2014 Wastewater Master Plan Update

2014 WASTEWATER MASTER PLAN UPDATE

Prepared for:

The City of Round Rock
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Acronyms and Abbreviations

BCRWWS	Brushy Creek Regional Wastewater System
BWF	Base Wastewater Flow
CAMPO	Capital Area Metropolitan Planning Organization
CC	Construction Cost
CCN	Certificate of Convenience and Necessity
CDM	CDM Smith
CIP	Capital Improvement Program
CoRR	City of Round Rock
EAC	Easement Acquisition Cost
EAS	Easement Acquisition Services
ETJ	Extraterritorial Jurisdiction
GIS	Geographical Information System
gpd	gallons per day
gpm	Gallons per Minute
GWI	Ground Water Infiltration
LUE	living unit equivalent
MGD	Million Gallons per Day
MH	Manhole
MUD	Municipal Utility Districts
PS	Professional Services
PWWF	Peak Wastewater Flow
TAZ	Traffic Analysis Zone
TCEQ	Texas Commission on Environmental Quality
WWMP	Wastewater Master Plan
WWTP	Wastewater Treatment Plant

Executive Summary

The City of Round Rock (CoRR) contracted with Atkins to perform an update to the previous Wastewater Master Plan (WWMP). CDM developed the original WWMP in 2005 utilizing geographical information system (GIS) data, existing conditions and flow monitoring data. They subsequently updated the WWMP in 2008, and Atkins updated the WWMP in 2011. This document serves as an update to the 2011 WWMP.

The average daily flow was developed using the existing land use developed by the CoRR and ground water infiltration data from the 2005 flow monitoring. This calculated value of 15.8 million gallons per day (MGD) serves as the basis for the 2015 flows input into the model. The CoRR system includes regional lines and two wastewater treatment plants that are owned and operated through the Brushy Creek Regional Wastewater System (BCRWWS), which consists of the cities of Round Rock, Cedar Park, subregional customers, and a number of Municipal Utility Districts, including Brushy Creek, Fern Bluff, Chandler Creek, Vista Oaks, Terra Vista, Walsh Ranch, and Paloma. The Brazos River Authority (BRA) maintains and operates the facilities.

Atkins updated the existing Bentley SewerGems model with wastewater lines that had been completed since 2011 and additional 8-inch lines at the City's request to comprise the 2015 existing system model. Scenarios were developed in the model for 2015, 2025, and build out, each subsequent scenario adding new wastewater lines and sewersheds as expansion requires.

The existing and future land use GIS files provided by the CoRR were used to determine the 2015 and build out wastewater flows that were applied to each scenario respectively. The land use was converted to gallons per day (GPD) via living unit equivalents (LUE) per acre and GPD per capita conversion criteria. The flows developed for the 2025 planning horizon were developed based on anticipated areas of growth within the next ten years through discussions with CoRR Staff. The flows within the sewersheds developed for the previous 2005 model were based on flow monitoring data and include a separate ground water infiltration (GWI) component. The sewersheds added after 2005 utilize the CoRR design criterion to develop projected flows. The CoRR's criterion accounts for GWI, therefore a separate factor is not included for the sewersheds added after 2005.

Aktins performed a hydraulic analysis for all three planning horizon dates based on the modeling results for a 5-year design storm. Gravity mains were evaluated based on whether the flow came within 2 feet of the top of the existing manhole. Lift stations were evaluated based on Texas Commission on Environmental Quality (TCEQ) criteria. Wastewater treatment was evaluated based on contractual allowance from the BCRWWS.

The following are recommended upgrades to the existing system required through buildout, see Appendix B for a detailed breakdown of required improvements:

- Upgrade 7.4 miles of wastewater lines. These upgrades are required either due to new development or increased population within existing areas.
- Install 27.3 miles of new wastewater lines to service new development.
- Upgrade four existing lift stations and build three new lift stations.
- Expand wastewater treatment capacity by the year 2022, starting design in 2018. Any additional required capacity in the interim should be purchased from surplus availability. The subsequent wastewater treatment plant design is anticipated to begin in 2025.

Table ES-1 summarizes the anticipated costs for all projects through build out:

Table ES-1
Summary of All Projects for Build-out Flows

Category	Description	Total Project Cost Estimate ($)
Pipe Upgrades	Upgrade 7.4 miles of existing wastewater lines	21,725,126
New Pipe	Install 27.3 miles of new wastewater lines	55,883,689
Lift Stations	Upgrade 4 lift stations and install 3 new lift stations	19,795,643
Treatment	Add a total of 14 MGD average day treatment capacity	171,028,567
	Total	**268,433,026**

Based on the results of the 2025 modeling, the required projects were prioritized as to those that would be required within the next 10-year planning horizon, the 10-year Capital Improvements Program (CIP) is presented in Section 6 of this document. Table ES-2 summarizes the anticipated costs for the 10-year CIP:

Table ES-2
10 year CIP Costs ($)

Project Bid Year	Pipe	Lift Stations	Treatment
2016	480,174	-	500,000
2017	1,772,633	-	4,500,000
2018	1,905,800	-	4,100,000
2019	6,850,676	3,215,300	12,500,000
2020	9,437,911	813,817	12,500,000
2021	6,411,719	4,600,393	12,500,000
2022	7,133,107	1,704,340	-
2023	7,691,609	-	-
2024	3,845,605	-	-
2025	-	-	51,900,000
Totals	45,529,234	10,333,850	98,500,000

1.0 INTRODUCTION

The City of Round Rock (CoRR) previously completed a wastewater master plan in 20011 based on a SewerGEMS model. This report documents the update and review of the SewerGEMS model, including addition of lines that have been completed since the 2011 wastewater master plan, an assessment of the current wastewater collection system, and suggested improvements via either upsizing or new lines in order to meet future capacity requirements. The years for consideration in this report are existing (2015), 10-year planning cycle (2025), and build-out (2050).

1.1 OBJECTIVES

The purpose of the wastewater master plan revision is to update projected future wastewater flows using the latest land use and population growth planning and census data, update the SewerGEMS hydraulic model to reflect new data on facilities and demands, analyze modeling results to identify the location and timing of capital improvements projects, and develop budget costs for each capital improvement program (CIP) project. The results of this report are meant to assist the CoRR in developing its CIP and associated wastewater impact fees.

2.0 STUDY AREA

2.1 STUDY AREA DESCRIPTION

2.1.1 Existing Collection System

A review of the most recent City of Round Rock GIS files indicates that the existing CoRR and regional wastewater collection system is comprised of lines ranging in diameter from 6 to 84 inches. The total system consists of approximately 417 miles of wastewater pipe, 8,440 manholes, and 11 lift stations. For the purposes of modeling the existing wastewater collection system, lines 10 inches in diameter and larger were included in the model. Particular 8-inch diameter wastewater lines were identified by CoRR based on input from the operations and maintenance personnel, these lines were also included in the model.

RR vs. Regional

2.1.2 City of Round Rock Extraterritorial Jurisdiction

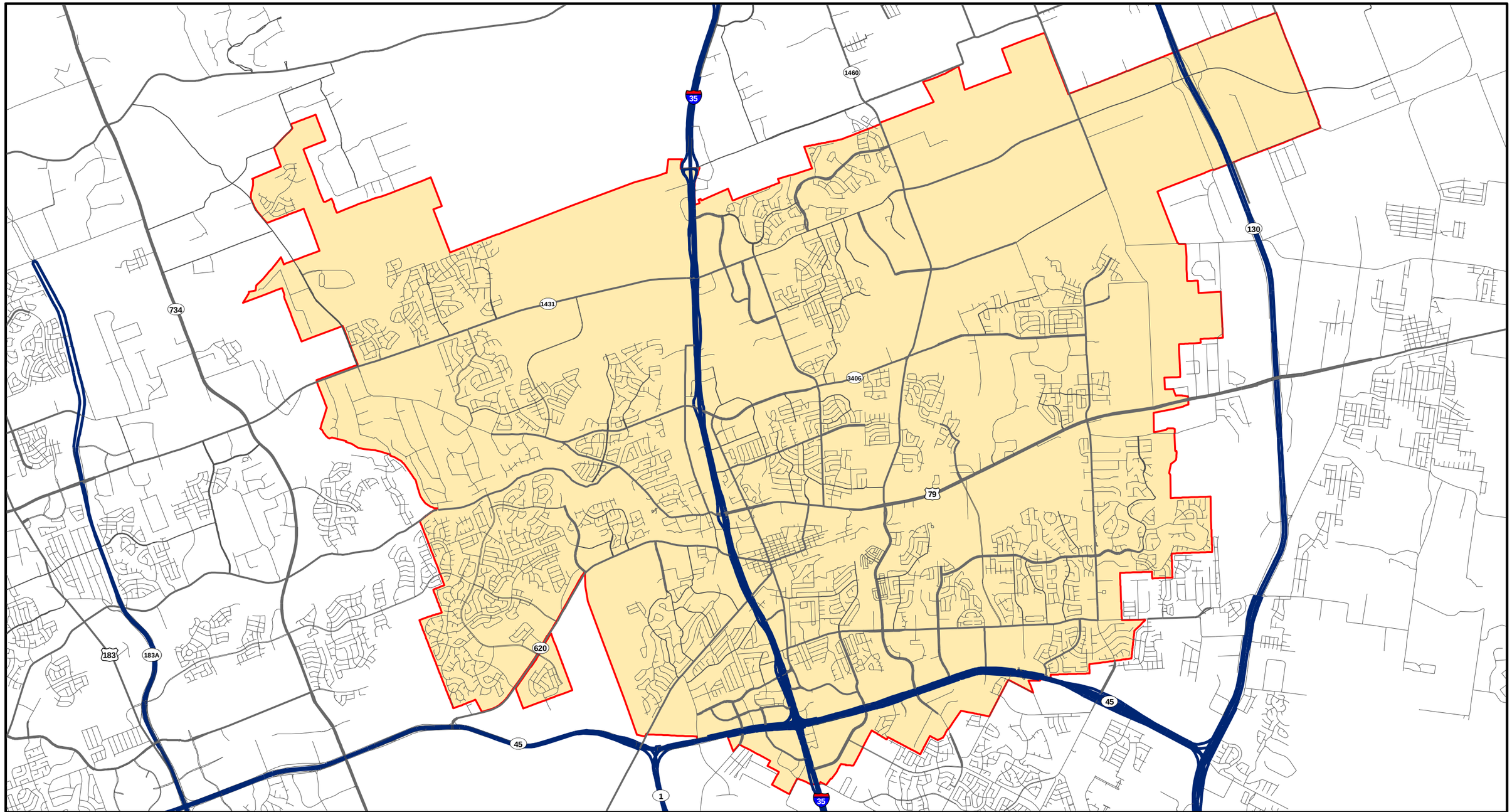
The CoRR extraterritorial jurisdiction (ETJ) is shown on Figure 2-1. The CoRR is bound on all sides by Georgetown to the north, Hutto to the east, Pflugerville and Austin to the south, and Cedar Park and Leander to the west. The impact of this location is the build-out scenario is in fact the ultimate expansion, as there is no additional land to expand to without annexation or incorporation of land currently within the city limits of adjacent municipalities.

2.1.3 City of Round Rock Certificate of Convenience and Necessity

The CoRR Certificate of Convenience and Necessity (CCN) border is shown on Figure 2-2. The wastewater service area evaluated is also shown on Figure 2-2, which was developed based on the following additions to the CCN:

- Land within the ETJ to the north of Vizcaya
- Land within the ETJ to the east of Lake Forest
- Land within the ETJ to the east of the Regional Wastewater Treatment Plant (WWTP)
- Land within the ETJ to the east of Siena
- Land within the ETJ at the southern border of the ETJ

The wastewater service area was the basis for modeling the CoRR wastewater collection system.



ETJ Boundary

0 5,000 10,000 Feet

0 1 2 Miles

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Figure 2-1
City of Round Rock
Extra-Territorial Jurisdiction (ETJ)

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 09 Oct 2015

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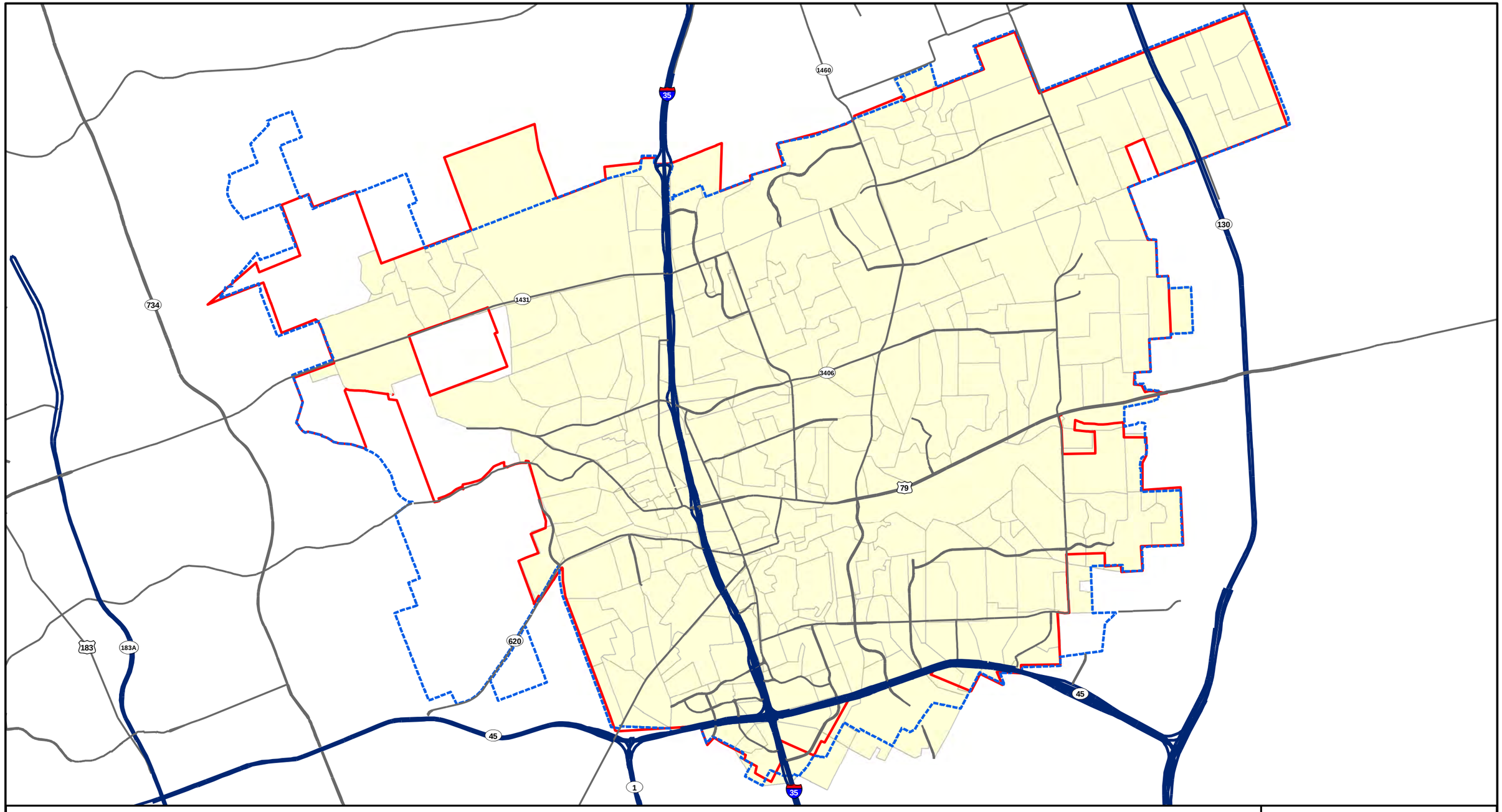

ETJ Boundary

Round Rock Sewer CCN Boundary (2015)

Buildout Modeled Wastewater Service Area

Freeway/Toll Road

Major Road

0 5,000 10,000 Feet

0 1 2 Miles

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Figure 2-2
City of Round Rock
Certificate of Convenience & Necessity
& Modeled Wastewater Service Area

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 09 Oct 2015

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2.2 LAND USES

2.2.1 Existing Land Uses

The CoRR provided Atkins with Geographical Information System (GIS) files for existing (2015) land usage. The GIS includes the land use category and acreage for all parcels in the ETJ. This land use data is used to develop population and wastewater flow by parcel as described in following sections. The GIS has the following 16 land use categories for existing land use:

- Single Family
- Two Family
- Multi Family
- Mixed Use
- Educational Facility
- Commercial
- Office
- Industrial
- Government/Institutional
- Utilities
- Agricultural
- Drainage
- Mining
- Open Space
- Recreational
- Undeveloped

The existing land uses can be seen on Figures 2-3 and 2-4.

