Please separate water resources report and wastewater treatment report.

This water resources report is for Falcon Meadows at Bent Grass. Please provide the correct water resources report, specific for this project.

WOODMEN HILLS METROPOLITAN DISTRICT

WATER RESOURCES
&
WASTEWATER REPORT

August, 2020

Prepared for:

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APPENDICES

1.0 INTRODUCTION AND CONCLUSION

The purpose of this report is to provide an update of prior Water Resource Supply and Wastewater reports for the Woodmen Hills Metropolitan District. This report is updated for the year 2020 and includes specific inclusion of Falcon Meadows at Bentgrass Preliminary PUD.

The Service Areas for both Water and Wastewater for the Woodmen Hills Metropolitan District are attached as ***Appendix A***.

CONCLUSION: **The Woodmen Hills Metropolitan District has an adequate Water Supply to meet the needs of Falcon Meadows at Bentgrass Preliminary PUD on a 300-year basis. Additionally, the Woodmen Hills Metropolitan District has an adequate wastewater system and treatment capacity to provide wastewater service to the Falcon Meadows at Bentgrass Preliminary PUD.**

2.0 PROJECTED LAND USES

2.1 *Projected Land Uses*: Lands within the subject area have been planned as a residential development. This report and associated commitments pertain to the Falcon Meadows at Bentgrass Preliminary PUD. Please refer to the Land Use Exhibit in ***Appendix B***.

2.2 *Water and Wastewater Demands for* ***Falcon Meadows at Bentgrass Preliminary PUD****:* Lands within the subject area have been planned as a residential development.

Table 2-1:
Summary of Expected Water and Wastewater Demands of Falcon Meadows PUD

# of Units	*Use*	*Annual Demand (@ 0.353 AF/SFE/Year) (AF)*	*Average Daily Flow (ADF) (GPD)*	*Maximum Daily Flow (MDF) (@ 2.45 x ADF) (GPD)*
260	**Residential**	**91.78**	**81,935**	**200,742**

Table 2-2: Summary of Expected Wastewater Loads of Falcon Meadows PUD

SFE	Average Daily Flows (Gal/Day)	Average Daily- Max Month Flow (Gal/Day)
260	42,380 (GPD)	44,720 (GPD)

3.0 DISTRICT WATER NEEDS AND DEMANDS

3.1 Actual Water Demand Summary: The Woodmen Hills Metropolitan District (WHMD, the District) tracks water demands and water use on an annual basis. The three most recent water use data are as follows:

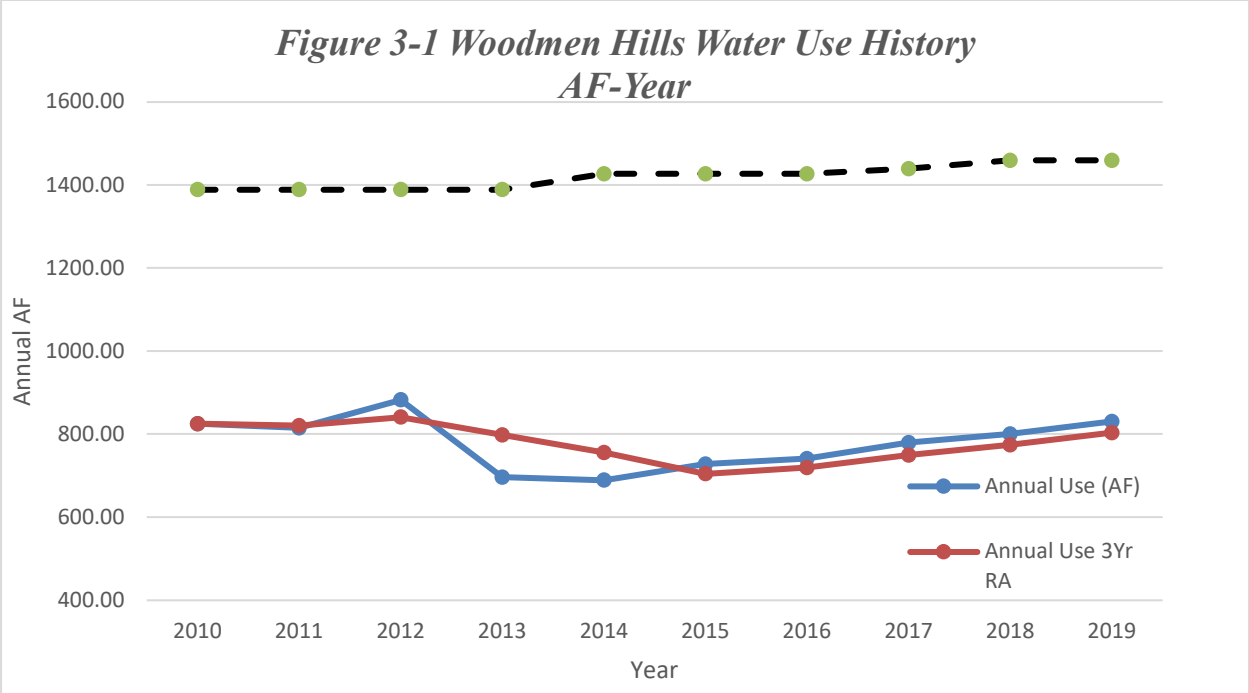
Table 3-1: Three Year Use History

Year	Annual Water Use (AF)	SFE (No)	Unit User Characteristic (AF/SFE)
2017	779.54	2679	0.291
2018	800.33	2815	0.284
2019	830.49	2914	0.285

3.2 Unit Water User Characteristics: The actual delivered unit user characteristic varies year to year, and for averages about 0.29 annual acre-feet for WHMD. The District has adopted a 0.353 AF/SFE-Day planning demand factor that covers not only actual use, but also covers reserves, system losses, and water accountability. An SFE is a single-family-equivalent. All single-family homes are counted as one SFE; commercial and non-residential land uses are projected in terms of SFE, where a single tap might be the equivalent of more than one SFE. If and when any multi-family development is proposed in Woodmen Hills, an adjustment will be allocated in which a dwelling unit may be less than 1 SFE.

Over the last 10 years, the unit user characteristic has been trending downward due to water conservation awareness, limitations on turf grass, low-flow fixtures, and inverted block rates which encourage water conservation. The trend has remained downward and although there is reasonable belief that the downward trend is likely to continue, WHMD has not assumed additional downward trending into long-range planning, but will address the trend as it actually materializes.

3.3 Current Demand versus Supply: In 2019, WHMD used 830 acre-feet out of a potential supply of 1,459 annual acre-feet on a 300-year basis, or about 57% of supply. Use of overall supply has varied over the last decade with a maximum of 63% of 300-year supply being used in the year 2012, and a minimum use of 48% in 2014. This number will vary based on timing of water acquisitions, annual weather, and various other factors. Below is a graph of WHMD percent demand compared to the 300-year Water Supply.



County Water Master Plan 2040 and 2060 Projections: WHMD lies within the El Paso County Master Planning Area, or Region #3. The master plan generally shows WHMD in its correct location.

Buildout: The Woodmen Hills projected service area includes roughly 2,400 gross acres. This includes the existing District boundaries, extra territorial service areas, and areas of possible or likely future inclusion. This service area is roughly 82% of buildout.

Expected buildout of WHMD is based on the overall SFE density, extrapolated. The existing overall gross developed density is 1.49 SFE/gross acre. Gross acres include numerous non-water-using lands, such as drainageways, open spaces, roads, rights of way, and other non-water use areas. The existing overall density includes mixed use, which includes substantial low-density development (one or more acre lots), commercial, and urban density development.

Based on known and future land use, and a projection of development for non-planned areas, it is expected that WHMD buildout may approach 4,000 to 4,200 SFE.

Annual growth rates over the last decade have varied from no growth in 2011 to nearly 5% growth in the year 2018. Overall, the 10-year annual growth rate in

WHMD has been 1.73% per year. The District's projections plot growth at both a 2% and a 3% rate.

2040 Buildout: Since WHMD already exceeds 80% buildout, full buildout would be anticipated within the 2040 timeframe. Woodmen Hills Service Area is likely to be fully built-out between the years 2032 and 2038. Therefore, we are addressing WHMD 2040 needs in terms of full buildout. The 2040 buildout is currently expected to be 4,200 SFE. Using the current unit user characteristic, water average annual planning suggests a 1,218 acre-feet average annual need, with a planning need of 1,483 acre-feet demand which includes roughly 20% reserves. Current holdings are 1,459.5 acre-feet on a 300-year basis. In 2040, actual expected need will be more than met with the current supply, but since WHMD is currently planning based on over 20% reserves, a possible, very small shortage of 23.5 annual acre-feet might be expected.

