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# City of Wimberley

# Wastewater Collection and Treatment System Feasibility Study

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SUBMITTED BY:

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City of Wimberley

**CITY OF WIMBERLEY**

**WASTEWATER COLLECTION AND TREATMENT SYSTEM FEASIBILITY REPORT**

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## 1.0 INTRODUCTION

Wimberley is a small Texas Hill Country community that was recently incorporated as a city. This community of approximately 2,600 residents is located in Hays County, one of the fastest growing counties in the United States, and features an economy that is largely tourist based. The popularity of the town has placed significant demands and stresses on the Blanco River and Cypress Creek that make Wimberley one of the most beautiful, unique and environmentally sensitive areas in the Hill Country.

For years, Wimberley has relied on individual septic systems to meet its wastewater treatment needs. Elevated *E. coli* and fecal coliform bacteria levels have been detected in the city's local waterways, particularly in Cypress Creek, which winds through the city's central business district. The source of pollutants is believed to be in part failing septic systems on properties that line the creek.

No evidence exists of permits having been issued for a large percentage of the septic systems in central Wimberley. Improperly covered septic fields exist on several properties and approximately eighteen (18) businesses in the area are having their septic systems "pumped and hauled" on a regular basis due to the inadequacy of their systems. Of those systems found to be properly permitted, several are serving land uses that are significantly different from the land use for which they were originally permitted. In recent history, at least one business has been closed down due to septic concerns.

Less than five percent of the septic systems currently installed in central Wimberley comply with the requirements outlined in the City of Wimberley's On Site Sewage Facilities Regulations, adopted in 2009. Most of the systems in the subject area are non-compliant due to the small lot size on which they are located, and many do not meet the required buffer distance from surface waters (Cypress Creek and Blanco River). Bringing the non-compliant systems into compliance with today's standards, if possible, would require significant modifications such as septic system relocation and/or land acquisition. This would be cost prohibitive for many area residents and businesses.

The lot size requirements for septic system installation in Wimberley are considerable, due largely to the fact that the soils in the area are not conducive for such a method of wastewater disposal. A majority of the area is rock or clay and listed as 'very limited' for use with septic systems per the United States Department of Agriculture Natural Resources Conservation Service.

In a letter to the Texas Water Development Board dated June 30, 2012, City of Wimberley Sanitarian Mr. Kyle Dehart, RS, stated that the City of Wimberley (City) is facing an existing nuisance and public health hazard in the central Wimberley area as a result of inadequate and failing septic systems.

Though failing septic systems in central Wimberley are believed to be contributing to unacceptable bacteria levels in the creek, there may be other potential sources of bacteria along the creek as well. Excreted matter from bats, ducks and deer may also be impacting bacteria concentrations in the creek, as could septic systems located upstream of the subject area.

Constructing a centralized wastewater collection and treatment system to serve the central Wimberley area would be a major step forward in protecting Cypress Creek and the Blanco River. While this solution may not eliminate all bacteria in the creek, it should substantially improve water quality and address potential regulatory and economic issues associated with the presence of substandard septic systems.

The City of Wimberley has successfully secured Planning and Design Funding from the Texas Water Development Board's Clean Water State Revolving Fund for the design of a central wastewater collection and treatment system. Alan Plummer Associates, Inc. (APAI) has been retained by the City to evaluate the feasibility of several wastewater collection and treatment system options and provide detailed design documents for the selected alternative.

As part of the feasibility study, APAI participated in the Central Wimberley Stakeholder Committee process. This process took place over the course of nine (9) weeks during which seven (7) members of the community representing various interests in the project met to discuss the wastewater situation. The stakeholder process was facilitated by Laura Raun Public Relations. While reference is made to stakeholder concerns throughout this report, a more detailed description of the process is provided in Appendix 1.

## 2.0 SERVICE AREA AND FLOW PROJECTIONS

In order to accurately estimate the advantages and disadvantages of each of the alternatives evaluated, a service area boundary was determined from which flow projections were estimated. The service area and flow projections presented in this chapter are common to the options explored. Two (2) of the options included expansion of the service area and therefore an increase in flow projections and two (2) included a reduction in service area. The methodology behind determining adjusted service areas and flows are presented in detail in the Alternatives Evaluation section and builds upon that which is presented here.