2.2.2 Future Land Uses

The CoRR also provided GIS files for 12 land use categories at ultimate build-out, as shown below:

- Residential
- Avery Mixed Use
- Downtown Mixed Use
- Dell Mixed Use
- Commercial/Multifamily
- Business park
- Commercial
- Industrial
- Public Facilities
- Mining
- Park Land
- To Be Determined

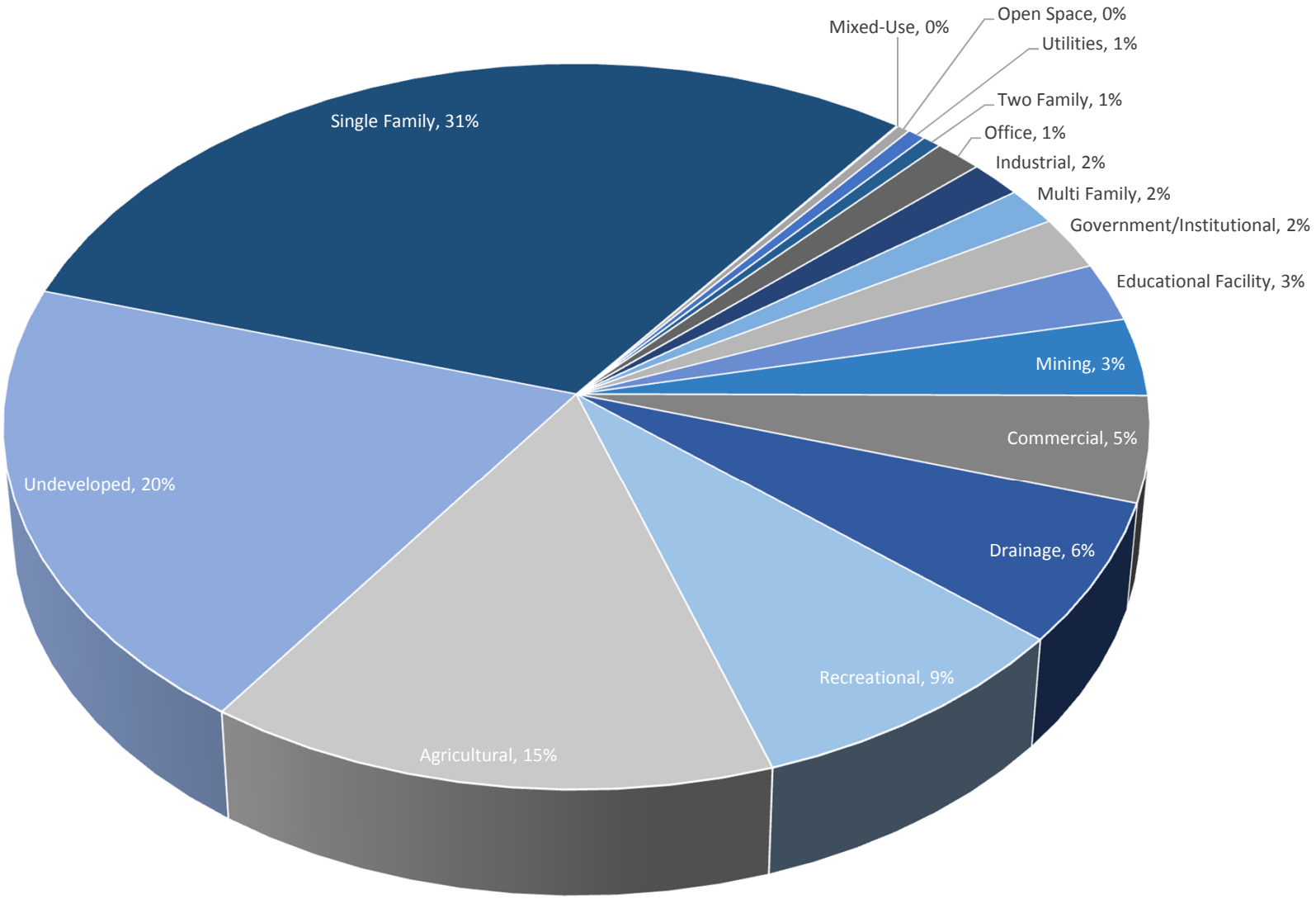
Since there is not an exact correlation between the GIS land use categories for existing versus build-out conditions, several assumptions were made in order to provide consistency in the use of the land use data for the existing and future population and wastewater projections.

- The future land use GIS has a single Residential land use category. Atkins made the assumption that all existing multifamily areas would be categorized as multifamily in the future, if the area in question is still identified as Residential in the future. The CoRR also identified three additional parcels that should be considered multifamily in the future. The existing single family and two family land use was correlated with the future Residential land use parcels which w not classified as multifamily as just discussed.

- The future categories of Commercial/Multifamily, Dell Mixed Use, Avery Mixed Use, and Downtown Mixed Use were assumed to be the same as the single Mixed Use category in the GIS file for existing land use.

- The future Business Park land use is assumed to match the existing Office land use.

Figure 2-3 Existing Land Use Percentages



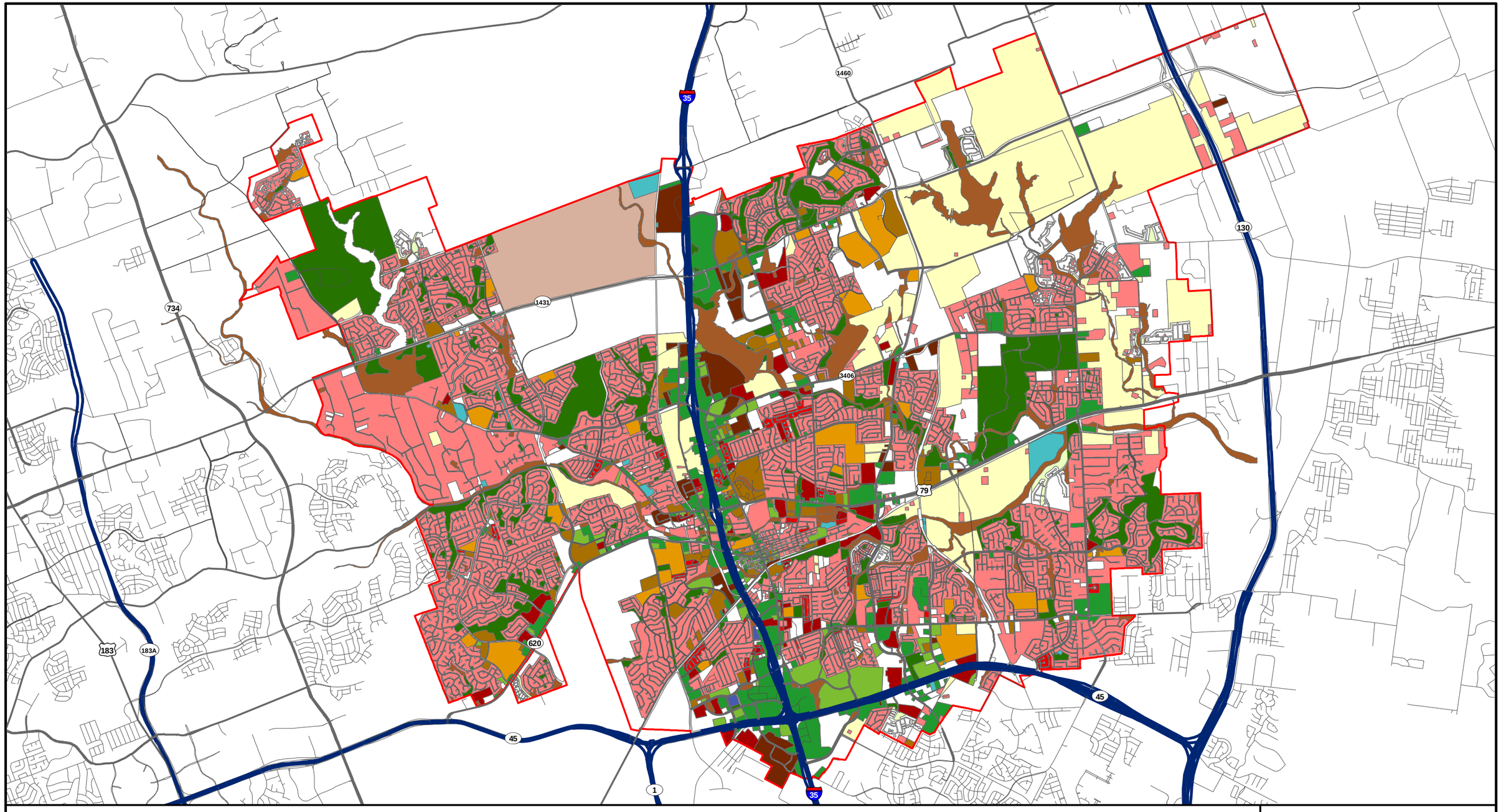


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Figure 2-4
City of Round Rock
Existing Land Use

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 14 Oct 2015

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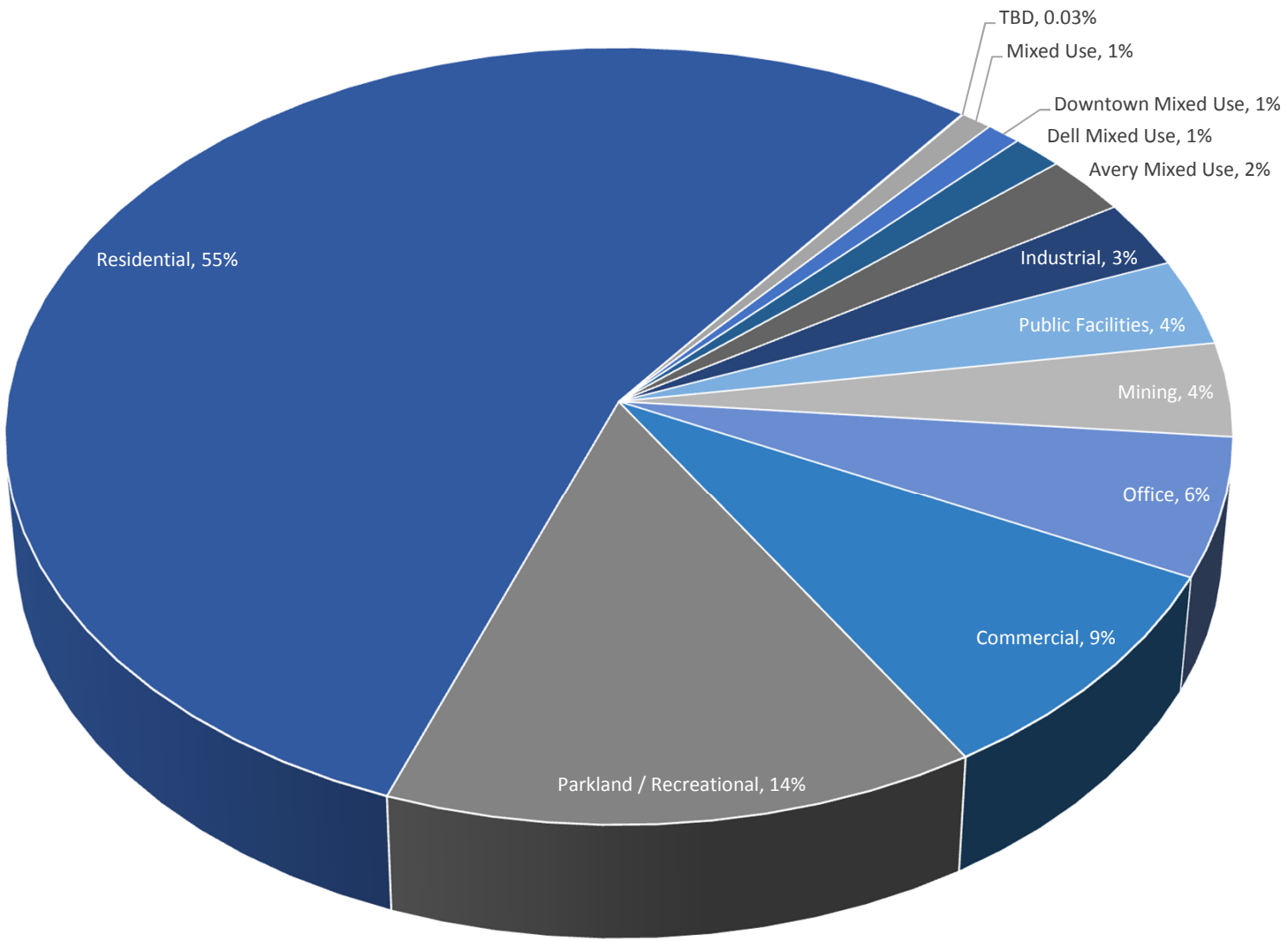
Figure 2-5 Future Land Use Percentages



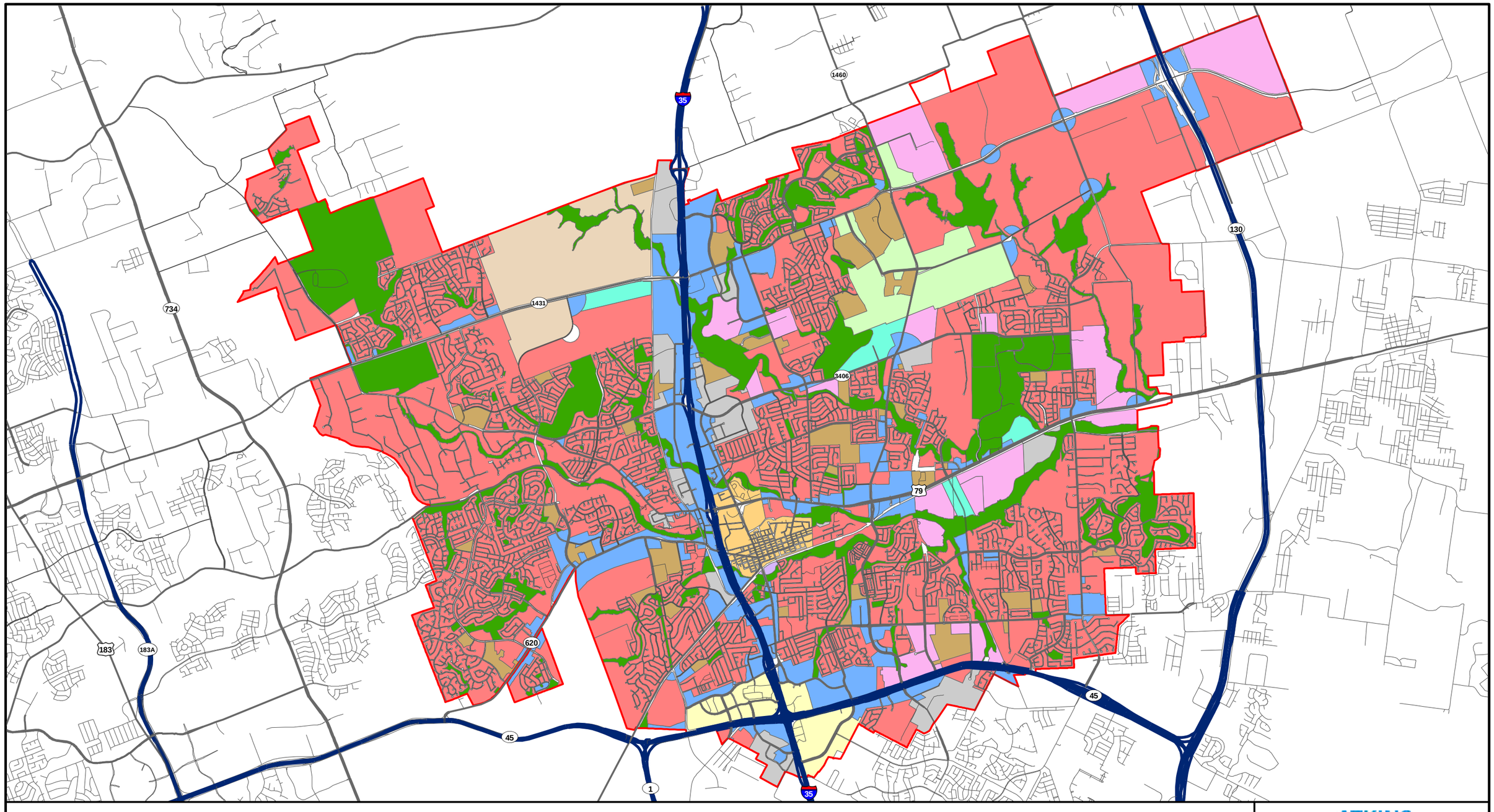


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Figure 2-6
City of Round Rock
Build Out Land Use

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Job: 100019988	Date: 13 Oct 2015

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- The future land use file only identifies Public Facilities, whereas the existing land use file identifies public facilities as either Educational facilities or Government/Institutional facilities. Atkins evaluated the public facilities in the future and identified each polygon in the GIS file as either educational or government/institutional. Through this process, the future land use categories were altered to match the existing land use categories.

There are other categories that do not match between the existing and future GIS files, but they were not addressed as they do not produce any wastewater flow (e.g., Agricultural, Open Space. Drainage, Mining). However, at the request of CoRR, the recreational areas in the future were identified, as required irrigation will have an impact on the water analysis.

Future land uses with modifications described above are shown in Figures 2-5 and 2-6.

2.3 EXISTING AND PROJECTED POPULATIONS

Population is a major factor for a municipal utility in determining both the wastewater flows and water demands. However, Round Rock and many utilities have different CCN's and service area populations for the water and wastewater systems. Round Rock's ETJ build-out population is an important common denominator for the 2015 wastewater master plan and the concurrent water master plan being prepared by CDM. The City desired that both master plans should reflect the same population growth in the ETJ. Therefore, both the ETJ and wastewater service area populations are addressed in this report.

2.3.1 ETJ Population Projections

There are several sources of population data that were evaluated for the master plan population projections. The City has published population projections by year for both the city limits and the ETJ to cover the period of 2010 to 2030. These numbers provide a baseline for comparison with other methods, but they do not directly address population just within the wastewater service area or an ultimate build-out population. The year 2050 has been adopted in previous studies at the target build-out year.

The Capital Area Metropolitan Planning Organization (CAMPO) in May 2015 adopted the CAMPO 2040 Regional Transportation Plan which includes projections for both population and employment for 2010, 2020 and 2040 for Williamson, Travis, Hays, Bastrop, Caldwell and Burnet counties. The data is developed at the Traffic Analysis Zone (TAZ) level of detail. The CAMPO 2040 Plan has 2,102 TAZ's in total for the six counties, of which there are 116 entirely or partially within Round Rock's ETJ. 33 TAZ's on the perimeter were clipped to the City's ETJ boundary for GIS analysis with the assumption of uniform population density within each TAZ in order to derive the ETJ population per CAMPO data.

The following are some results of the CAMPO data analysis with comparison to the City's ETJ population projections:

- CAMPO's 2010 ETJ population of 135,450 compares to the City's published number of 141,807 per 2010 Census data.
- CAMPO's 2015 ETJ population is approximately 185,000 by interpolation between the 2010 and 2020 numbers, compared to the City's 160,385 ETJ estimate for 2015.
- The divergence increases for 2020, i.e., 232,830 with CAMPO data versus 182,320 by the City.
- The ETJ population for 2040 is 309,000 using CAMPO's data. The City's projection only extends to 2030 (215,795), but a 3rd order polynomial trend line by Atkins (R2=0.9992 for 2010-2030 yearly data) produces a 2040 population estimate of 240,000 using the City's data.