2060 Buildout: WHMD is expected to be fully built-out prior to 2040; therefore, 2060 projections are the same as 2040.

4.0 WATER RIGHTS AND SUPPLY

4.1 District Water Rights

The District has numerous local and off-site water rights. The rights include both renewable sources and Denver Basin non-renewable sources. The District's total legal supply on a 300-year basis currently stands at 1,459.48 annual acre-feet$_{300}$. Below is a narrative description of the nature of those supplies. ***Appendix C*** is the District's current legal water supply inventory.

4.2 Adequacy of Water Rights

Current water rights holdings are adequate for current demands and average expected buildout demands. The District's planning or desired holdings are also within 20% of meeting 2040 and 2060 buildout projections on a 300-year basis (District buildout is expected to occur prior to 2040). The perceived planning shortage would be 23.5 annual acre-feet. However, the District expects to make acquisitions far in excess of the perceived 23.5 acre-feet shortage.

Current Use	830 Acre-feet
Buildout Average Need	1,276 acre-feet (includes 2040 and 2060)
Buildout Planning Target	1,483 acre-feet (includes 2040 and 2060)
Existing 300-Year Rights	1,459.5 acre-feet$_{300}$

The WHMD current water rights supply provides for a conjunctive water supply mixing fully-consumable, non-renewable water with renewable sources. While current 300-year supplies exceed expected full buildout, including 2040 and 2060 scenarios, WHMD is actively pursuing long-term, additional future supplies to bolster its long-term water security and address anticipated physical depletions of non-renewable water.

4.3 Description of Current Water Rights

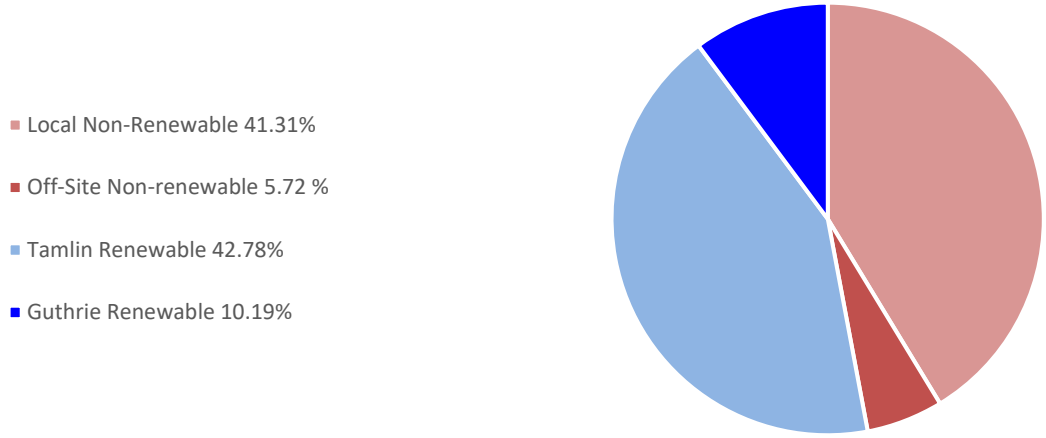
<u>Renewable Water Supply</u>: Woodmen Hills and the surrounding area are within a designated groundwater basin known as the Upper Black Squirrel (UBS) Groundwater Management District. Rules regarding use, access, and other management issues are governed by the UBS and the State Groundwater Commission. These rules vary from other areas in the state. Water types managed within the District are alluvial groundwater which exists in the upper most sands, which are only 15 to 25 feet deep in the Falcon area, but up to 350 feet deep easterly in the Guthrie Ranch area. Alluvial water in the UBS are "over-appropriated," which means no additional alluvial water rights are available. Therefore, acquisition of alluvial rights is limited to the purchase of someone else's existing alluvial rights. The Guthrie alluvial rights were obtained in such a fashion. Alluvial rights are renewable.

The District has renewable resources in two categories. One is a direct alluvial pumping right in the UBS basin at Guthrie, and the other is a perpetual, contractual right through Cherokee Metropolitan District. The direct alluvial right is for 89 annual acre-feet and, as a renewable right, it does not need to be counted on a 300-year basis. It is currently fully physically available, and is used at about an average of 90% of its full capacity.