### 2.1 Service Area

The area expected to be served by a central wastewater collection system is generally bounded by the Blanco River to the south, Cypress Creek to the west, Deer Creek to the east and Blue Hole Regional Park to the north. The area described by these bounds is within the City of Wimberley's Certificate of Convenience and Necessity (CCN), includes the downtown area in which failing septic systems are believed to be located, and lies within natural geographic boundaries (i.e. rivers and creeks). The extent of the service area is illustrated in Figure 1.

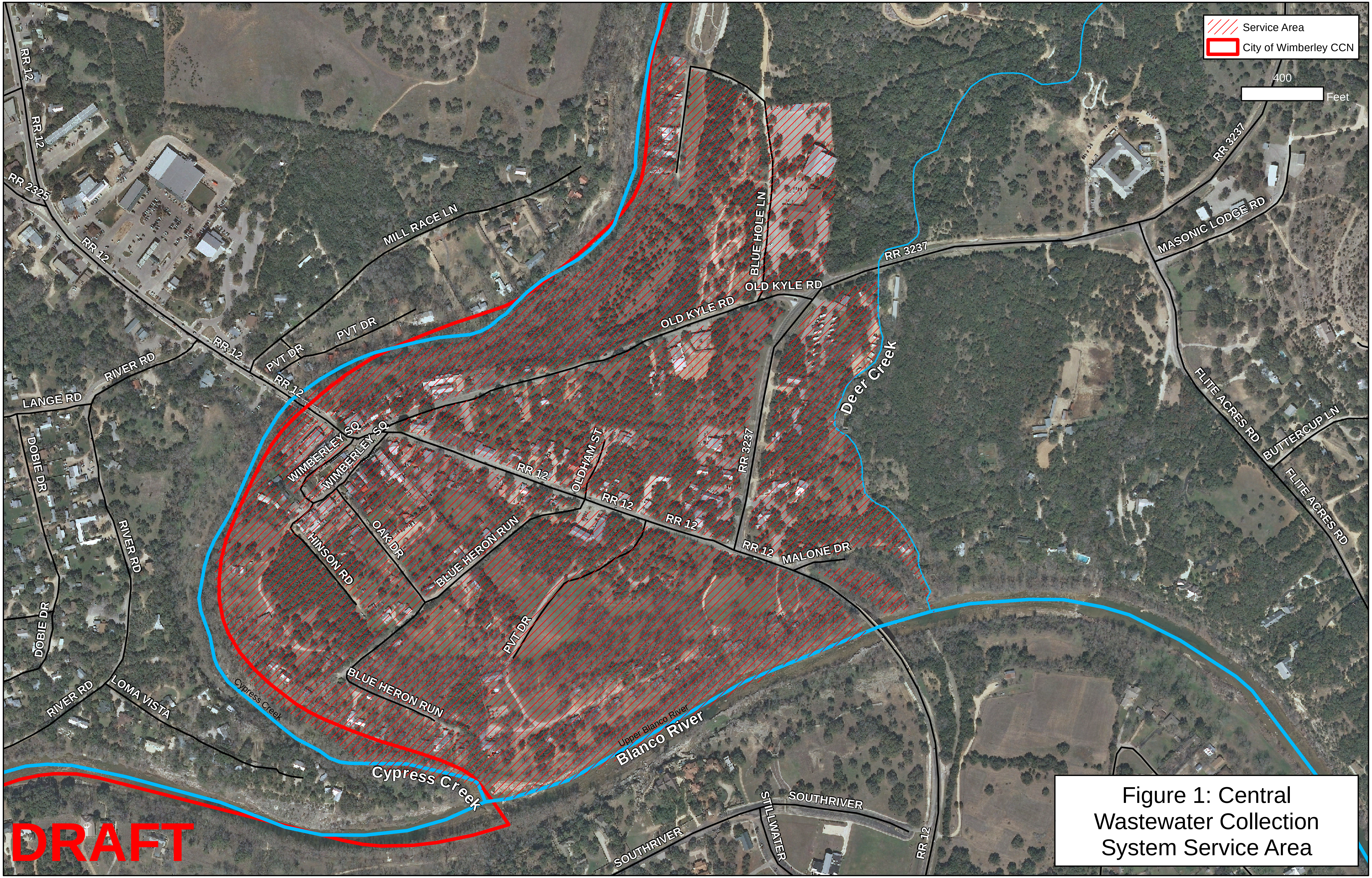



Figure 1: Central Wastewater Collection System Service Area

### 2.2 Flow Projections

Average daily wastewater flows for the service area shown in the figure were developed in close coordination with the City based on discussions with residents and business owners, as well as an evaluation of Hays County Appraisal District tax and land use maps. A certain number of Living Unit Equivalents (LUE) was assigned to each parcel based on the type of expected use (i.e. residential, retail, restaurant, etc.) Each existing LUE is equivalent to 300 GPD per Texas Commission on Environmental Quality (TCEQ) guidelines. One or more LUEs, as applicable, was assigned to currently undeveloped parcels in anticipation of future use. Existing residential connections were assumed to contribute 300 gpd in wastewater. Future residential connections, likely built with high efficiency water fixtures, would contribute 210 gpd per current American Water Works Association (AWWA) standards. The proposed collection system is expected to serve 169 connections at build-out. Table 1 presents the estimated wastewater flows based on type of customer served.

**Table 1: Service Area Flow Projections**

| | Number of Connections (Initial) | Estimated Wastewater Flow (GPD) | Number of Connections (Build-Out) | Estimated Wastewater Flow (Build-Out - GPD) |
|---|---|---|---|---|
| **Residential** | 60 | 18,000 | 95 | 25,350 |
| **Restaurant** | 5 | 7,500 | 5 | 7,500 |
| **Retail//Mixed Use** | 50 | 19,500 | 60 | 22,500 |
| **Hotel//RV Park** | 3 | 4,800 | 3 | 4,800 |
| **Church/Theatre** | 3 | 4,200 | 3 | 4,200 |
| **Public Restrooms** | 2 | 1,500 | 2 | 1,500 |
| **Nursing Home** | 1 | 9,000 | 1 | 9,000 |
| **Total:** | **124** | **64,500** | **169** | **74,850** |