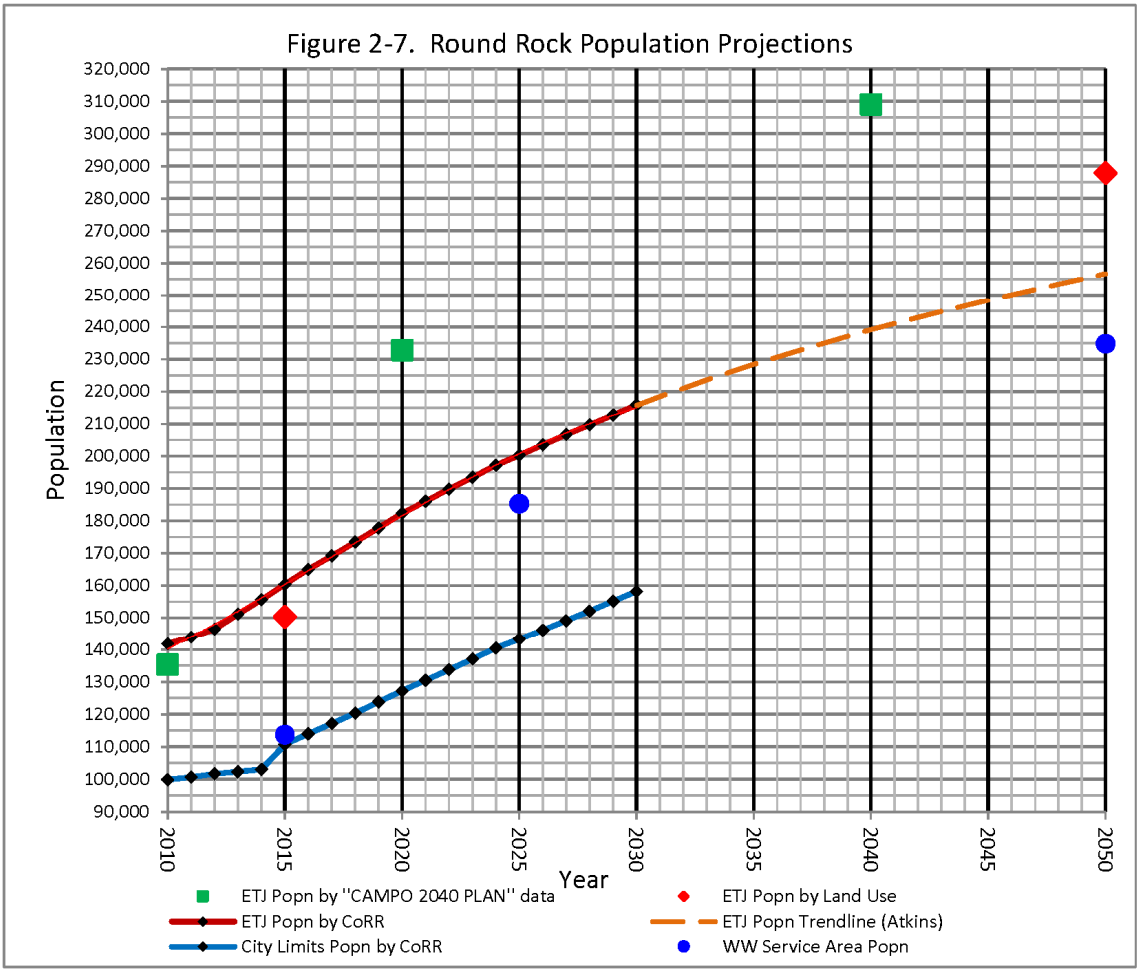
Neither the City nor CAMPO provide a "build-out" population projection for the City's ETJ. For the 2011 and the current 2015 Wastewater Master Plan updates, Atkins prepared population estimates specifically for build-out with an approach based on the following two sets of data:

- Land Use for existing and build-out development as the land use category and acres for all parcels in the ETJ, as furnished to Atkins in GIS by the City, and
- Residential land use criteria as
    - (a) 3.5 people per LUE (living unit equivalent, i.e., typical single-family dwelling unit), and
    - (b) different LUEs per acre for different categories of residential development, as follows: 3.0 LUE/ac for single-family, 4.5 LUE/ac for duplex, 12.0 LUE/ac for multi-family, and 8.5 LUE/ac for mixed use. (Mixed use is taken as 50% multi-family at 12 LUE/ac and 50% commercial at 5 LUE/ac.)

In addition to the GIS land use categories provided by the City, note that Atkins developed a separate density criteria of 5.5 LUE/acre for the Brushy Creek and Fern Bluff MUDs, using existing and projected build-out dwelling unit counts developed by the City for combined single-family and multi-family land use in the MUDs. Atkins also identified several older large-lot residential areas in the northwest portion of the ETJ with on-site wastewater disposal. Using lot counts and area measurements, residential density criteria of 0.7 to 1.5 LUE/ac were assigned to these isolated low-density areas. Note that the Brushy Creek and Fern Bluff MUDs and the northwest low-density tracts are in the ETJ but outside the City's wastewater service area.

Therefore for each parcel in the ETJ, the population was calculated as the acres of residential land use times the LUEs per acre for the land use category, times 3.5 people per LUE. Note that the same methodology was used for the 2011 and 2015 Updates.

The ETJ build-out population projection by land use was aggregated to CAMPO's TAZ's to highlight TAZ's where there is a significant difference in the results between the two methodologies, although the CAMPO 2040 population is not indicated as build-out. Based on the City's GIS database for 2050 future land use and the methodology described above, the total ETJ build-out population projection by land use is 287,840, almost 288,000. In comparison, CAMPO's data produces a 2040 ETJ population estimate of 309,000, but a trend line projection to 2050 build-out is not reliable with just the 2010, 2020 and 2040 CAMPO data points. Figure 2-7 presents the ETJ population projections developed from different sources as discussed above.



2.3.2 Wastewater Service Area Population Projections

The methodology for estimating the wastewater service area population is basically the same as used for the ETJ population, i.e., using the various categories of residential land use, the corresponding LUE/acre population density criteria, and 3.5 people per LUE. However, for the wastewater service area the residential parcel populations are aggregated to the collection system sub-basins ("catchments") for the purpose of the computer modeling, instead of CAMPO's TAZs as used for the larger ETJ. See Section 4 regarding the catchments and modeling.

Wastewater service area populations are developed for existing (2015) land use conditions, build-out conditions (say 2050), and for projected 2025 conditions. Existing wastewater flows are needed to identify any flows that may cause current capacity problems which require near-term capital improvements. The ultimate or build-out population must be projected in order to develop design flows that will be used for sizing necessary pipeline improvements. In addition, a 10-year projection for 2025 wastewater service area population is needed for developing impact fees to pay for additional capacity required for growth that occurs in just the next ten years. The impact fee revenue is only a portion of the cost for capacity improvements that will be sized for the build-out flows.

The populations for existing and build-out conditions were developed directly from the City's GIS land use mapping as discussed above. Interpolation of the 2025 population from the existing and build-out populations was developed on a catchment-by-catchment basis in order to account for different rates of development in different parts of the service area, with input from City staff on development trends and planned interceptor extensions. For each catchment the existing population was expressed as a percentage of the projected build-out population, along with the total increase in the catchment population from existing to build-out. Then, for impact fee purposes, each catchment was assigned a percentage for how much of the increase in population from existing to build-out is expected to occur from existing to 2025, considering the development trends in the vicinity and the existing percent-developed in the catchment.

Based on the data and methodology discussed above, the estimated populations of the wastewater service area are 113,770 for 2015, 234,800 for build-out, and 185,330 for 2025 by interpolation. The wastewater service area build-out population is 82% of the projected ETJ build-out population of 288,000 discussed above, see Figure 2-7. Note that the wastewater service area does not include the Brushy Creek and Fern Bluff MUDs.

3.0 WASTEWATER GENERATION

3.1 COLLECTION SYSTEM FLOWS

The City's criteria for wastewater unit flow is 80 gallons per day per capita (80 gpd/cap) as an annual average. The criteria of 3.5 people per LUE produces average wastewater unit flow of 280 gpd/LUE. The previous section described derivation of the wastewater service area's 2015, 2025 and 2050 populations by catchment area. Therefore, the residential wastewater loading for the service area is calculated as each catchment's population for each time period times 80 gpd/cap. The resulting total average daily residential flows are 9.1 mgd for 2015, 14.8 mgd for 2025, and 18.8 mgd for build-out.

Various non-residential land uses generate a substantial amount of wastewater in addition to the residential wastewater flows. Section 2.2 addresses all of the City's land use categories, including different categories used for existing versus build-out development in the GIS databases and Atkins' adjustments to establish consistency for population and wastewater projections.

Table 3-1 presents the criteria for LUE/acre and gpd/acre (at 280 gpd/LUE) for the land use categories in the GIS database. Note that the MUD Density and Low Density criteria which were developed for the ETJ population projection do not apply to the wastewater flow calculations since these areas are outside of the wastewater service area. Except for the multi-family and commercial land use categories, the unit flow criteria in Table 3-1 are the same as adopted for master plans prior to Atkins' 2011 wastewater master plan update. (See the 2011 Wastewater Master Plan Update report for more details on the analysis for criteria changes). In summary, for the 2011 update, the multi-family density was reduced to 12 LUE/acre from the previous 14 LUE/acre, and Commercial was increased to 5 LUE/acre from the previous 3 LUE/acre. The basis for these changes was analysis of 2010-2011 Winter Month water billing data, which is generally assumed to reflect wastewater flow. Customers' water billings and parcel acreage were analyzed for 56 multi-family tracts, 358 Commercial parcels, 125 Office parcels, and 77 Industrial parcels. The resulting gpd/acre for each customer was converted to LUE/acre at the standard 280 gpd/LUE. Statistical analysis of the results led to the aforementioned changes in the criteria for multi-family and commercial land use density, but kept the office and industrial LUE/acre criteria the same.

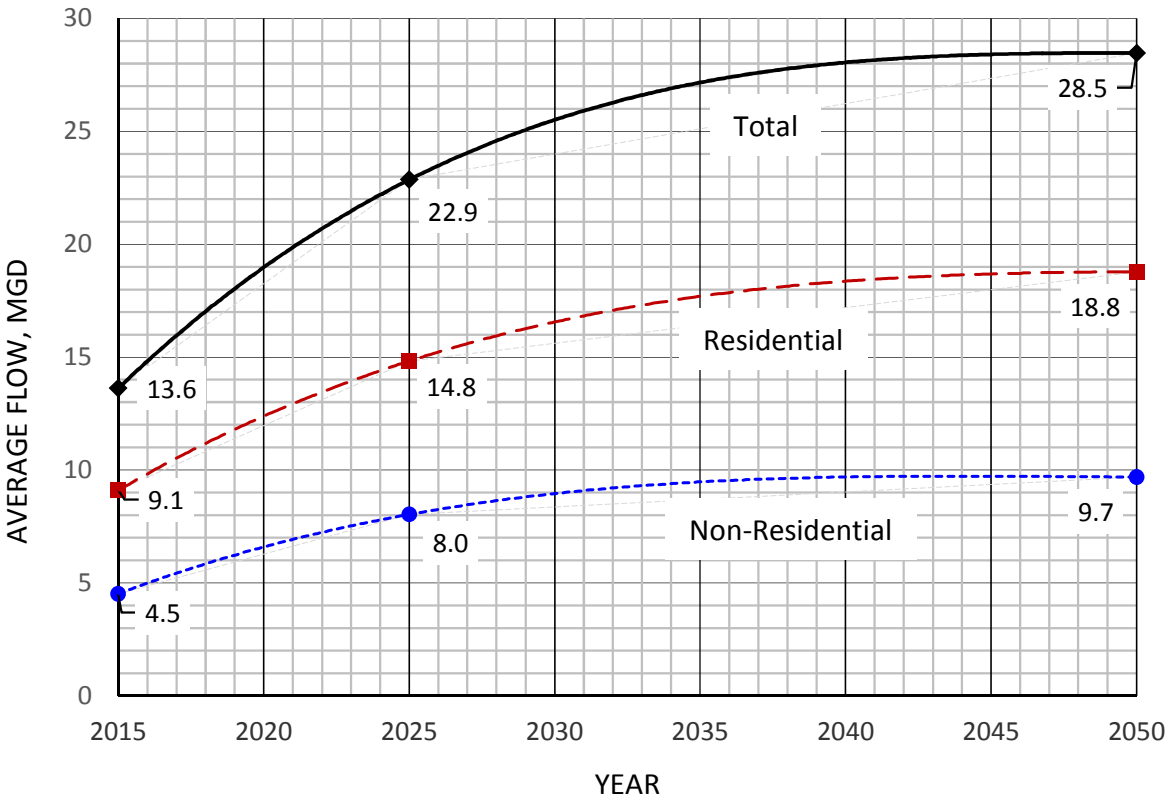
Table 3-1. WASTEWATER UNIT FLOW CRITERIA BY LAND USE		
LAND USE	LUEs/ac	gpd/acre
Single Family	3.0	840
Two Family	4.5	1,260
Residential	3.0	840
Multi Family	12.0	3,360
Mixed-Use	8.5	2,380
Avery Mixed Use	8.5	2,380
Dell Mixed Use	8.5	2,380
Dwtwn Mixed Use	8.5	2,380
Comm/MF	8.5	2,380
Commercial	5.0	1,400
Office/Business Park	3.0	840
Industrial	3.0	840
Educational Facility	2.73	765
Government/Institutional	1.82	510
Utilities	1.82	510
NOTES:		
3.5 people/LUE and 80 gpd/capita (wastewater)		
Mixed Use = 50% MF at 12 LUE/ac and 50% Comm at 5 LUE/ac		

The wastewater flow for each non-residential land use category in each catchment is calculated as the acres of land use times the gpd/acre in Table 3-1. These are summed to get the total non-residential wastewater flow for each catchment. This is essentially the same methodology as used to determine the total population for all of the different residential land use categories in each catchment.

The 2015 and build-out non-residential flows for each catchment were determined directly from the City's GIS database for 2015 and build-out land use. Derivation of the interpolated 2025 non-residential flows for impact fee purposes is essentially the same methodology as used for population. Each catchment was assigned a percentage for how much of the increase in non-residential flow from existing to build-out would occur from existing to 2025 considering development trends in the area and the existing flow as a percentage of the build-out flow. The total non-residential daily average flow for the wastewater service area is 4.5 mgd for 2015, 8.0 mgd for 2025, and 9.7 mgd for build-out.

Figure 3-1 shows polynomial trend lines for the residential, non-residential, and total service area wastewater flows from 2015 to 2050. Note that the total wastewater flow is about 66% residential and 34% non-residential throughout the study period.

Figure 3-1 Round Rock Wastewater Service Area Flow Projections



This section has discussed the residential and non-residential components of the average wastewater flows. Flows for wastewater system modeling and analysis are further developed with diurnal curves for peaking and inflow/infiltration components. These factors are discussed in Section 4.

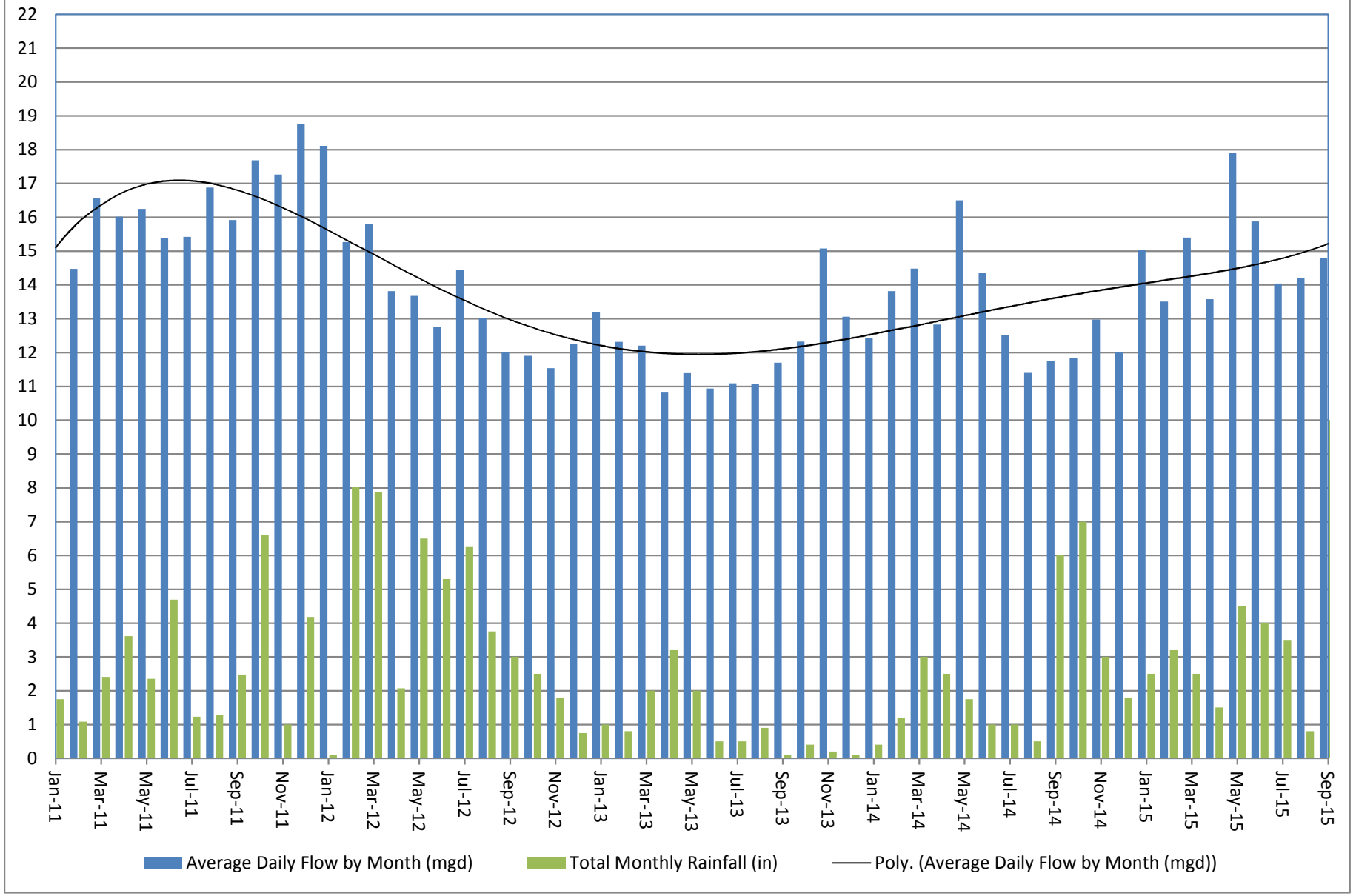
3.2 TREATMENT PLANT FLOW RECORDS

The CoRR furnished records of the monthly flows at the East and West treatment plants serving the Brushy Creek Regional Wastewater System. On average the East plant received about 99% of the total flow. Figure 3-2 shows this data as total average daily flow (MGD) by month from January 2011 to September 2015. The data includes monthly rainfall amounts. Over the past three years, the highest total monthly flow recorded is 17.9 MGD, and the average total flow for the same time period is 13.2 MGD. Since the flow data is monthly and not daily, it does not show the flow response to individual storms. Daily wet weather flows with high intensity rainfall events can be significantly higher than the monthly average flows.