The second renewable source is a 350 annual acre-feet contractual and perpetual right through Cherokee. It is typically used near its face value capacity since it is perpetual at about 98%. This water is delivered to the District through a three-mile off-site system to the south of the District.

In prior years, the renewable rights supplied about 53% of the District's annual needs. Figure 4-1, below, illustrates WHMD source of supply breakdown of renewable vs non-renewable sources.

Figure 4-1 Woodmen Hills Source Utilization
Use in Acre-feet (3 year Average)



<u>Non-Renewable Denver Basin Supply:</u> The second type of groundwater in the Falcon area is Denver Basin water. The Denver Basin is a vast, deep-rock aquifer that stretches from south of Falcon northerly to beyond Denver. Rights that are granted in the Denver basin are based on the ownership of the surface property; the larger the parcel, the larger the allocation. This water is much deeper, ranging up to 2,650 feet deep. Denver Basin water is considered finite and therefore non-renewable water. In the Falcon area, there are four main formations that make up the Denver Basin: Dawson, Denver, Arapahoe, and Laramie-Fox-Hills, described from top to bottom.

The District has numerous determinations under the existing District boundaries, which total 779 annual acre-feet on a 300-year basis and 2,356 annual acre-feet on a 100-year basis. Except maybe for support of future ASR projects, it is not

anticipated that the number of local well sites will be increased in the near future. Although there is significant unused pumping capability in the Falcon area, the District has relied less on their local sources in the past five to ten years.

The District has also acquired additional off-site Denver Basin rights. These areas have yet to be fully developed as physical supply. The Hart well field already has future easements and well sites dedicated, but because there is no current need, no wells have been drilled yet in the Hart area. Because the Guthrie area has not been accessed by any other Denver Basin users at this time, its physical capacity has remained strong. Not counting the Dawson or Denver formations, the Guthrie and Hart areas have a total of 860 annual acre-feet$_{100}$ and 287 acre-feet$_{300}$. The Guthrie Denver Basin well field is only currently being pumped at a fraction of its full capability (less than 20%). The Guthrie well field is the location where WHMD expects additional physical sources (additional wells) will be drilled as needed in the near future (next 10 to 20 years).

4.4 *Description of Long-Term Planning and Future Sources of Supply*: In theory, the 300-year supply of water for WHMD appears to be more than adequate for full buildout, which would include both the 2040 and 2060 scenarios. Even with the projected WHMD 20% reserve desire, the current 300-year supply is less than 2% short. However, portions of the District's Water Supply are based on non-renewable sources. The District currently relies on about 47% of its water supply to come from non-renewable water sources or Denver Basin wells. Although these sources are substantial, the District anticipates yield degradation of non-renewable physical supplies over time and believes that expansion of its water supply will be advisable over time. While some Denver Basin water may be added, a focus on renewable source addition is a priority.

In 2018, the District developed a water policy intended to facilitate the goal of continued addition of water with a priority of seeking additional renewable resources. Elements of the policy aim to:

a) Cause development to "pay its way" in terms of water, as well as capital improvements.
b) Develop separate funding supply dedicated to acquisition of new water, develop physical infrastructure, and/or otherwise invest in additional and/or improved sources.

In addition to adding off-site sources, an additional priority is to acquire and/or invest in a renewable water supply. WHMD's current use is based on an average of 53% renewable water sources.

<u>Future Additional Sources:</u> Although there is currently little to no perceived shortage expected in supply, the District will be acquiring and/or improving

sources of supply and increasing water reliability and efficiency over time. New sources/expansions are expected to come from five areas:

1. Developer Inclusions: The Service Area considered for full buildout includes areas that are currently not in the formal District boundaries. Developers must turn over any and all water as a term of inclusion. While limited, the District will place these into its inventory. Some have existing determinations and some lands are not quantified. As such, these sources will be rather limited and are expected to be non-renewable and less than 100 annual acre-feet[300].

2. Acquisitions: The District established a funding mechanism in 2018 dedicated to the development of additional legal and physical supply. This fund is entirely funded through development revenues and the current fund has become substantial. Current negotiations cannot be disclosed for obvious reasons. It should be noted that the District pursues both non-renewable and renewable sources with emphasis on the renewables.