## 3.0 COLLECTION SYSTEM

The proposed collection system described in this section was developed to provide wastewater collection for the service area described in Section 2.0 Service Area and Flow Projections. Expanding the system to areas beyond this or reducing the extent of the system is detailed in the 5.0 Alternatives Evaluation section. For the purposes of cost comparison, each of the collection systems described includes only that of collection, and does not include the infrastructure necessary to convey wastewater to the location of final treatment. These costs vary depending on the option selected and are therefore also covered in the Alternatives Evaluation section.

### 3.1 Collection System Options

The collection system would be constructed primarily to serve the downtown area and residents/businesses along FM 3237 and Old Kyle Road between Ranch Road 12 and the FM 3237/Old Kyle Road intersection. The area south of Wimberley Square, along Cypress Creek, would also be served, as would residences along Blue Hole Lane.

#### *3.1.1 Conventional System*

A conventional collection system, consisting of gravity sewers, force mains and lift stations, is the most widely used method of wastewater collection. In moderately sloped areas, and especially in locations where the treatment plant is downstream of the service area, conventional systems are generally the most cost effective and least maintenance intensive alternative. However, due to the topography of Wimberley, a conventional collection system would require three lift stations as well as deep trench excavation in certain areas of the system in order to maintain the required pipe grade. Both of these conditions can increase construction costs considerably. Additionally, operating three lift stations would add to the annual operational and maintenance costs of the system. For these reasons, two other options were considered for the collection system, including a low-pressure sewer system and a vacuum sewer system.

#### *3.1.2 Low-Pressure System*

Low-pressure sewer systems consist of individual grinder pump stations on private properties that pump wastewater from small holding tanks via force mains to either intermediate lift stations or to a treatment plant. Since the system is under pressure, the installation depth of sewer lines is greatly reduced, typically only four (4) feet deep in most places. This can result in significant construction cost savings.