The portion of the total treatment plant flow that is attributed to Round Rock is based on set ownership percentages as previously determined from flow monitoring. The CoRR reports its estimate of about 63% as Round Rock's flow. The remainder is contributed by the other partners in

the regional system (Brushy Creek and other MUDs, Cedar Park, Leander). Only a portion of Cedar Park's total wastewater flow is discharged to the regional system since it continues operation of its treatment plant for a portion of its flow.

Figure 3-2
Brushy Creek Regional Wastewater System Total Flow (East & West Plants)



4.0 MODEL DEVELOPMENT

4.1 MODEL SOFTWARE

Atkins utilized the 2011 Wastewater Master Plan Update *Bently SewerGEMS* model as a basis for the 2015 WWMP Update.

4.2 MODEL UPDATES

4.2.1 Projects Constructed or in Construction

Atkins incorporated several new lines into the existing 2011 model based on construction drawings from CoRR Staff. The new lines included in the existing conditions are:

- Chandler Creek Lower
- Chandler Creek Upper
- Lake Creek Segments 2 and 3
- McNutt Creek Segment C3
- McNutt Creek Segment C9
- Vizcaya

The updates to the existing system can be seen on Figure 4-1.

4.2.2 Network Expansion

Atkins added one specific 8-inch diameter line along Sam Bass Road in order to evaluate system deficiencies in the vicinity. Figure 4-2 shows the line that was added to the network.

4.3 MODEL LOADING

4.3.1 Modeled Basins

Sewersheds are areas by which rainfall can be conveyed to the sewer collection system via a single inlet structure, in this case a collection system manhole. Sewersheds are defined based on the topography of area, natural boundaries, and available collection system entry points. The 2011 model was divided into 165 sewersheds Atkins further subdivided several sewersheds due to the network modifications discussed in Sections 4.2.1 and 4.2.2. Additionally, multiple sewersheds were added due to more accurately evaluate system deficiencies. Figure 4-3 shows the sewersheds as delineated for the ultimate build-out scenario, a total of 266 sewersheds, as well as which were active sewersheds in the 2015 and 2025 model runs.

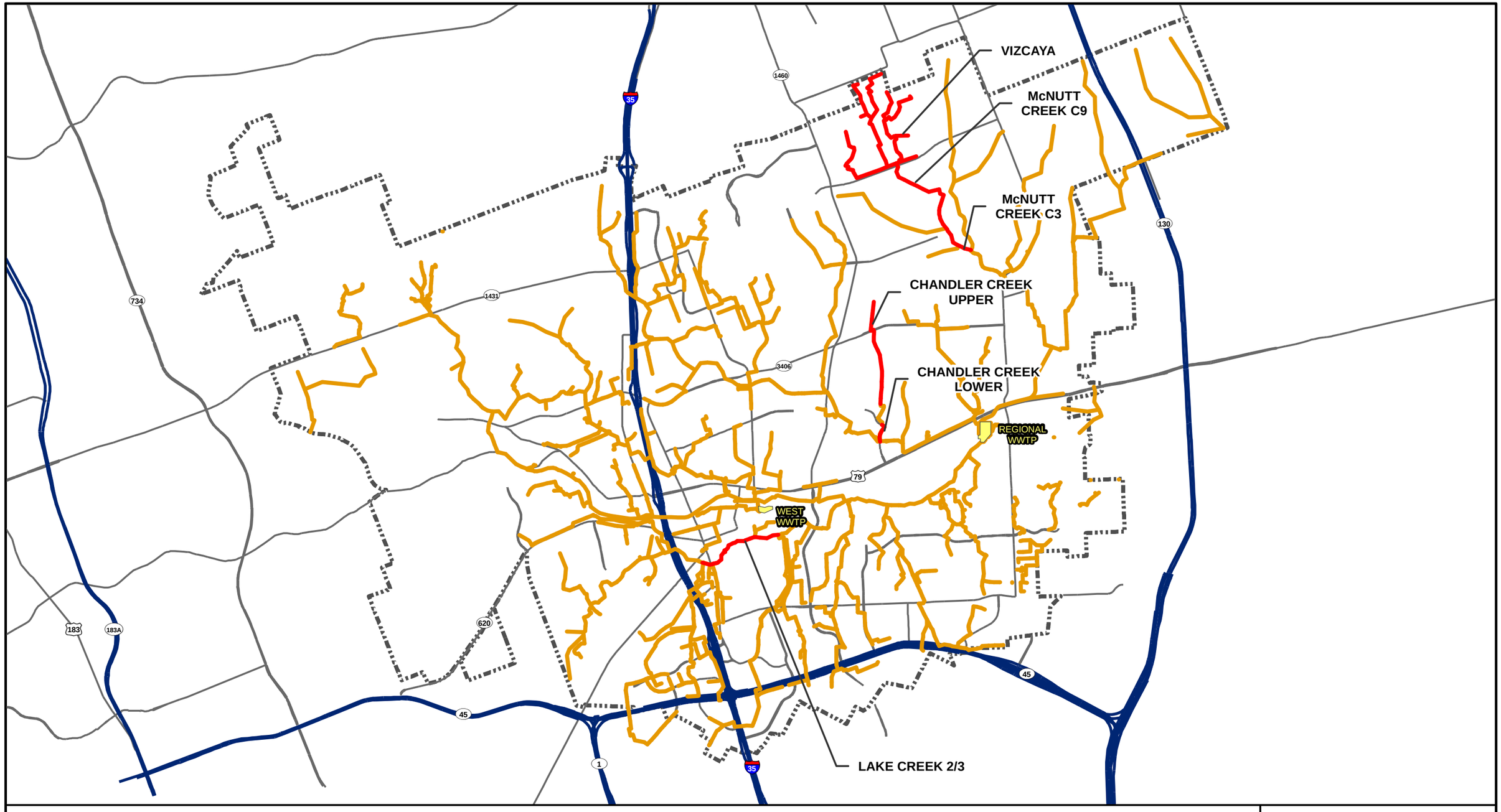


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Figure 4-1
City of Round Rock
Existing System Updates

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 13 Oct 2015

N:\Clients\Q_R\RoundRock_City\Wastewater Master Plan Update (2015)\gen\figures\Report 2015\73041-1_ExistingSystemUpdates.mxd

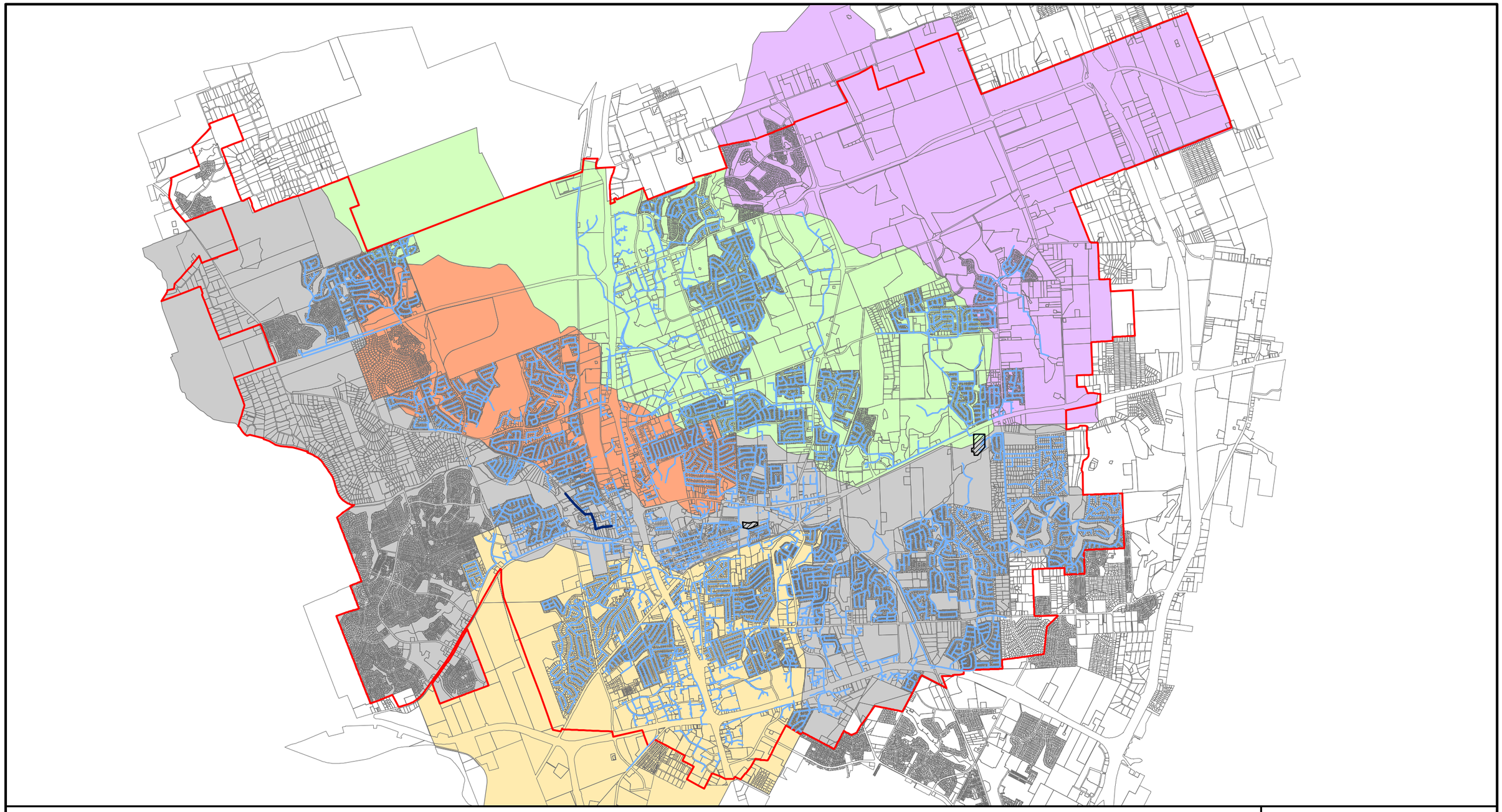

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Figure 4-2
City of Round Rock
Network Expansion - 8" Lines

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 13 Oct 2015

N:\Clients\Q_R\RoundRock_City\Wastewater Master Plan Update (2015)\gis\figures\Report 2015073014-2_NetworkExpansion.mxd

ETJ Boundary

Catchment Boundary

Year Catchment Included in Model

LC11-03	2015
F-Parks3	**2025**
F-OC102a	**Buildout**

Basins

- Brushy
- Chandler
- Lake Creek
- McNutt
- Onion

0 6,000 12,000 Feet

0 1 2 Miles

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Figure 4-3
City of Round Rock
Basin Delineation

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 13 Oct 2015

File: N:/Clients/Q_R/RoundRock_City/100019988/geo/figs/4-3_BasinDelineation.mxd

4.3.2 Flow Components

The CoRR Rock Wastewater Master Plan completed in 2005 included calibration of the wastewater collection system model based on sewershed flow monitoring. At that time a ground water infiltration (GWI) value was assigned to each existing sewershed. Additional flow monitoring was not authorized for the current Wastewater Master Plan update. Therefore, Atkins retained the values originally derived in 2005 due to an absence of information required to update and/or modify the previous values. A static GWI value was not assigned to sewersheds that were added to the model after 2005 due to the addition of new wastewater lines because the design criteria used to determine the peak dry weather flow for the new sewersheds includes GWI.

The base wastewater flow (BWF) is incorporated into the model by applying a diurnal pattern to the average daily wastewater flow. Below are examples of the typical diurnal patterns for residential and non-residential flows. The diurnal patterns in the model were developed based on the 2005 flow monitoring and were not modified during the update of the Wastewater Master Plan since no additional flow monitoring data was obtained.

Figure 4-4
Typical Residential Diurnal Pattern

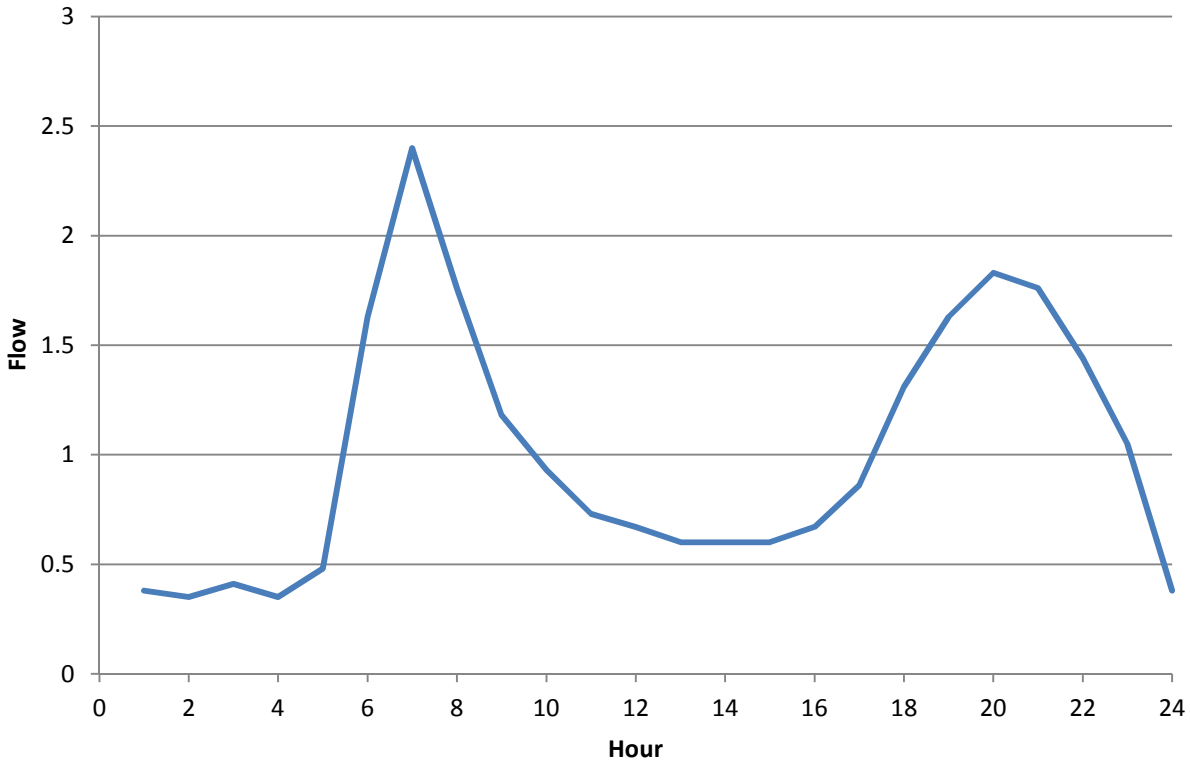
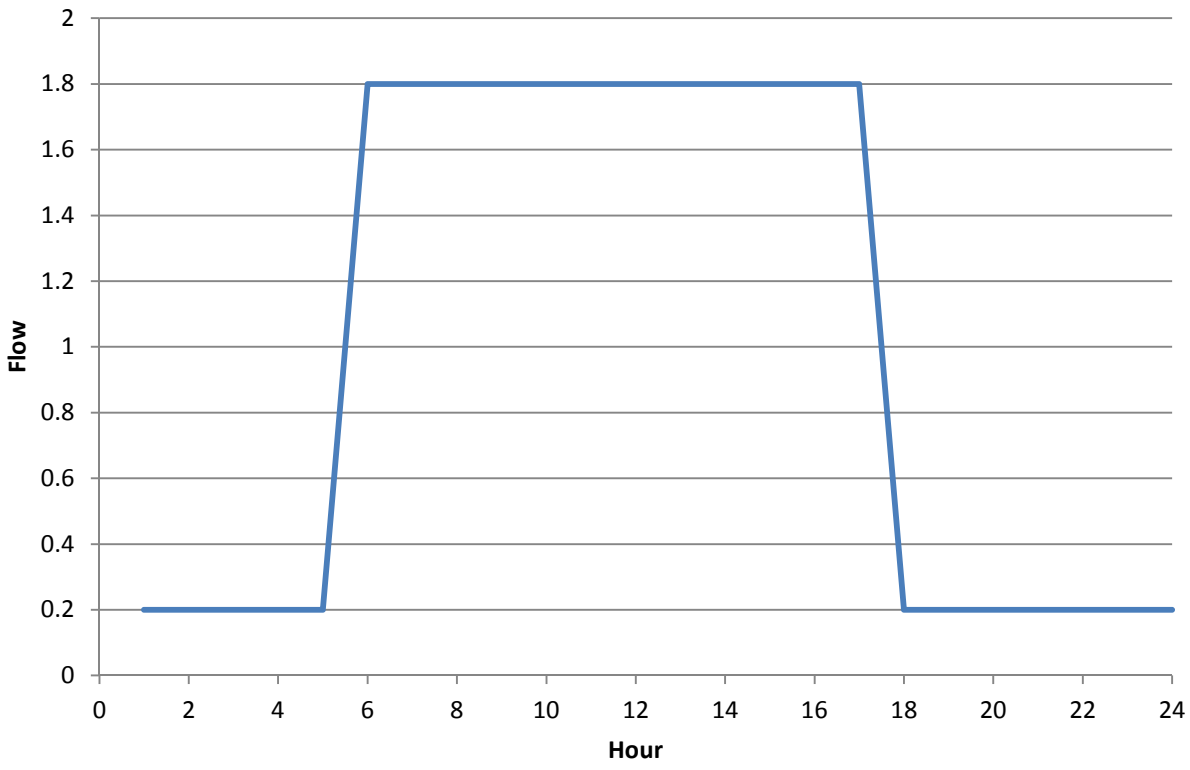


Figure 4-5
Typical Non-Residential Diurnal Pattern



The residential average daily flow within the sewersheds existing at the time of the CoRR Master Plan completed in 2005 is calculated by multiplying the population by a per capita wastewater flow that was determined based on the results of the flow monitoring data. For sewersheds that were added after the 2005 date, the CoRR design criteria of 80 gallons/capita/day was applied to the population to determine the residential average daily flow. Non-residential average daily flows were calculated by converting land use acreage to flow using the conversion factors discussed in Section 3. The residential, non-residential, and GWI values loaded in the model for each year analyzed can be found in Appendix A.