3. Regionalization: There are two forms of regionalization, described herein.

    a. One element is the development of close cooperative ties with adjacent Falcon Districts in order to act in concert and develop water efficiency through joint efforts. WHMD is the largest water provider and the regional wastewater provider among the five Falcon Districts, and it is geographically central to all five of the major Falcon Districts, making it key to Falcon's regional water development. WHMD already has joint water projects with Meridian Service Metropolitan District, and now has developed a working relationship with Falcon Highlands Metropolitan District. The joint actions allow for more comprehensive water projects and greater water efficiency.

    b. The second element is a much broader regionalization. WHMD has been open to cooperative actions with Colorado Springs Utilities (CSU). CSU potentially is open to shared physical facility utilization, which would enable WHMD to expand its scope in seeking water rights. While it is not expected that CSU will provide actual water, the access to facilities opens greater doors for WHMD.

4. Facility Expansion: WHMD jointly owns extensive transmission systems with Meridian Service Metropolitan District, which extend

14 miles easterly and 5 miles southerly of its service area. While certain water rights are already associated with these facilities, additional and/or replacement supplies are being considered as either non-renewable replacements and/or additional rights. WHMD is currently under construction of a transmission line westerly, along with substantial storage, which enhances fire protection, service pressures, and also opens additional options for regionalization.

5. Indirect, Lawn Irrigation Return Flows (LIRF) Credits, and Direct Reuse: While WHMD plans on adding additional renewable water resources, WHMD understands the value of its ability to retain consumptive use of the non-renewable resources it does pump. Therefore, we project that at least some continued pumping of Denver Basin water should extend out many decades as it creates the basis for reuse for both indirect as well as future direct reuse. The conjunctive use of renewable and non-renewable supplies also allows for future potential for aquifer storage and recharge, which is expected to become an option for WHMD within the Arapahoe Formation of the Falcon area.

   Currently, WHMD discharges roughly 300 acre-feet per year, which is fully consumable and reusable. In addition, WHMD has quantified its LIRF credits in a case whereby the credits are currently being used to offset underdrain flows. However, the District has implemented underdrain control systems that will eliminate the need for using LIRF credits for augmentation, allowing the LIRF credits to be converted to potable use.

<u>Future Supplies:</u>

- Unquantified Lands: As the District includes additional lands, additional determinations will either be added to the District's supplies or the un-quantified rights will be turned over to the District, which will then be quantified, determined, and ultimately added to the District's supplies.

  The District does not immediately process all unquantified rights upon obtaining ownership, but holds such ownership until an adequate amount of lands are processed, which makes determinations reasonable in cost. At this time, the District is holding about 30 acres in wait, which would represent roughly an additional 9 to 10 annual acre-feet 300 to its inventory. The District usually likes to have roughly 40 acres before processing determinations. These are not added to the District's inventory until formally determined.

- Determinations Which Might be Dedicated Upon Inclusion: Within the expected service area are lands that are not yet included which also will be

bringing existing determinations to the table and dedicating these supplies to the District. These are not added to the District's inventory until deeded over.

- Future Acquisitions: WHMD recently adopted a water management and acquisition policy which allows for the generation of funds dedicated to acquisition of future water rights acquisitions. WHMD's Water Acquisition Fund has now exceeded several million dollars. The fund is dedicated strictly to acquiring and/or developing additional future supplies. Obviously, negotiations that are ongoing for purchase of both renewable and non-renewable resources cannot be discussed here.

- Regionalization: WHMD is not planning, or at least not depending, on any additional supplies which may be obtained through regionalization. WHMD is the largest and central district among the five Falcon Districts. WHMD is central to interconnecting each of the five Falcon Districts and has been pursuing joint operations with its neighbors for a lengthy period. Ultimately, joint operations could dramatically enhance the reliability and efficiency of the Falcon Districts.

  WHMD also participates in one-on-one, as well as joint, discussions with CSU, who may ultimately provide regional delivery systems that allow for a broader range of acquisitions for WHMD.

5.0 WATER SYSTEM FACILITIES AND PHYSICAL SUPPLY

5.1 Source of Supply:

Local Wells: The District has 11 wells in the Falcon area, mainly in the Arapahoe and Laramie Fox-Hills formations. These wells are all within the District's Service Area boundary.

Off-site Wells: The District operates four Denver Basin wells at the Guthrie field, which is about 12 miles east of the Falcon area. The Denver Basin wells are in the Arapahoe and Laramie Fox-Hills formations. Additionally, the District owns and operates two alluvial wells in the Guthrie Ranch area which pump renewable water from the Upper Black Squirrel Basin.