However, the costs associated with installing individual grinder pumps are more substantial than that of conventional sewer laterals. In addition, operational and maintenance requirements of low pressure systems are considerable in that each residential grinder pump station consists of one grinder pump and each non-residential grinder pump station requires two pumps per Texas Commission on Environmental Quality (TCEQ) regulations. For any given system, there can be several hundred pumps in operation, all of which require energy, parts repair and eventually full replacement. Grinder pumps generally have a lower life expectancy than other sewage pumps due to their solids handling requirements and typically need to be replaced after 10 years.

Another concern that often comes into play when grinder pumps are considered is the designation of the party responsible for maintenance. Since the pumps are located on private property, some municipalities opt to make property owners responsible for maintaining their systems. Alternatively, some municipalities have developed agreements to perform the maintenance but then hold the property owners financially responsible for this service, while others maintain the system as part of the overall utility. Regardless of the entity performing and/or paying for maintenance, grinder pumps do require a certain degree of owner involvement beyond that which is needed for property owners connected to a conventional system via a sewer lateral. For example, a property owner who will be away from their home for more than a few days is encouraged to 'flush' their system by running fresh water or draining a full bathtub. The purpose of this is to increase the volume of water in the storage tank to the point the pumps turn on and pump it out. Failing to do this could result in stagnant wastewater if the level is below that which triggers pump operation and the wastewater is not pumped out of the tank for several days, which could result in nuisance odors. These kinds of considerations, in addition to construction and O&M costs, were compared between the other two systems in order to make an accurate assessment of the type of system most appropriate for the Wimberley area.

*3.1.3 Vacuum System*

Vacuum sewer systems consist of a central vacuum station which maintains negative pressure throughout the collection system. Individual services are connected to a vacuum valve pit which includes a pneumatically operated valve and small storage tank. When wastewater in the tank reaches a certain level, the valve opens and the system is exposed to atmospheric pressure. The air that enters the system is pulled, along with wastewater, to the central vacuum station where it is stored and then pumped to intermediate lift stations or the treatment plant. The vacuum system option offers a similar benefit to that of the low-pressure sewer in that the depth and size of sewer lines is substantially reduced when compared with conventional collection systems in areas with topography similar to that of Wimberley. The vacuum valve pit does not require energy as is the case with the grinder pumps, but as with any moving part it does require periodic maintenance and replacement.

## 3.2 Collection System Comparison

In comparing the three collection system alternatives, consideration was given to construction costs, expected operation and maintenance costs, as well as non-cost factors such as operator familiarity, aesthetic impact and reliability.

*3.2.1 Cost Comparison*

The costs of the conventional system were developed by APAI based on current unit bid prices listed by San Antonio Water Systems for sewer lines, manholes and service laterals. Unit prices for these components did take into account the expected depth of excavation. Cost estimates for lift stations were developed in coordination with package lift station vendors, with appropriate costs designated for excavation, installation, fence construction, odor control, etc. As discussed previously, the costs represented in Table 2 include only wastewater collection and not conveyance to the ultimate point of treatment. Operational and maintenance costs were estimated based on expected power usage, labor requirements and pump repair/replacement at the three lift stations. The extent of the proposed conventional collection system is shown in Figure 2.