The peaking factor applied to residential flows within sewersheds added after 2005 was 3.5. The following are representative of the peaking factors applied to the non-residential flows:

Land Use	Peaking Factor
Commercial/Industrial	1.8
Public Facilities	2.18

Rainfall Dependent Inflow and Infiltration (RDII) is accounted for in the model by applying unit hydrographs defined by the parameters R, T, and K. These parameters were defined in the 2007

Wastewater Master Plan and were not modified with the exception of the values applied to new sewersheds. Prior to the 2011 WWMP Update, the CoRR design criterion of 1,000 gallons per acre per day was applied to sewersheds added after 2005. At the request of the CORR, this value was decreased to 750 gallons per acre per day, this reduction was accomplished by reducing the R values applied to sewersheds added after 2005 by 28%. The reduced R values are shown below:

	1000 gal/ac/day	**750 gal/ac/day**
R1	0.002	0.00144
R2	0.001	0.00072
R3	0.001	0.00072

The RTK values above determined for the 2011 WWMP Update were also applied to sewersheds added after 2005 in the 2015 WWMP Update.

5.0 CAPACITY ANALYSES

Atkins modeled the flows for three separate planning horizons; 2015, 2025, and build out (2050). For the purposes of developing a Capital Improvement Program for the CoRR, the capacities were evaluated based on the flows developed from the existing and projected CoRR land uses as discussed in Section 3. The existing and 2025 models were primarily used in determining the correct timing of the required upgrade, while the build out model was used to determine the required capacity of the upgrade. The following hydraulic criteria were used in evaluation of the system:

Network Component	Criteria
Gravity Mains	Flows within 2-feet of top of MH
Treatment	Annual Average Dry Weather Flow
Lift Stations	Texas Administrative Code – Title 30, Part 1, Chapter 217, Subchapter C

The rainfall conditions used to analyze the hydraulics of the CoRR wastewater system were not modified from the previous WWMP. The modeling software utilizes a 5-year, 24-hour design storm for calculations.

5.1 GRAVITY MAINS

Atkins performed a review of each pipe segment that the model indicated was flooded. For each segment the minimum capacity and the PWWF after the last catchment entry point were used to determine the status of the line. There are five pipe segments that do not have capacity to convey the current PWWF as developed from the existing land use conversions: Brushy Creek 2, Brushy Creek 4, Brushy Creek 5, Chandler Creek 2, and Lake Creek 1. Chandler Creek 2 and Lake Creek 1 both utilize assumed inverts. Atkins recommends surveying the existing manholes. The other three projects to address the required upgrades for these pipe segments have been prioritized in the CIP with the expectation that all three will bid by 2017. Figure 5-1 and Table 5-1 summarize the findings of the hydraulic analysis. Future pipes were sized such that the peak wet weather flow will not exceed 85% of the capacity of the pipe flowing full.

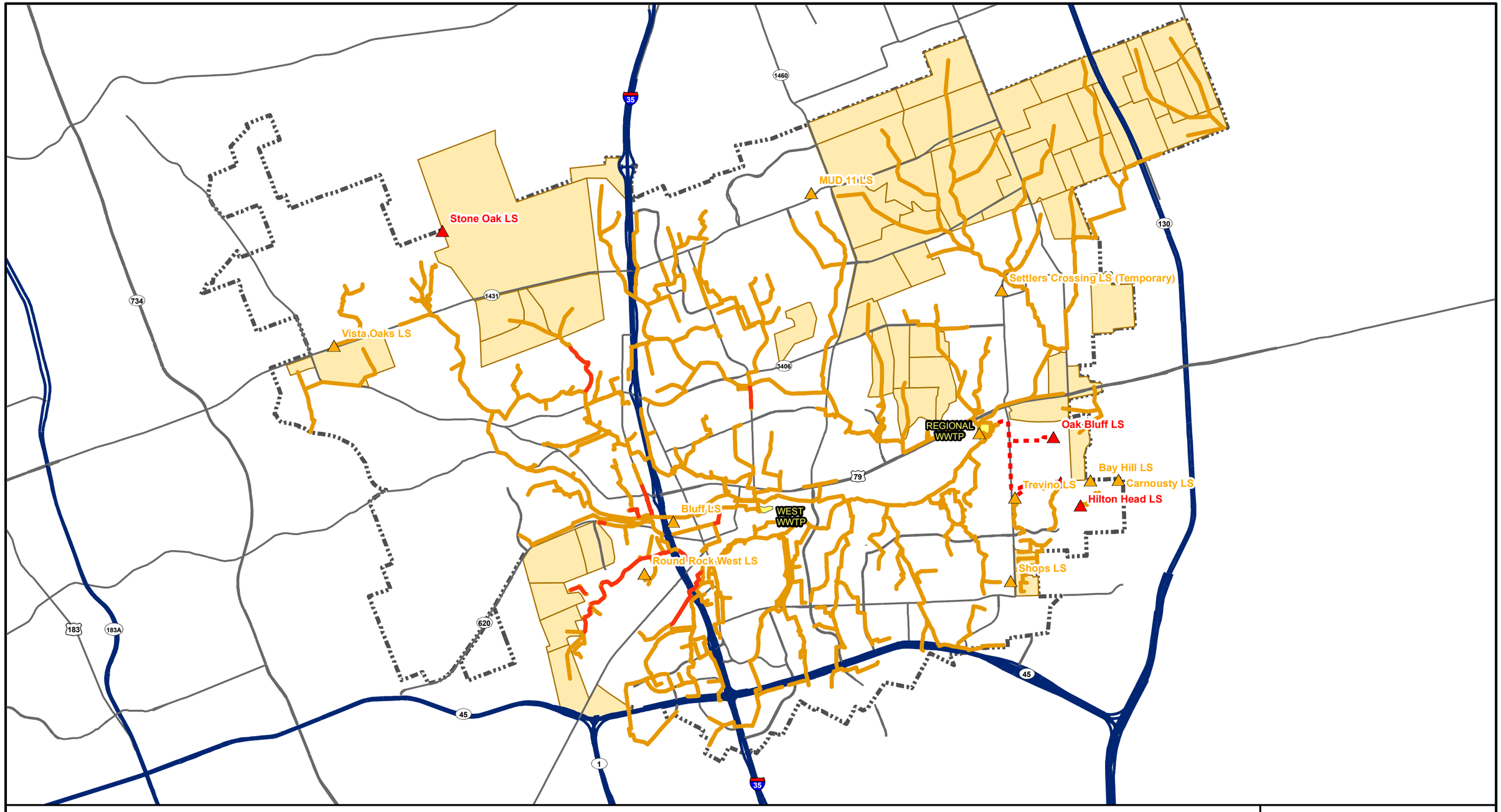


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Figure 5-1
City of Round Rock
Hydraulic Deficiencies for Buildout Conditions

Prepared by: 19910	Scale: 1:75,000
Job: 100042582	Date: 3 May 2016

File: N:/Clients/Q_R/RoundRock_City/100019988/geo/figs/5-1_HydraulicDeficiencies.mxd

Table 5-1
Undersized Pipe Segments

Pipe Segment	Key	Description	Existing Capacity (MGD)	Existing Model Required Flows			Model Required Flows for Buildout			Notes
				Peak DWF (MGD)	Peak RDII (MGD)	Peak WWF (MGD)	Peak DWF (MGD)	Peak RDII (MGD)	Peak WWF (MGD)	
Brushy Creek 2	BC2	10-in and 12-in line from Liberty Ave. at Burnet St. to Pecan Ave. at Spring St.	0.32	0.14	1.58	1.72	0.33	2.49	2.82	Undersized for existing PWWF
Brushy Creek 4	BC4	978 lf 10-in on Wonder Dr. and Ledbetter St.	0.5	0.23	0.68	0.91	0.23	0.87	1.1	Undersized for existing PWWF
Brushy Creek 5	BC5	1,600 lf of 8-in on Chisholm Trail South of Sam Bass Rd.	0.26	0.19	0.39	0.58	0.21	0.80	1.01	Undersized for existing PWWF
Chandler Creek 2	CC2	8-in and 6-in lines from Spring Breeze Dr to Chandler Interceptor. Area is just South of Old Settlers Blvd at Sunrise Rd.	0.29	0.30	0.16	0.46	0.25	0.94	1.19	Undersized for existing PWWF. Has assumed inverts - recommend survey and flow monitoring
Lake Creek 1	LC1	Line owned by CoRR. 15-in and 12-in lines from southeast side of St. Williams Loop to halfway between McNeil Rd and S Mays St.	2.82	1.12	2.85	3.97	3.26	2.90	6.16	Undersized for existing PWWF and buildout DWF. Has assumed inverts - recommend survey.
Lake Creek 4	LC4	10-in and 8-in lines from Wagongap Dr and Chisholm Valley Dr to West Logan St. Crosses under I-35.	1.02	0.37	0.74	1.11	0.41	1.35	1.76	Undersized for buildout PWWF. Model loading might be cause of overflow - recommend flow monitoring
Lake Creek 5	LC5	Line owned by CoRR. 12-in and 10-in lines from the south end of West Creek Loop to the southeast side of St. Williams Loop.	1.08	0.31	0.31	0.62	2.23	0.07	2.3	Undersized for buildout DWF from new development upstream
Lake Creek 6	LC6	8-in line from the corner of Rock Ridge St and Cedar Falls St to Oakridge Dr and Creekmont Dr.	0.31	N/A	N/A	N/A	1.19	0.02	1.21	Undersized for buildout DWF from new development upstream (not modeled in existing system model)
Lake Creek 10	LC10	12-in and 10-in lines from Old West Dr between Rawhide Dr and Old West Pl. to one segment north of Yucca Dr.	0.68	0.76	0.76	1.52	1.45	0.26	1.71	Undersized for existing DWF
Lake Creek 11	LC11	8-in line from just North of SH 45 and just West of I-35 to Hesters Crossing Rd. Runs along I-35	0.42	0.20	0.23	0.43	0.50	0.02	0.52	Undersized for existing PWWF
Onion Creek 1	OC1	12-in and 8-in lines from Hidden Glen Dr to Plantation Dr just past Cuero Cv.	1.25	0.03	0.04	0.07	1.81	0.58	2.39	Undersized for buildout DWF from new development upstream

5.2 WASTEWATER TREATMENT PLANTS

The City of Round Rock system includes two WWTPs, the Brushy Creek West Regional Wastewater Treatment Facility (West WWTP) and the Brushy Creek Regional Wastewater Treatment Facility – East Plant (East WWTP). The following table provides relevant information for both facilities:

	West WWTP	**East WWTP**
Owners	City of Austin City of Cedar Park City of Round Rock Brazos River Authority	City of Austin City of Cedar Park City of Round Rock
Operator	Brazos River Authority	Brazos River Authority
Permitted annual average daily dry weather flow (MGD)	3.0	21.5
Permitted 2-hour peak flow (MGD)	9.0	75.0
Average dry weather flow (1) (MGD)	0.68(2)	14.36

(1) Data source is WWTP reporting data from Jan 2011 – Sept 2015
(2) Average is for the 6 months the West WWTP received flow, does not include the 51 months of 0 MGD

The West WWTP is utilized for additional treatment capacity during peak weather events and for maintenance purposes. The West WWTP received flow for 6 out of the 57 months from January 2011 to September 2015. The Wastewater Master Plan assumes that the West WWTP is available through buildout. However, there are not any required upgrades or modifications to this plant.

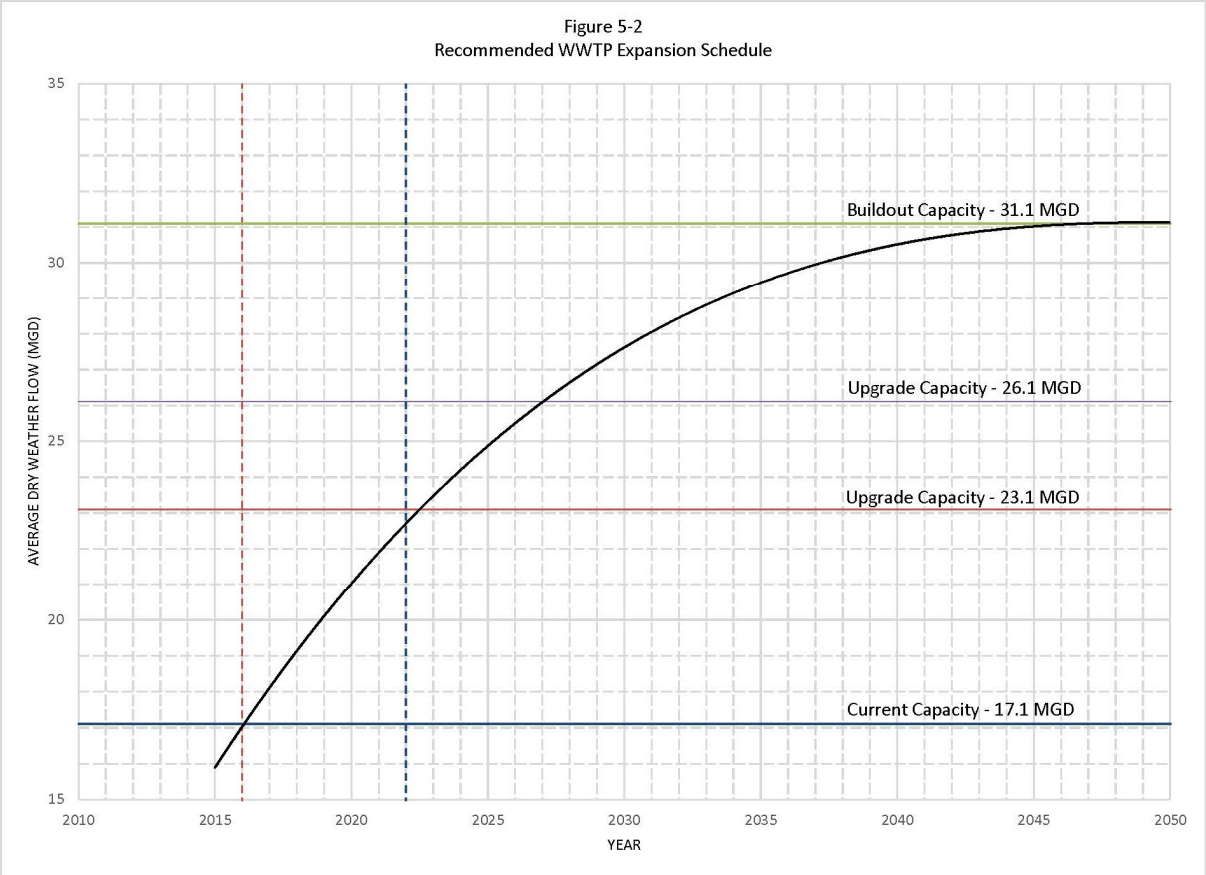
The CoRR currently has an allocation of 17.1 MGD for East WWTP. The capacity of the East WWTP was evaluated based on the average dry weather flows calculated for each planning period based on land use; 2015, 2025 and buildout.

Year	**Average Dry Weather Flow Based on Land Use (MGD)**
2015	15.8
2025	25.5
Buildout	31.1

Based on the average dry weather flow projections, it is recommended that the CoRR begin designing the East WWTP upgrade to increase CoRR capacity from 17.1 MGD to 23.1 MGD in 2018, with an

expected completion date of 2022. Any additional required capacity in the interim should be purchased from surplus availability. The anticipated date to begin the subsequent East WWTP upgrade design to increase CoRR capacity from 23.1 to 31.1 MGD is 2025, with a construction completion date of 2027.

Figure 5-2
Recommended WWTP Expansion Schedule



5.3 LIFT STATIONS

The CoRR commissioned a separate investigation into the existing lift stations in the Forest Creek area in 2009, Forest Creek Wastewater and Inflow Study, which was completed in December 2009. Of the five lift stations that the model indicates require upgrades for build out conditions, four of these are in the Forest Creek area. After discussion with the CoRR, it was decided that the report produced by CDM would be the basis of the proposed lift station upgrades with the Forest Creek area. The CIP was modified to reflect the findings of the report. The remaining lift station which requires an upgrade is the Stone Oak Lift Station.

Table 5-2
Lift Station Capacities

Name	Location	Number of Pumps	Existing Firm Capacity (gpm)	Required Firm Capacity	
				Existing PWWF (gpm)	Build Out PWWF (gpm)
Stone Oak	NE Corner Stone Oak Subdivision	2	234	243	249

Per TCEQ Rule 30 TAC, Title 30, Part 1, Chapter 217, Subchapter C this lift station should be able to operate during PWWF with one pump out of service. It is recommended that this lift station be upgraded from 0.34 MGD to 0.38 MGD in 2022.