Cherokee Water: This water is alluvial from the Upper Black Squirrel Basin and is renewable. The annual quantity obtained from Cherokee is 350 acre-feet and is a perpetual right.

5.2 Water Treatment: The District owns and operates three water treatment plants and provides water treatment to its entire supply. The plants are all within the service area and treat at the following capacities:

Filter Plant #1	1.10 MGD Treatment Capacity
Filter Plant #2	0.36 MGD Treatment Capacity
Filter Plant #3	1.30 MGD Treatment Capacity

5.3 *Water Storage:* The District currently owns and operates three water storage facilities. The total capacity is just over 3.5 million gallons. WHMD has started construction of an additional tank and the "West Transmission System." This additional tank is located system such that it will bolster fire flow, service pressures, system reliability and potable water storage.

5.4. *Distribution, Pumping, and Transmission Lines*: The District has two major off-site transmission lines which are jointly owned with Meridian Service Metropolitan District. WHMD is responsible for the operation of both the Tamlin and Guthrie systems.

The Tamlin system is a 12-inch line extending roughly three miles south-westerly of the District, and is connected to the Cherokee Metropolitan District. The ultimate capacity of the Tamlin system is 1.8 MGD. The Tamlin system includes a 1.5 MGD pumping station.

The Guthrie system is a 14 mile long, 12-inch pipeline extending to the east of the District along Judge Orr Road. It includes wells, pumping facilities, and a mid-point pumping station. Its current capacity is 1.944 MGD.

The District has additional pump stations within the District boundaries, which include the Theriot Pump station and an integral pump station within Filter Plant #3.

The District consist of multiple service pressure zones and roughly 13 miles of internal distribution lines.

5.5. *Recent and Upcoming System Expansions*:

West Water System: The District is completing a new "West Water Loop" which extends three miles to the west of the current service boundary. This line is an 18-inch line and also includes a new 3.0 MG potable water storage tank. This system does not include any additional water rights, but does enhance the fire supply, service pressure looping, and system reliability. While no source of supply is being added, the new transmission line does open the door for future joint projects, shared supplies, and/or regionalization options. This project should be completed near the end of 2020 and will be on line in 2021.

Guthrie Expansion: As a joint project with Meridian Service Metropolitan District, a well field expansion is slated within the Guthrie system, which will be constructed in 2021 and go online spring of 2022. This project is Phase Two of the Overall Guthrie Master Plan and extends the Guthrie collection system easterly by roughly one mile and adds two new wells. This project does not add any legal supply but enhances the physical capabilities of the system.

5.6 Water Quality

The District treats and filters 100% of its water supply. Filtration is generally for iron and manganese removal, and water is disinfected and meets and or exceeds all CDPHE drinking water standards. ***Appendix E*** is a copy of the 2019 WHMD Consumer Confidence Report, which outlines water quality as delivered to District consumers.

6.0 *WASTEWATER REPORT*

6.1 *Unit Use Wastewater Loads*: Wastewater flows for WHMD are based on established benchmarks of the average daily flow of 163 gallons per day per SFE and 172 gallons per day per SFE for the average daily-maximum month flow. These are summarized as follows:

- *Average Daily Flow: 163 GPD/SFE*
- *Average Daily-Max Month Flow: 172 GPD/SFE*

6.2 *Treatment Facilities*: The WHMD recently constructed a new regional wastewater treatment facility which was placed on line in the spring of 2019. This facility serves the Falcon regional area. Falcon Highlands Metropolitan District, Paint Brush Hills Metropolitan District, and portions of Meridian Service Metropolitan District are also served by this facility. The new plant is an advanced wastewater treatment plant with a hydraulic capacity of 1.3 MGD. WHMD is;

1. In compliance with its discharge permit
2. Has substantial adequate capacity for the additional flows

Current hydraulic loading is roughly 53% . With the addition of Falcon Meadows at Bentgrass Prelimnary PUD and all other committed but un-developed areas, plant hydraulic capacity will be at roughly 59%.

6.3 *Collection and Pumping Facilities*: WHMD operates over 80 miles of wastewater collection system and owns and operates three lift stations. This development will be required to install gravity sewer facilities in accordance with WHMD standards and approvals. Said gravity sewer facilities will connect to existing collection systems owned and operated by WHMD.