shown in the following Table 2 - Wastewater Flow Projections:

**Table 2 - Wastewater Flow Projections**

Land Use	Master Plan			Existing/Approved Projects			Proposed:		
	Ave. Daily Flow	Ave. BOD Load	Peak Flow	Ave. Daily Flow	Ave. BOD Load	Peak Flow	Ave. Daily Flow	Ave. BOD Load	Peak Flow
	MGD	#/Day	MGD	MGD	#/Day	MGD	MGD	#/Day	MGD
Single Family Residential	0.8600	2,434	2.150	0.725	2068	1.813	0.135	367	0.337
School	0.0493	745	0.123	0.034	510	0.084	-	-	-
Commercial	0.0155	16	0.039	0.008	8	0.021	-	-	-
Civic	0.0062	6	0.015	0.004	4	0.009	-	-	-
Golf Course	0.0014	2	0.003	0.001	2	0.003	-	-	-
<b>TOTAL</b>	<b>0.932</b>	<b>3,203</b>	<b>2.331</b>	<b>0.772</b>	<b>2591</b>	<b>1.930</b>	<b>0.135</b>	<b>367</b>	<b>0.337</b>

## General

The wastewater improvements for Meridian Ranch are designed in accordance with the applicable requirements of the Colorado Department of Public Health and Environment. Public collector sewers serve the individual properties and convey the wastewater to an existing pump station located in the town of Falcon. The wastewater pump station will boost the wastewater through a force main to the BSWTF.

The topography of Meridian Ranch generally falls away to the south and east and will discharge the sewage through the existing sanitary sewer main and then to Stapleton Drive. Wastewater is conveyed from this point through the Woodmen Hills development to a lift station located in Falcon and then sent to the BSWTF.

## Existing Facilities

Collector sewers will be installed at depths to serve basements and will be designed to carry peak daily flow with the pipes at 75% of capacity. Service laterals are to be a minimum of 4 inches in diameter and the collector sewers will have a minimum diameter of 8 inches. If the sewers are to be located within a designated mapped floodplain, the manhole rim will be located a minimum of 6 inches above the 100-year floodplain elevation. All sewer will be air-tested during construction to ensure water tightness. The collector sewer system will generally follow the centerlines of the proposed roadways within the development.

## **Woodmen Hills Wastewater Treatment Plant**

The PBHWTP was constructed in the early 1980's under a joint agreement between the owners and the developments of Woodmen Hills and Paint Brush Hills. The plant is located on 13 acres within the Meridian Ranch development along Stapleton Drive approximately ½ mile east of Meridian Road. The agreement stated that Meridian Ranch will have an allocated capacity of 500 single family residential units for a total of 0.0925 MGD.

## **Cherokee Metropolitan District Agreement**

Meridian Ranch has also entered into an Inter-governmental Agreement (IGA) with the CMD to share the capacity of the existing wastewater treatment facility south of State Highway 94 near Shriever AFB known as the Black Squirrel Wastewater Treatment Plant (BSWTF). MSMD's share of the capacity is 2.2 MGD at this plant. The facility was completed in July 2010.

## **Lift Station and Force Main**

An existing lift station is operating at approximately 2.2 MGD to carry the wastewater to the treatment facility. The ultimate capacity of the lift station is 4.1 MGD.

## **Summary**

The current capacity allocated to MSMD at the PBHWTP is 0.0925 MGD and the total capacity available at the BSWTF is 2.2 MGD for a total of just under 2.3 MGD. The available capacity of the wastewater treatment facilities is sufficient to accept the additional flows from Meridian Ranch as a result of the Sketch Plan Amendment. The total available capacity of 2.3 MGD is greater than the projected demand of 0.932 MGD. Based on the above analysis the existing wastewater treatment facilities have sufficient capacity to accept additional wastewater from the amended Meridian Ranch Sketch Plan.