6.0 CAPITAL IMPROVEMENT PLANS

Based on system deficiencies and projected growth, Atkins in coordination with the CoRR Staff, developed a 10-year Capital Improvement Plan (CIP). See Appendix B for details of individual projects. Figure 6-1 shows the 10-year CIP. Tables 6-1 and 6-2, and Figure 6-2 summarize the recommended projects. Project costs include construction cost, professional services, and easement acquisition and services as follows:

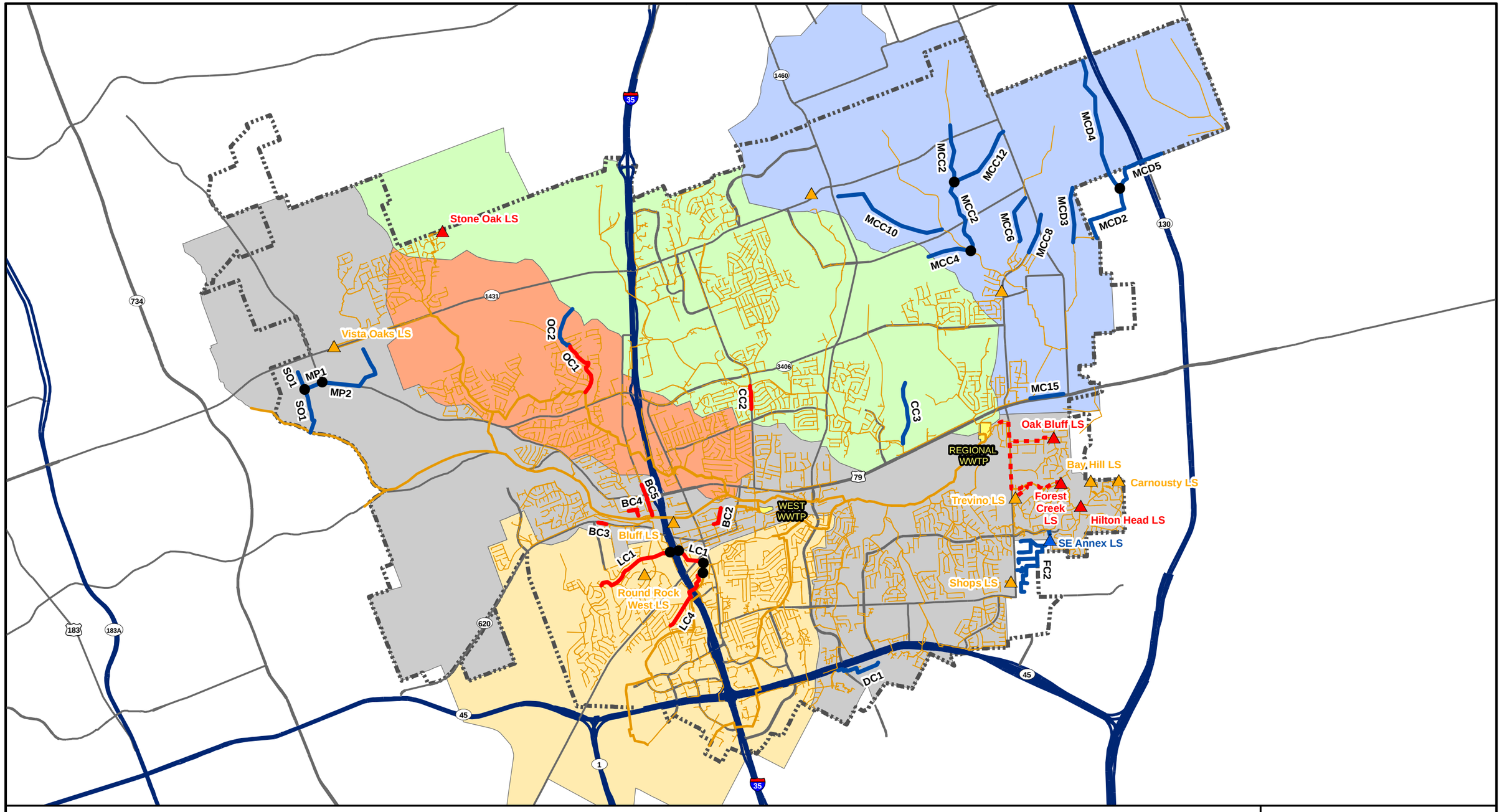
Cost Item	Value
Construction Cost (CC)	5% bonds and insurance Mobilization Demobilization 18% contractor overhead and profit 20% contingency
Professional Services (PS)	15% of the CC
Easement Acquisition Cost (EAC)	10% of (CC + PS)
Easement Acquisition Services (EAS)	4% of EAC
Total Project Cost	CC + PS + EAC + EAS

Inflation was assumed to be 4% per year for interceptors and lift stations.

Atkins recommends that the CoRR update the Wastewater Master Plan in 3 to 4 years.

Table 6-1
10-year CIP Budget

Project Bid Year	Pipe	Lift Stations	Treatment
2016	$480,174	-	$500,000
2017	$1,772,633	-	$4,500,000
2018	$1,905,800	-	$4,100,000
2019	$6,850,676	$3,215,300	$12,500,000
2020	$9,437,911	$813,817	$12,500,000
2021	$6,411,719	$4,600,393	$12,500,000
2022	$7,133,107	$1,704,340	-
2023	$7,691,609	-	-
2024	$3,845,605	-	-
2025	-	-	$51,900,000
Totals	$45,529,234	$10,333,849	$98,500,000



Wastewater Treatment Plant
Project Break

Lift Stations
Existing Lift Station
Proposed Lift Station Upgrade
Proposed New Lift Station

Wastewater Interceptor Projects
Proposed Sewer Upgrade
Proposed Force Main Upgrade
Proposed New Sewer
Proposed New Force Main

Existing Wastewater Lines
Regional Line
Force Main
CORR Wastewater Line

ETJ Boundary

Streets
Freeway/Toll Road
Major Road

Basins
Brushy Creek
Chandler Creek
Lake Creek
McNutt Creek
Onion Creek

0 6,000 12,000 Feet

0 1 2 Miles

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Figure 6-1
City of Round Rock
Ten Year CIP

Prepared by: 19910	Scale: 1:72,000
Job: 100019988	Date: 13 Oct 2015

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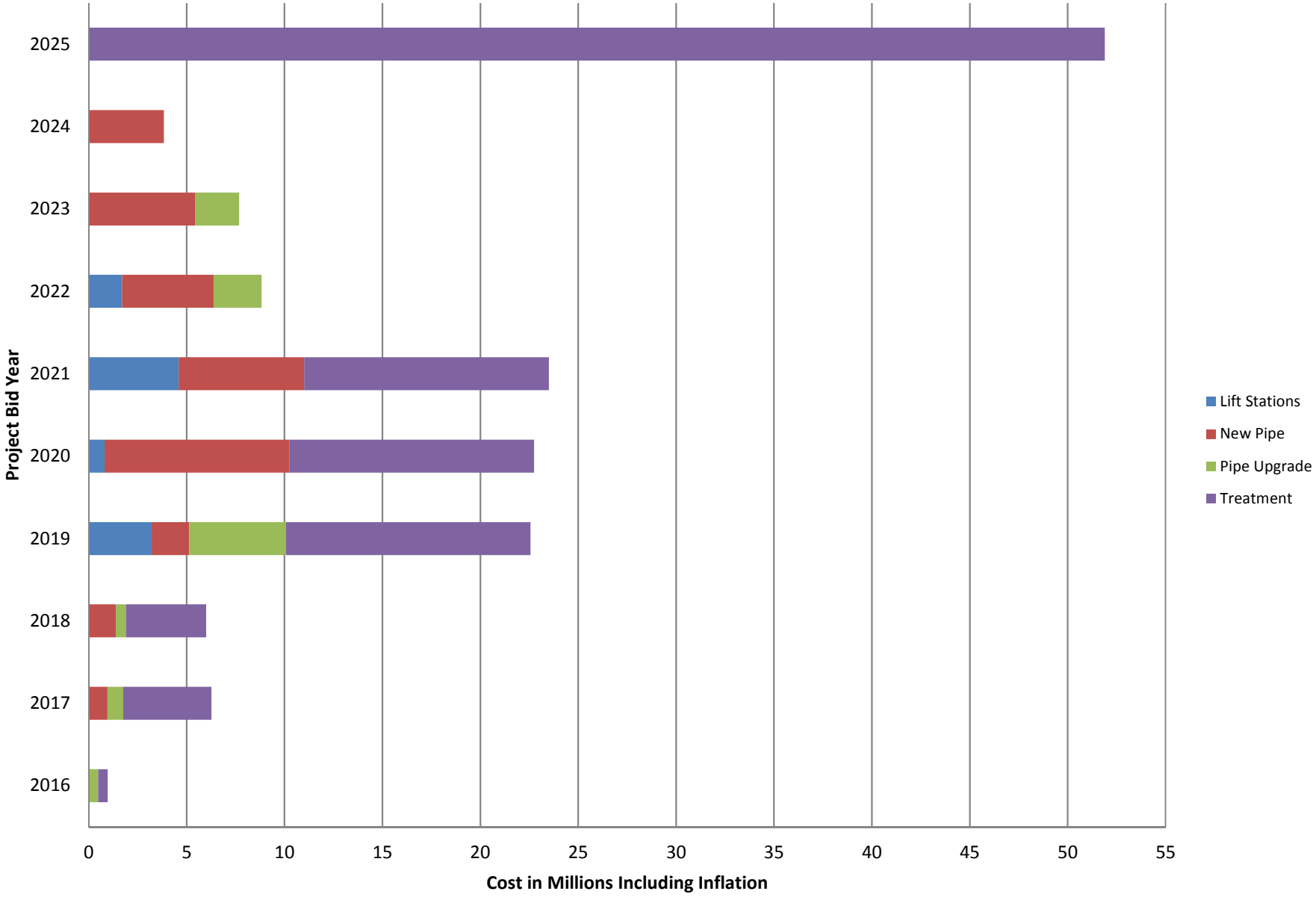
Table 6-2
10-year CIP

Project Bid Year	Project	Type	Cost with Inflation
2016	Brushy Creek 4	Pipe Upgrade	192,096
	Brushy Creek 5	Pipe Upgrade	288,078
	WWTP Rerate	Treatment	500,000
2017	Brushy Creek 2	Pipe Upgrade	684,510
	Brushy Creek 3	Pipe Upgrade	125,142
	Dry Creek 1	New Pipe	962,982
	WWTP Rerate	Treatment	4,500,000
2018	Chandler Creek 2	Pipe Upgrade	520,222
	Chandler Creek 3	New Pipe	857,680
	McNutt Creek 15	New Pipe	527,897
	WWTP Expansion 1	Treatment	4,100,000
2019	Lake Creek 1	Pipe Upgrade	4,932,665
	McNutt Creek 10	New Pipe	1,918,011
	Upgrade Lift Station: Forest Creek	Lift Stations	3,215,300
	WWTP Expansion 1	Treatment	12,500,000
2020	McNutt Creek C4	New Pipe	765,875
	McNutt Creek D2	New Pipe	8,672,036
	Upgrade Lift Station: Hilton Head	Lift Stations	813,817
	WWTP Expansion 1	Treatment	12,500,000
2021	Forest Creek 2	New Pipe	2,148,396
	McNutt Creek C2	New Pipe	4,263,323
	Upgrade Lift Station: Oak Bluff	Lift Stations	4,600,393
	WWTP Expansion 1	Treatment	12,500,000
2022	McNutt Creek C8b	New Pipe	1,070,234
	McNutt Creek D4	New Pipe	2,263,003
	Onion Creek 1	Pipe Upgrade	2,451,844
	Onion Creek 2	New Pipe	1,348,025
	Upgrade Lift Station: Stone Oak	Lift Stations	884,503
	SE Annex LS	Lift Stations	819,836
2023	Lake Creek 4	Pipe Upgrade	2,235,053
	McNutt Creek C6	New Pipe	1,815,386
	McNutt Creek C12	New Pipe	1,204,491
	McNutt Creek D5	New Pipe	2,436,679
2024	Mayfield Park 1	New Pipe	393,290
	Mayfield Park 2	New Pipe	1,960,456
	Spanish Oak 1	New Pipe	1,491,858
2025	WWTP Expansion 2	Treatment	51,900,000

Figure 6-2 Ten-Year Capital Improvement Plan Costs



7.0 REFERENCES

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Appendix A

Average Daily Flows and Ground Water Infiltration by Planning Horizon

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
F-CC109	143	398	2,144	2,580	31,810	171,481	206,398	5,105	80,507	99,357	0
F-CC114	312	1	2,631	5,261	86	210,479	420,871	11,892	69,880	205,186	0
HEC_Seton	171	5	541	541	278	31,736	31,736	65,623	91,797	91,797	0
Terav-C-MUD11	509	2,731	3,637	3,637	160,336	213,543	213,543	11,177	20,265	20,265	0
BC02-02-B	47	231	235	235	11,778	11,975	11,975	0	0	0	1,800
BC02-01	179	951	998	998	48,406	50,789	50,789	8,727	8,713	8,713	4,100
BC03	296	1,580	2,621	2,621	325,663	540,314	540,314	6,973	0	0	29,700
BC04-01A	90	361	624	624	21,194	36,635	36,635	0	0	0	0
BC04-02-A	196	1,274	1,517	1,517	74,821	89,086	89,086	9,102	9,104	9,104	0
BC04-03	178	1,119	1,268	1,268	65,692	74,469	74,469	30,404	30,404	30,404	0
BC04-01	83	584	718	718	34,287	42,166	42,154	0	0	0	0
BC05-02	159	910	1,073	1,073	46,330	54,586	54,586	9,093	12,289	12,289	30,900
BC05-01	355	1,586	2,186	2,186	80,736	111,253	111,253	2,785	63,308	63,308	36,200
BC07-06-A	127	710	826	826	41,704	48,478	48,478	15,877	15,793	15,793	3,400
BC06-03-A	218	621	765	765	64,235	79,067	79,067	49,783	113,719	113,719	9,700
BC06-01	187	1,152	1,368	1,368	119,173	141,431	141,431	4,751	5,811	5,811	90,000
BC06-03-B	201	1,027	1,279	1,279	106,158	132,289	132,289	4,291	46,592	46,592	9,000
BC06-02	78	546	505	505	56,417	52,245	52,245	1,020	1,659	1,659	20,100
BC07-02-A	32	687	692	692	40,344	40,638	40,638	1,932	1,904	1,904	3,500
BC07-06-B	84	321	739	739	18,833	43,409	43,409	54,859	0	0	2,200
BC07-04	146	574	740	740	33,715	43,443	43,443	1,785	28,776	28,776	39,200
BC07-05-B	45	357	378	378	20,963	22,189	22,189	0	0	0	26,200
BC07-01	229	1,343	1,450	1,450	78,843	85,150	85,150	61,551	106,040	106,040	16,000
BC07-02-B	47	554	590	590	32,501	34,667	34,667	0	0	0	5,200
BC07-02-C	74	438	639	639	25,691	37,498	37,498	44,289	28,674	28,674	8,200
BC07-02-D	48	318	344	344	18,651	20,211	20,211	2,023	37,304	37,304	5,300
BC07-03	774	2,428	3,328	3,328	142,577	195,400	195,400	129,204	271,103	271,103	24,200
BC07-05-A	90	649	680	680	38,081	39,921	39,921	0	0	0	52,200
BC08-01	55	430	435	435	25,254	25,546	25,546	1,962	65	65	10,300
BC08-02	27	193	440	440	11,306	25,834	25,834	2,965	10,641	10,641	3,500
BC20-01	131	1,120	1,114	1,114	109,678	109,082	109,082	4,961	4,248	4,248	42,700
BC20-03	81	708	678	678	69,351	66,419	66,419	25,797	31,666	31,666	31,259
BC20-04	33	457	455	455	44,704	44,585	44,585	0	0	0	8,800
BC20-02	63	694	685	685	67,993	67,079	67,079	27,969	33,652	33,652	10,900
BC21-01	121	371	1,350	1,350	26,962	98,174	98,174	25,300	58,487	58,487	9,700

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
BC21-02	60	35	703	703	2,520	51,099	51,099	27,822	23,429	23,429	9,700
BC21-03	50	172	596	596	12,530	43,301	43,301	9,759	19,854	19,854	9,700
BC22-02-D	29	318	163	163	23,119	11,861	11,850	11,281	10,562	10,562	0
BC22-02-C	46	370	370	370	26,899	26,879	26,899	146	135	135	38,800
BC22-02-B	29	184	194	194	13,377	14,120	14,104	1,514	4,349	4,349	0
BC22-02-E	41	257	295	295	18,684	21,450	21,447	8,671	8,090	8,090	0
BC22-02-H	74	33	0	0	2,399	0	0	59,480	69,073	69,073	19,900
BC22-02-A	51	277	57	57	20,138	4,121	4,144	22,417	36,219	36,219	0
BC22-01-B	28	44	40	40	3,184	2,928	2,928	16,997	23,545	23,545	2,600
BC22-01-C	75	127	148	148	9,217	10,751	10,751	42,594	45,945	45,945	6,900
BC22-01-A	27	0	1	1	0	59	59	20,681	20,677	20,677	2,400
BC22-02-G	28	161	186	186	11,705	13,518	13,522	222	6	6	0
BC22-02-F	69	192	341	341	13,958	24,790	24,791	19,756	19,075	19,075	0
BC23-03	142	783	1,226	1,226	56,709	88,844	88,844	1,189	0	0	35,500
BC23-02	136	418	391	391	30,295	28,321	28,321	58,774	98,345	98,345	20,800
F-BC103	158	323	570	570	25,822	45,635	45,635	23,773	108,660	108,660	0
BC23-01	145	765	1,031	1,031	55,450	74,724	74,724	16,285	6,861	6,861	39,100
BC40-03	249	1,283	1,336	1,336	75,350	78,409	78,409	21	2	2	0
F-Parks3	295	0	166	166	0	13,241	13,241	0	0	0	0
Spanish Oak	28	0	288	288	0	23,018	23,018	0	0	0	0
OC29	73	574	596	596	25,245	26,203	26,203	0	0	0	16,800
CC43	245	1,135	1,452	1,452	66,636	85,260	85,260	26,887	67,763	67,763	0
CC32-03	93	616	659	659	36,146	38,703	38,703	720	7,425	7,425	16,100
CC32-01	144	1,167	1,270	1,270	68,517	74,583	74,583	3,211	9,947	9,947	3,100
CC32-02	324	1,270	1,357	1,357	74,539	79,678	79,678	37,302	53,151	53,151	66,100
CC33	138	606	627	627	35,584	36,817	36,817	14,777	62,718	62,718	30,800
CC34-07	118	766	877	877	50,903	58,273	58,273	448	384	384	0
CC34-06	58	341	436	436	22,666	28,935	28,935	0	81	81	0
CC34-01	251	1,212	1,695	1,695	80,508	112,593	112,593	29,245	43,008	43,008	49,100
CC34-02	157	2,093	2,244	2,244	139,002	149,053	149,053	16,617	85,080	85,080	52,000
CC34-05	97	301	302	302	19,974	20,091	20,091	34,217	35,281	35,281	7,000
CC34-04	156	868	1,069	1,069	57,664	70,994	70,994	5,882	6,258	6,258	21,900
CC34-03	203	626	726	726	41,609	48,207	48,207	15,642	35,266	35,266	62,900
F-CC110	125	0	1,180	1,180	0	94,436	94,436	0	39,898	39,898	0
CC35	65	632	516	516	85,690	69,963	69,963	574	0	0	53,500

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
CC36-02-C	109	0	0	0	0	0	0	31,598	121,789	121,789	3,100
CC36-02-A	56	3	3	3	193	189	189	26,162	26,980	26,980	1,300
CC36-03-C	209	1,149	1,564	1,564	67,444	91,796	91,796	28,124	75,671	75,671	18,000
CC36-01-C	345	0	19	19	0	1,106	1,106	24,205	296,736	296,736	12,100
CC36-01-A	116	0	0	0	0	0	0	83,448	85,022	85,022	4,100
CC36-01-B	67	0	0	0	0	0	0	14,421	14,421	14,421	1,200
CC36-01-D	124	0	0	0	0	0	0	23,870	23,870	42,256	1,200
CC36-04-A	45	0	0	0	0	0	0	30,463	41,652	41,652	1,200
CC36-05	67	8	9	9	495	533	533	50,468	53,641	53,641	300
CC36-06	95	844	851	851	49,574	49,980	49,980	58,679	58,984	58,984	700
CC36-03-A	113	223	467	467	13,105	27,443	27,443	24,742	49,303	49,303	9,600
CC36-03-B	270	0	61	61	0	3,555	3,555	50,160	108,024	108,024	7,500
CC36-04-B	70	0	0	0	0	0	0	58,192	55,781	55,781	1,800
CC36-02-B	47	0	0	0	0	0	0	55,411	58,775	58,775	1,100
Terav-A	135	0	0	0	0	0	0	98,686	172,028	172,028	0
CC36-02-E	124	0	0	0	0	0	0	22,057	83,170	83,170	2,800
CC36-02-D	93	0	0	0	0	0	0	85,789	98,345	98,345	1,900
CC37	77	610	557	557	66,033	60,320	60,320	205	7,601	7,601	38,500
CC42-02	229	437	905	905	25,658	53,123	53,123	4,353	22,315	22,315	0
CC42-01	322	1,298	1,483	1,483	76,215	87,086	87,086	57,975	61,409	61,409	7,200
F-CC107	116	0	0	0	0	0	0	0	0	0	0
CC42-D	127	956	1,077	1,077	76,453	86,148	86,148	8,266	5,381	5,381	0
CC42-B	78	373	437	437	29,823	34,962	34,962	32,062	19,237	19,237	0
CC42-C	39	230	299	299	18,431	23,895	23,895	0	0	0	0
F-CC112	74	546	715	715	43,664	57,226	57,226	0	470	470	0
CC42-A	132	885	1,042	1,042	70,821	83,331	83,331	1,446	0	0	0
F-CC108	178	0	1	1	0	49	49	0	0	0	0
CC36-03-D	144	667	743	743	39,152	43,633	43,633	64,301	56,034	56,034	14,000
F-CC111	126	0	169	202	0	13,518	16,164	0	74,063	98,751	0
F-CC113	211	0	0	4,181	0	13	334,447	0	0	140,618	0
F-CC104	139	0	1,458	1,458	0	116,680	116,680	0	0	0	0
F-CC101	132	5	263	434	438	21,019	34,740	33,815	35,483	50,489	0
LC16-03	29	240	160	160	10,038	6,676	6,676	7,112	7,899	7,899	8,362
BC04-02	50	342	371	371	20,082	21,800	21,800	0	0	0	0
BC04-04	16	0	0	0	0	0	0	0	0	0	0

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
BC22-03	156	832	2,197	2,197	60,511	159,743	159,743	31,845	68,456	68,456	13,700
RW01-G	87	16	103	141	967	6,071	8,259	29,512	64,894	88,482	12,300
RW01-F	185	1,358	1,443	1,443	79,730	84,704	84,704	98,955	127,525	127,525	26,100
Avery	186	0	693	1,155	0	55,437	92,395	88,547	92,383	126,901	0
LC14-2	97	782	875	875	35,937	40,231	40,231	19,150	28,318	28,318	28,800
F-CC103	132	3	378	627	264	30,202	50,160	18,239	21,889	36,492	0
BC40-01	24	155	159	159	9,125	9,345	9,345	8	0	0	0
BC40-02	122	784	889	889	46,044	52,220	52,220	134	0	0	0
BC01B	324	2,733	2,812	2,812	114,784	118,119	118,119	0	0	0	31,500
BC04-02-B	49	259	265	265	15,203	15,538	15,538	24,062	33,068	33,068	0
OC39	59	285	457	457	16,709	26,818	26,818	0	0	0	0
BC02-02-C	68	360	389	389	18,338	19,789	19,789	309	0	0	2,600
EW01-B	62	0	0	0	0	0	0	11,958	68,821	68,821	18,300
EW01-D	261	1,627	3,063	3,063	159,278	299,908	299,908	63,654	108,853	108,853	77,300
EW01-A	52	234	249	249	22,888	24,405	24,405	0	3,003	3,003	15,400
EW01-E	227	394	744	744	38,558	72,869	72,869	81,104	176,351	176,351	67,500
EW01-C	49	0	0	0	0	0	0	37,311	46,423	46,423	14,600
F-BC104	240	0	0	1,514	0	0	121,094	0	46	132,999	0
F-BC102	90	0	0	519	0	0	41,519	0	9,970	47,720	0
BC02-02-A	55	404	583	583	20,556	29,663	29,663	5,635	4,466	4,466	2,100
F-CC106	110	0	1,058	1,058	0	84,621	84,621	0	0	0	0
F-CC105	148	0	420	656	0	33,621	52,503	0	0	0	0
F-CW104	180	0	0	30	0	20	2,363	0	0	134,186	0
F-CW108	145	0	0	908	0	0	72,666	0	0	39,011	0
F-CW107	143	0	0	337	0	0	26,951	0	0	83,487	0
F-CW106	167	0	23	1,694	0	1,876	135,517	0	0	0	0
F-CW105	189	0	880	1,399	0	70,432	111,922	0	15,255	26,630	0
F-CW102	115	0	413	517	0	33,050	41,334	0	0	28,617	0
F-SG101	173	0	0	0	0	0	0	0	126,366	126,366	0
F-CW101	137	0	631	1,261	0	50,441	100,881	0	5,440	18,132	0
F-LB101	99	0	881	1,762	0	70,484	140,969	0	0	0	0
F-LC103	96	0	0	964	0	0	77,083	0	0	0	0
F-LC101	48	0	0	254	0	0	20,345	0	0	14,533	0
F-LC104	85	11	11	897	873	873	71,763	0	0	0	0
F-LC105	113	0	0	1,033	0	0	82,632	0	0	0	0

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
F-MN116	344	0	1,601	3,202	0	128,073	256,147	0	7,090	23,634	0
F-MN117	517	0	976	4,880	0	78,077	390,385	0	1,906	9,531	0
F-MN121	177	0	404	435	0	32,343	34,777	0	61,149	103,862	0
F-MN123	281	0	0	2,887	0	0	230,972	0	0	0	0
F-MN120	209	0	0	1,841	0	0	147,316	0	0	19,406	0
F-MN112	303	0	1,207	2,414	0	96,568	193,136	0	215	430	0
F-MN119	158	0	581	1,162	0	46,471	92,941	0	11,367	22,734	0
F-MN110B	195	536	1,370	1,781	42,880	109,625	142,515	243	0	0	0
F-MN122	72	0	0	755	0	0	60,387	0	0	0	0
F-MN109	166	0	0	1,682	0	7	134,536	0	0	0	0
F-MN124	125	0	0	0	0	0	0	0	9,702	52,753	0
F-MN101	152	0	31	423	0	2,470	33,849	0	383	38,529	0
F-BC01A	92	0	389	684	0	16,345	28,732	0	0	0	6,900
F-MN102	83	3	5	5	202	377	377	136	65,939	65,939	0
F-MN103	223	125	678	1,046	10,016	54,223	83,695	18,449	58,967	85,979	0
F-MN107	295	1,150	2,185	2,444	92,006	174,837	195,545	10,047	28,625	33,269	0
F-MN108	394	728	2,859	3,569	58,203	228,688	285,517	11,421	57,350	72,659	0
F-CC115	134	0	2,788	2,788	0	223,015	223,015	0	74,338	92,923	0
F-MN110A	161	94	546	659	7,504	43,699	52,748	0	0	0	0
F-OC102a	172	0	0	21	0	0	1,693	0	0	691	0
F-OC102b	236	0	0	2,101	0	0	168,095	0	0	27,907	0
F-Mining	1930	0	0	22	0	0	1,733	8,723	8,723	3,572	0
F-OC101	322	2	2,145	4,286	153	171,603	342,901	0	24,948	83,158	0
F-MN118	257	0	13	2,690	0	1,067	215,199	0	0	0	0
F-CW103	176	0	63	1,134	0	5,067	90,684	0	0	49,502	0
F-SG102	174	0	0	0	0	0	0	0	0	141,593	0
LC09-01-B	104	76	194	194	12,428	31,799	31,799	38,134	49,281	49,281	4,900
LC09-01-A	30	0	1	1	0	155	155	21,025	17,970	17,970	1,400
LC10	163	1,298	1,351	1,351	76,214	79,338	79,338	0	0	0	64,300
LC11-02	81	305	364	364	39,225	46,745	46,745	7,687	19,669	19,669	288,500
LC11-01	45	0	0	0	0	0	0	36,354	36,651	36,651	22,800
LC11-04-B	99	0	973	1,216	0	124,929	156,161	26,499	35,131	43,763	36,300
LC11-05	459	0	1,606	3,213	0	206,310	412,620	202,846	210,719	218,593	128,500
LC11-04-A	110	11	571	757	1,458	73,276	97,215	34,462	40,754	55,436	40,200
LC12-03	59	390	408	408	19,840	20,744	20,744	2,077	1,367	1,367	18,600

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
LC11-03	96	223	403	403	28,673	51,759	51,759	40,893	66,530	66,530	176,800
LC11-04-C	93	0	0	0	47	47	47	72,989	121,647	121,647	34,000
LC11-04-D	187	14	727	1,440	1,848	93,409	184,970	156,120	156,120	181,992	68,600
LC12-04	29	535	625	625	27,232	31,815	31,815	6,635	0	0	3,200
LC12-02	26	220	224	224	11,168	11,383	11,383	564	0	0	7,400
LC12-01	134	978	1,036	1,036	49,727	52,684	52,684	9,449	10,383	10,383	32,300
LC13	148	1,227	1,394	1,394	155,419	176,583	176,583	2,371	2,371	2,371	111,100
LC14-1	54	176	133	133	8,099	6,093	6,093	32,078	39,010	39,010	1,600
LC45-A	43	0	845	845	0	67,566	67,566	56,303	28,152	28,152	0
LC15-D	76	550	527	527	90,357	86,546	86,546	45,815	46,945	46,945	33,200
LC15-C	29	34	20	20	5,626	3,290	3,290	22,104	22,887	22,887	12,600
LC15-B	67	0	575	575	0	94,419	94,419	38,947	22,510	22,510	29,800
LC15-A	166	865	1,242	1,242	142,117	204,128	204,128	63,107	65,412	65,412	72,200
LC16-02	56	91	103	103	3,818	4,287	4,287	15,698	36,655	36,655	7,800
LC16-01	235	1,801	1,887	1,887	75,311	78,885	78,885	18,193	16,311	16,311	75,438
LC17-03	105	623	616	616	36,578	36,188	36,188	11,341	6,995	6,995	20,300
LC17-01	64	318	428	428	18,683	25,118	25,118	17,536	4,407	4,407	4,600
F-BC101	44	0	0	0	0	0	0	0	29,580	34,912	0
LC17-02	86	586	630	630	34,406	37,016	37,016	4,964	2,661	2,661	12,700
LC18	173	782	940	940	49,053	58,953	58,953	48,871	67,477	67,477	34,400
LC19-04	88	681	681	681	31,210	31,206	31,206	0	0	0	15,500
LC19-03	127	728	720	720	33,390	33,002	33,002	14,133	14,060	14,060	21,200
LC19-02	87	712	670	670	32,635	30,705	30,705	0	0	0	11,700
F-LC102	121	0	1,031	1,031	0	47,256	47,256	0	14,518	14,518	0
LC19-01	109	879	886	886	40,307	40,624	40,624	0	0	0	18,600
LC09-02	137	598	729	729	75,804	92,385	92,385	7,567	7,334	7,334	35,800
LC34	85	1,569	1,565	1,565	125,499	125,175	125,175	19,865	35,088	35,088	0
LC45-C	151	1,035	1,995	1,995	82,777	159,633	159,633	38,893	99,088	99,088	0
LC45-B	92	96	1,297	1,297	7,663	103,771	103,771	73,864	53,174	53,174	0
F-CC102	186	667	1,310	1,310	53,330	104,789	104,789	8,653	6,120	6,120	0
F-MN111	250	0	1,628	3,246	0	130,245	259,646	0	28,334	94,446	0
F-MN114	265	0	776	1,553	0	62,111	124,222	0	4,899	9,797	0
OB-Div-A	69	322	494	494	25,733	39,509	39,509	4,321	398	398	0
OC24	101	795	824	824	37,131	38,478	38,478	1,901	0	0	18,400
OC25	90	497	855	855	21,485	36,980	36,980	20,796	1,648	1,648	11,700

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
OC26	216	835	884	884	61,180	64,792	64,792	96,757	102,087	102,087	148,300
OC27	61	334	345	345	32,499	33,630	33,630	5,058	9,415	9,415	41,000
OC28-03	36	218	307	307	21,885	30,820	30,820	5,029	1,770	1,770	0
OC28-04	29	267	229	229	26,804	22,950	22,989	0	282	282	33,600
OC28-01	33	199	242	242	19,946	24,245	24,245	2,201	729	729	3,800
OC28-02	234	882	1,630	1,817	88,566	163,609	182,370	7,599	0	0	43,600
OC30	129	844	845	845	97,128	97,178	97,178	16,171	16,171	16,171	8,800
OC31-04-A	114	674	765	765	39,570	44,894	44,894	1	24,874	24,874	0
OC31-02-A	120	253	327	327	14,882	19,206	19,206	5,147	25,733	25,733	11,100
OC31-03	65	130	254	285	7,661	14,937	16,756	6,470	6,303	6,303	2,500
OC31-09-B	43	0	0	0	0	0	0	11,830	44,464	44,464	1,200
OC31-09-A	138	13	13	13	765	791	791	79,253	106,736	106,736	3,800
OC31-11	14	108	108	108	6,357	6,359	6,359	0	0	0	18,300
OC31-07	100	476	507	507	27,951	29,760	29,760	0	0	0	42,300
OC31-05-C	99	312	321	321	18,312	18,859	18,859	4	4	4	3,100
OC31-05-A	226	822	901	901	48,266	52,909	52,909	10,115	10,115	10,115	7,000
OC31-05-B	397	1,803	2,218	2,218	105,863	130,194	130,194	39,289	36,302	36,302	12,100
OC31-06	229	1,304	1,379	1,379	76,537	80,939	80,939	0	0	0	20,200
OC31-10	123	471	517	517	27,655	30,375	30,375	6,945	22,772	22,772	4,900
OC31-08	46	197	229	229	11,545	13,471	13,471	0	0	0	4,200
OC31-01	91	635	734	734	37,275	43,108	43,108	0	0	0	0
OC31-04-B	130	846	959	959	49,645	56,308	56,308	0	0	0	0
OC38-B	60	342	506	506	20,094	29,734	29,734	0	0	0	0
Vista	371	2,056	2,466	2,466	120,684	144,802	144,802	21,915	14,253	14,253	0
OC38-A	89	523	546	546	30,692	32,035	32,035	0	0	0	0
CC42-03	104	227	281	281	13,340	16,500	16,500	0	6,651	6,651	0
BC20-05	116	333	334	334	32,643	32,702	32,702	23,621	23,621	23,621	22,241
RW01-A	978	2,565	4,255	4,255	150,598	249,793	249,793	43,927	463,763	463,763	137,700
RW01-E	45	492	515	515	28,878	30,227	30,227	0	0	0	6,300
RW01-B	43	130	260	316	7,636	15,274	18,548	0	0	0	6,100
RW01-C	42	280	18	18	16,447	1,072	1,072	13,622	49,640	49,640	6,000
RW01-D	138	816	1,013	1,013	47,884	59,494	59,494	10,739	10,792	10,792	19,500
BC41-A	96	0	414	414	0	24,286	24,286	0	66,897	66,897	0
CC36-02-F	29	0	0	0	0	0	0	3,062	40,804	40,804	0
SWINT-A	68	397	564	564	31,735	45,118	45,118	20,160	9,023	9,023	0

Sewershed	Total Acreage	Population			Residential Flows (GPD)			Non Residential Flows (GPD)			GWI
		2015	2025	Buildout	2015	2025	Buildout	2015	2025	Buildout	
Terav_B	121	1,049	1,067	1,067	61,603	62,649	62,649	9,858	18,406	18,406	0
Teravista	183	0	0	0	0	0	0	51	51	2,024	0
Terav-C-MUD10	416	1,822	2,016	2,016	106,998	118,383	118,383	5,284	2,169	2,169	0
Vizcaya-2	49	0	380	380	0	30,434	30,434	0	9	9	0
Vizcaya-3	46	0	313	313	0	25,009	25,009	0	13,740	13,740	0
Vizcaya-6	52	0	547	547	0	43,776	43,776	0	0	0	0
Vizcaya-7	64	0	671	671	0	53,644	53,644	0	0	0	0
Vizcaya-5	77	0	674	674	0	53,933	53,933	0	0	0	0
Vizcaya-1	78	0	76	76	0	6,072	6,072	0	43,648	43,648	0
Vizcaya-4	65	0	189	189	0	15,145	15,145	0	33,979	33,979	0
Vizcaya-8	83	0	275	275	0	21,998	21,998	0	0	0	0
Vizcaya-9	88	0	0	0	0	0	0	0	73,857	73,857	0
Vizcaya-11	41	0	119	119	0	9,538	9,538	0	2,094	2,094	0
Vizcaya-12	120	0	1,469	1,469	0	117,514	117,514	0	78,319	78,319	0
Vizcaya-10	107	0	62	0	0	4,969	32	0	0	85,132	0
F-MN106	216	0	2,268	2,268	0	181,476	181,476	0	0	0	0
F-MN104	154	140	1,386	1,386	11,168	110,870	110,870	0	0	0	0
F-MN105	277	544	2,750	2,750	43,492	219,997	219,997	21,033	0	0	0
	37856	110093	185330	234439	7757416	13864355	17916168	4371752	8031531	9689576	3636100

Appendix B

Future Wastewater Utilities Capital Improvement Projects

FUTURE WASTEWATER UTILITIES CAPITAL IMPROVEMENT PROJECTS
2016 - 2025

((ESTIMATED COST & PROJECT INFORMATION BASED ON UPDATED 2007 WASTEWATER MASTER PLAN))

Printed: 10/13/2015

PROJECT BID YEAR	PROJECT MAP NAME	PROJECT	DESCRIPTION	PIPELINE CLASSIFICATION	Upgrade Recommendation (parallel, remove & replace, etc.)	2007 Construction Cost with Contingency	2007 Professional Fees	2007 Easement Acquistion and Services	2007 Total Project Cost	Total Inflation[1]	ESTIMATED COST[2]	Cost Allocated to Upgrade	IMPACT FEE ELIGIBLE 2007 Total Project Cost	IMPACT FEE ELIGIBLE ESTIMATED COST(2)
2014	Chandler Creek 1	New gravity WW line	5,400 lf of 15-in and 880 lf of 12-in			$1,061,431.00	$159,214.65	$185,354.64	$1,406,000.29	$444,200.17	$1,850,200	29.81%	$419,000	$552,000
2014	McNutt Creek C3	New gravity WW line	2,474 lf of 36-in			$852,820.32	$127,923.05	$101,997.31	$1,082,740.68	$342,072.19	$1,424,813	83.59%	$905,000	$1,191,000
2014	McNutt Crek C9	New gravity WW line	6,263 lf of 15-in			$1,224,450.63	$183,667.59	$146,444.30	$1,554,562.52	$491,135.70	$2,045,698	100.00%	$1,555,000	$2,046,000
2015	Lake Creek 2	Upgrade gravity WW line	Line owned by BCRWWTS. 1,605 lf of 30-in and 3257 lf of 36-in from halfway between McNeil Rd and S Mays St to a point northwest of the north end of Greenlawn Blvd.	Suburban	Remove & Replace (with some Pipe Burst)	$2,629,869.69	$394,480.45	--	$3,024,350.14	$1,114,681.86	$4,139,032	64.07%	$1,938,000	$2,652,000
2015	Lake Creek 3	Upgrade gravity WW line	Line owned by BCRWWTS. 1,189 lf of 36-in from Lake Creek Circle to a point northeast of the north end of Dove Haven Dr.	Urban	Remove & Replace (with some Pipe Burst)	$431,287.86	$64,693.18	--	$495,981.04	$182,803.26	$678,784	87.11%	$432,000	$591,000
2016	Brushy Creek 4	Upgrade gravity WW line	978 lf 10-in on Wonder Dr. and Ledbetter St.	Urban (light business)	Pipe Burst	$117,360.00	$17,604.00	--	$134,964.00	$57,131.86	$192,096	90.00%	$121,000	$173,000
2016	Brushy Creek 5	Upgrade gravity WW line	1,600 lf of 8-in on Chisholm Trail South of Sam Bass Rd.	Urban (light business)	Pipe Burst	$176,000.00	$26,400.00	--	$202,400.00	$85,678.31	$288,078	100.00%	$202,000	$288,000
2017	Brushy Creek 2	Upgrade gravity WW line	Replace 10-in line with 1,560 lf of 12-in line from Liberty Ave. (MH #0069) at Burnet Ave. to Pecan Ave. (MH # 002) at Spring St.	Urban (through Downtown Round Rock)	Pipe Burst	$297,460.00	$164,970.30	--	$462,430.30	$222,079.51	$684,510	100.00%	$462,000	$685,000
2017	Brushy Creek 3	Upgrade gravity WW line	Size after rehabilitation: 550 lf of 6-in	Urban (light business)	Remove & Replace	$73,514.18	$11,027.13	--	$84,541.31	$40,600.48	$125,142	0.00%	$0	$0
2017	Dry Creek 1	New gravity WW line	3,195 lf of 12-in			$512,410.05	$76,861.51	$61,284.24	$650,555.80	$312,425.70	$962,982	100.00%	$651,000	$963,000
2018	Chandler Creek 3	New gravity WW line	4,053 lf of 8-in			$438,825.33	$65,823.80	$52,483.51	$557,132.64	$300,547.46	$857,680	87.76%	$489,000	$753,000
2018	Chandler Creek 2	Upgrade gravity WW line	293 lf of 10-in and 1,248 lf of 12-in from Spring Breeze Dr to main interceptor. Area is just South of Old Settlers Blvd at Sunrise Rd.	Suburban	Pipe Burst (CDM - remove & replace)	$293,849.18	$44,077.38	--	$337,926.56	$182,295.85	$520,222	100.00%	$338,000	$520,000
2018	McNutt Creek 15	New gravity WW line	2,258 lf of 12-in			$270,094.50	$40,514.18	$32,303.30	$342,911.98	$184,985.26	$527,897	100.00%	$343,000	$528,000
2019	Lake Creek 1	Upgrade gravity WW line	Line owned by CoRR. 6,474 lf of 24-in and 1,171 lf of 21-in from southeast side of St. Williams Loop to halfway between McNeil Rd and S Mays St. Section under I-35 does NOT need to be replaced and it is not included in this cost.	Suburban to Urban	Remove & Replace (with some Pipe Burst)	$2,679,067.79	$401,860.17	--	$3,080,927.96	$1,851,736.97	$4,932,665	40.45%	$1,246,000	$1,995,000
2019	McNutt Creek 10	New gravity WW line	2,849 lf of 10-in and 4,973 lf of 12-in			$943,591.68	$141,538.75	$112,853.56	$1,197,983.99	$720,026.98	$1,918,011	52.86%	$633,000	$1,014,000
2020	McNutt Creek D2	New gravity WW line	1,393 lf of 18-in, 989 of 21-in, and 2,687 lf of 21-in tunnel (due to depth). This line connects to McNutt 1a			$4,102,237.16	$615,335.57	$490,627.56	$5,208,200.29	$3,463,836.03	$8,672,036	42.41%	$2,209,000	$3,678,000
2020	McNutt Creek C4	New gravity WW line	2,906 lf of 12-in			$362,290.86	$54,343.63	$43,329.99	$459,964.48	$305,910.19	$765,875	95.83%	$441,000	$734,000
2021	Forest Creek 2	New gravity WW line	8,675 lf of 8-in and 2,000 lf of 10-in (pump station and force main costed separately)			$977,193.75	$146,579.06	$116,872.37	$1,240,645.19	$907,750.86	$2,148,396	100.00%	$1,241,000	$2,148,000
2021	McNutt Creek C2	New gravity WW line	3,863 lf of 15-in and 5,181 of 24-in			$1,939,164.23	$290,874.63	$231,924.04	$2,461,962.90	$1,801,360.27	$4,263,323	31.04%	$764,000	$1,324,000
2022	McNutt Creek D4	New gravity WW line	3,738 lf of 8-in, 4,189 lf of 10-in, and 1,186 lf of 12-in			$989,733.29	$148,459.99	$118,372.10	$1,256,565.38	$1,006,437.88	$2,263,003	61.61%	$774,000	$1,394,000
2022	McNutt Creek C8b	New gravity WW line	~2,138 lf of 18-in (This is the other half of the McNutt 4 line)			$468,071.18	$70,210.68	$55,981.31	$594,263.17	$475,971.23	$1,070,234	76.92%	$457,000	$823,000
2022	Onion Creek 2	New gravity WW line	2,126 lf of 15-in and 982 lf of 18-in			$589,564.18	$88,434.63	$70,511.88	$748,510.69	$599,514.78	$1,348,025	15.88%	$119,000	$214,000
2022	Onion Creek 1	Upgrade gravity WW line	3,901 lf of 21-in from Hidden Glen Dr to Plantation Dr just past Cuero Cv. Required for new development north of the neighborhood	Suburban	Pipe Burst (CDM - remove & replace)	$1,183,845.29	$177,576.79	--	$1,361,422.08	$1,090,422.17	$2,451,844	14.66%	$200,000	$359,000
2023	Lake Creek 4	Upgrade gravity WW line	4,644 lf of 12-in from Wagongap Dr and Chisholm Valley Dr to West Logan St. Crosses under I-35.	Suburban to Urban	Pipe Burst (CDM - remove & replace)	$1,037,663.70	$155,649.55	--	$1,193,313.25	$1,041,740.09	$2,235,053	100.00%	$1,193,000	$2,235,000
2023	McNutt Creek C12	New gravity WW line	4,874 lf of 10-in			$506,527.65	$75,979.15	$60,580.71	$643,087.51	$561,403.34	$1,204,491	78.79%	$507,000	$949,000
2023	McNutt Creek D5	New gravity WW line	4,137 lf of 15-in			$1,024,702.97	$153,705.44	$122,554.47	$1,300,962.88	$1,135,716.20	$2,436,679	28.38%	$369,000	$691,000
2023	McNutt Creek C6	New gravity WW line	3,945 lf of 18-in			$763,428.82	$114,514.32	$91,306.09	$969,249.23	$846,136.40	$1,815,386	11.43%	$111,000	$207,000
2024	Spanish Oak 1	New gravity WW line	1,222 lf of 8-in and 3,039 lf of 12-in for Mayfield area			$603,245.25	$90,486.79	$72,148.13	$765,880.17	$725,978.19	$1,491,858	100.00%	$766,000	$1,492,000
2024	Mayfield Park 1	New gravity WW line	1,260 lf of 10-in for Mayfield area			$159,030.00	$23,854.50	$19,019.99	$201,904.49	$191,385.37	$393,290	100.00%	$202,000	$393,000
2024	Mayfield Park 2	New gravity WW line	2,500 lf of 10-in and 3,200 lf of 8-in			$792,726.70	$118,909.00	$94,810.11	$1,006,445.81	$954,010.48	$1,960,456	100.00%	$1,006,000	$1,960,000
Buildout	Cottonwood 1	New gravity WW line	2,654 lf of 8-in, 4,943 lf of 10-in, and 1,216 lf of 12-in			$1,077,979.73	$161,696.96	$128,926.38	$1,368,603.07	$1,514,837.18	$2,883,440	100.00%	$1,369,000	$2,883,000
Buildout	Cottonwood 2	New gravity WW line	5,770 lf of 10-in			$842,538.38	$126,380.76	$100,767.59	$1,069,686.73	$1,183,981.88	$2,253,669	100.00%	$1,070,000	$2,254,000
Buildout	Cottonwood 3	New gravity WW line	2,420 lf of 8-in			$258,210.00	$38,731.50	$30,881.92	$327,823.42	$362,851.08	$690,675	100.00%	$328,000	$691,000
Buildout	Lake Creek 7	New gravity WW line	1,841 lf of 10-in, 1,014 lf of 12-in, and 720 lf of 15-in			$531,927.56	$79,789.13	$63,618.54	$675,335.23	$747,494.24	$1,422,829	100.00%	$675,000	$1,423,000

FUTURE WASTEWATER UTILITIES CAPITAL IMPROVEMENT PROJECTS
2016 - 2025

((ESTIMATED COST & PROJECT INFORMATION BASED ON UPDATED 2007 WASTEWATER MASTER PLAN))

Printed: 10/13/2015

PROJECT BID YEAR	PROJECT MAP NAME	PROJECT	DESCRIPTION	PIPELINE CLASSIFICATION	Upgrade Recommendation (parallel, remove & replace, etc.)	2007 Construction Cost with Contingency	2007 Professional Fees	2007 Easement Acquistion and Services	2007 Total Project Cost	Total Inflation[1]	ESTIMATED COST[2]	Cost Allocated to Upgrade	IMPACT FEE ELIGIBLE 2007 Total Project Cost	IMPACT FEE ELIGIBLE ESTIMATED COST(2)
Buildout	Lake Creek 8	New gravity WW line	1,085 lf of 8-in			$118,451.70	$17,767.76	$14,166.82	$150,386.28	$166,454.93	$316,841	100.00%	$150,000	$317,000
Buildout	Lake Creek 9	New gravity WW line	3,263 lf of 10-in			$412,900.88	$61,935.13	$49,382.94	$524,218.95	$580,231.31	$1,104,450	100.00%	$524,000	$1,104,000
Buildout	Lake Creek 5	Upgrade gravity WW line	Line owned by CoRR. 2,394 lf of 15-in, 220 lf of 18-in, and 1,988 of 21-in from the south end of West Creek Loop to the southeast side of St. Williams Loop.	Suburban	Remove & Replace (with some Pipe Burst)	$1,209,430.68	$181,414.60	--	$1,390,845.28	$1,539,455.95	$2,930,301	100.00%	$1,391,000	$2,930,000
Buildout	Lake Creek 6	Upgrade gravity WW line	334 lf of 12-in and 1,107 lf of 15-in from the corner of Rock Ridge St and Cedar Falls St to Oakridge Dr and Creekmont Dr. For development upstream of this area.	Suburban	Pipe Burst (CDM - remove & replace)	$326,957.66	$49,043.65	--	$376,001.31	$416,176.74	$792,178	100.00%	$376,000	$792,000
Buildout	Lake Creek 10	Upgrade gravity WW line	1,227 lf of 12-in and 71 lf of 15-in from Old West Dr between Rawhid Dr and Old West Pl to one segment north of Yucca Dr.	Suburban	Pipe Burst	$265,320.18	$39,798.03	--	$305,118.21	$337,719.84	$642,838	100.00%	$305,000	$643,000
Buildout	Lake Creek 11	Upgrade gravity WW line	3,076 lf of 10-in from just North of SH 45 and just West of I-35 to Hesters Crossing Rd. Runs along I-35	Urban	Remove & Replace (with some Pipe Burst)	$459,116.30	$68,867.44	--	$527,983.74	$584,398.37	$1,112,382	100.00%	$528,000	$1,112,000
Buildout	McNutt Creek 16	New gravity WW line	2,425 lf of 8-in			$217,170.00	$32,575.50	$25,973.53	$275,719.03	$305,179.38	$580,898	100.00%	$276,000	$581,000
Buildout	McNutt Creek 17	New gravity WW line	1,631 lf of 10-in			$290,768.40	$43,615.26	$34,775.90	$369,159.56	$408,603.95	$777,764	100.00%	$369,000	$778,000
Buildout	McNutt Creek 18	New gravity WW line	2,309 lf of 8-in			$325,927.37	$48,889.11	$38,980.91	$413,797.39	$458,011.30	$871,809	100.00%	$414,000	$872,000
Buildout	McNutt Creek D3	New gravity WW line	3,367 lf of 10-in			$352,037.70	$52,805.66	$42,103.71	$446,947.07	$494,703.00	$941,650	100.00%	$447,000	$942,000
Buildout	McNutt Creek C7	New gravity WW line	2,495 lf of 12-in and 2,565 lf of 15-in			$696,093.12	$104,413.97	$83,252.74	$883,759.83	$978,188.84	$1,861,949	100.00%	$884,000	$1,862,000
Buildout	McNutt Creek C14	New gravity WW line	4,344 lf of 10-in			$512,401.50	$76,860.23	$61,283.22	$650,544.95	$720,055.14	$1,370,600	100.00%	$651,000	$1,371,000
Buildout	Onion Creek 3	New gravity WW line	3,543 lf of 12-in			$518,420.63	$77,767.59	$62,006.69	$658,224.91	$728,555.70	$1,386,781	100.00%	$658,000	$1,387,000
2019	Forest Creek LS	Upgrade lift station	Upgrade from 0.72 MGD to 2.26 MGD, upgrade FM from 6-in to 10-in			$1,708,079.10	$256,211.87	$43,975.68	$2,008,266.65	$1,207,032.96	$3,215,300	37.66%	$756,000	$1,211,000
2020	Hilton Head LS	Upgrade lift station	Upgrade from 0.36 MGD to 1.12 MGD			$425,006.25	$63,750.94	--	$488,757.19	$325,059.46	$813,817	1.32%	$6,000	$11,000
2021	Oak Bluff LS	Upgrade lift station	Upgrade from 0.50 MGD to 1.33 MGD, upgrade FM from 6-in to 10-in			$2,283,705.00	$342,555.75	$30,351.61	$2,656,612.36	$1,943,780.69	$4,600,393	0.00%	$0	$0
2022	Stone Oak LS	Upgrade lift station	Upgrade from 0.34 MGD to 0.38 MGD			$427,072.50	$64,060.88	--	$491,133.38	$393,370.09	$884,503	33.33%	$164,000	$295,000
2022	SE Annex LS	New lift station (currently proposed)	0.28 MGD capacity with 725 lf of 4-in force main			$358,558.50	$53,783.78	$42,883.60	$455,225.88	$364,610.21	$819,836	100.00%	$455,000	$820,000
Buildout	CR 123 LS	New lift station	0.93 MGD capacity with 2, 542 lf of 8-in force main			$1,333,690.28	$200,053.54	$159,509.36	$1,693,253.18	$1,874,175.89	$3,567,429		n/a	n/a
Buildout	Cottonwood LS	New lift station	2.44 MGD capacity with 4,385 lf of 10-in force main			$2,203,620.00	$330,543.00	$263,552.95	$2,797,715.95	$3,096,649.59	$5,894,366		n/a	n/a
2016	WWTP Rerate 1	Engineering for WWTP Rerate									$500,000	100.00%	$0	$500,000
2017	WWTP Rerate 1	WWTP Rerate Construction									$4,500,000	100.00%	$0	$4,500,000
2018	WWTP Expansion 1	Engineering for WWTP Expansion	Expand from 17.1 MGD to 23.1 MGD								$4,100,000	100.00%	$0	$4,100,000
2019	WWTP Expansion 1	Construction for WWTP Expansion	Expand from 17.1 MGD to 23.1 MGD								$12,500,000	100.00%	$0	$12,500,000
2020	WWTP Expansion 1	Construction for WWTP Expansion	Expand from 17.1 MGD to 23.1 MGD								$12,500,000	100.00%	$0	$12,500,000
2021	WWTP Expansion 1	Construction for WWTP Expansion	Expand from 17.1 MGD to 23.1 MGD								$12,500,000	100.00%	$0	$12,500,000
2025	WWTP Expansion 2	WWTP Expansion	Expand from 23.1 MGD to 26.1 MGD								$51,900,000	100.00%	$0	$51,900,000
2027	WWTP Expansion 3	WWTP Expansion	Expand from 26.1 MGD to 31.1 MGD			$19,665,000.00	$2,949,750.00	--	$22,614,750.00	$49,913,816.92	$72,528,567	100.00%	n/a	n/a
2016	Miscellaneous										$1,000,000	100.00%	n/a	n/a
			TOTAL =			$64,321,841	$9,768,632	$3,557,154	$77,647,656	$92,285,370	$269,433,026		$31,889,000	$155,331,000

(1) Inflation is 4% for interceptors and pump stations and 6% for WWTP expansions and is based on bid date which is assumed to be January 1st of the project's latest year of completion in the above table.
(2) ESTIMATED COST - Based on construction costs, October 2007 in Williamson County including 15% contingency, 15% professional services and inflation.