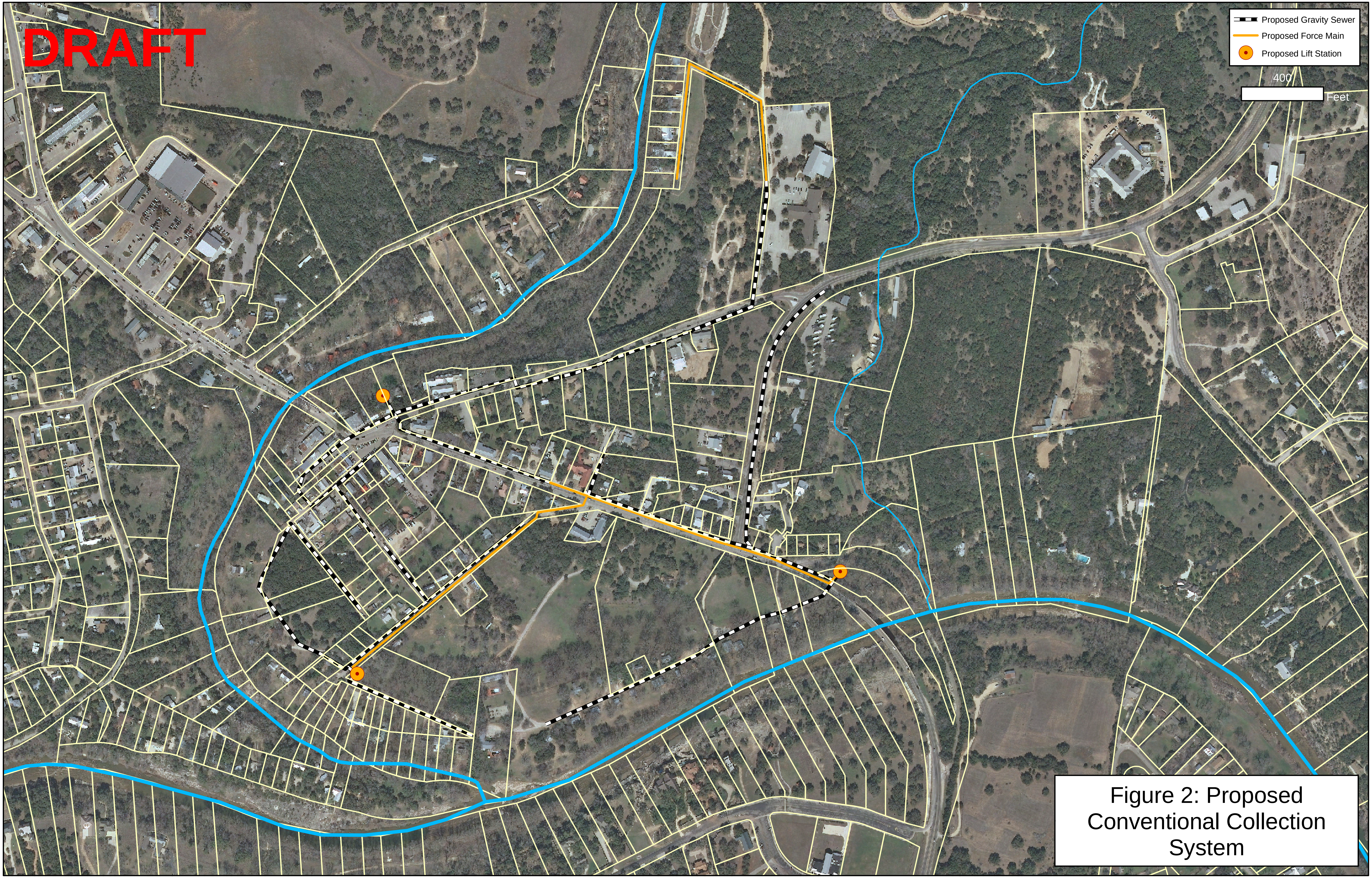



Figure 2: Proposed Conventional Collection System

Costs associated with a low-pressure sewer system were developed in coordination with E/One Sewer Systems, a grinder pump vendor represented by Environmental Improvements, Inc. The equipment and installation costs of single and duplex grinder pump stations, as well as the length of pressure sewer was provided by E/One. The installed cost of the pressure sewer was estimated by APAI. The linear footage costs of each 2 inch, 3 inch and 4 inch pressure sewer were estimated based on the unit price used for force main in the conventional collection system option.

Operational and maintenance costs were estimated based on expected power usage, labor requirements and pump repair/replacement at each individual grinder pump station. These costs were developed using references provided by E/One (i.e. annual maintenance calls and pump replacement for systems currently in operation). The extent of the proposed low-pressure system is shown in Figure 3. It is worthwhile to note that the figure includes representation of conveyance to the lift station that currently serves Deer Creek by pipe segment 39 but that this was not included in developing the force main costs of the collection system.

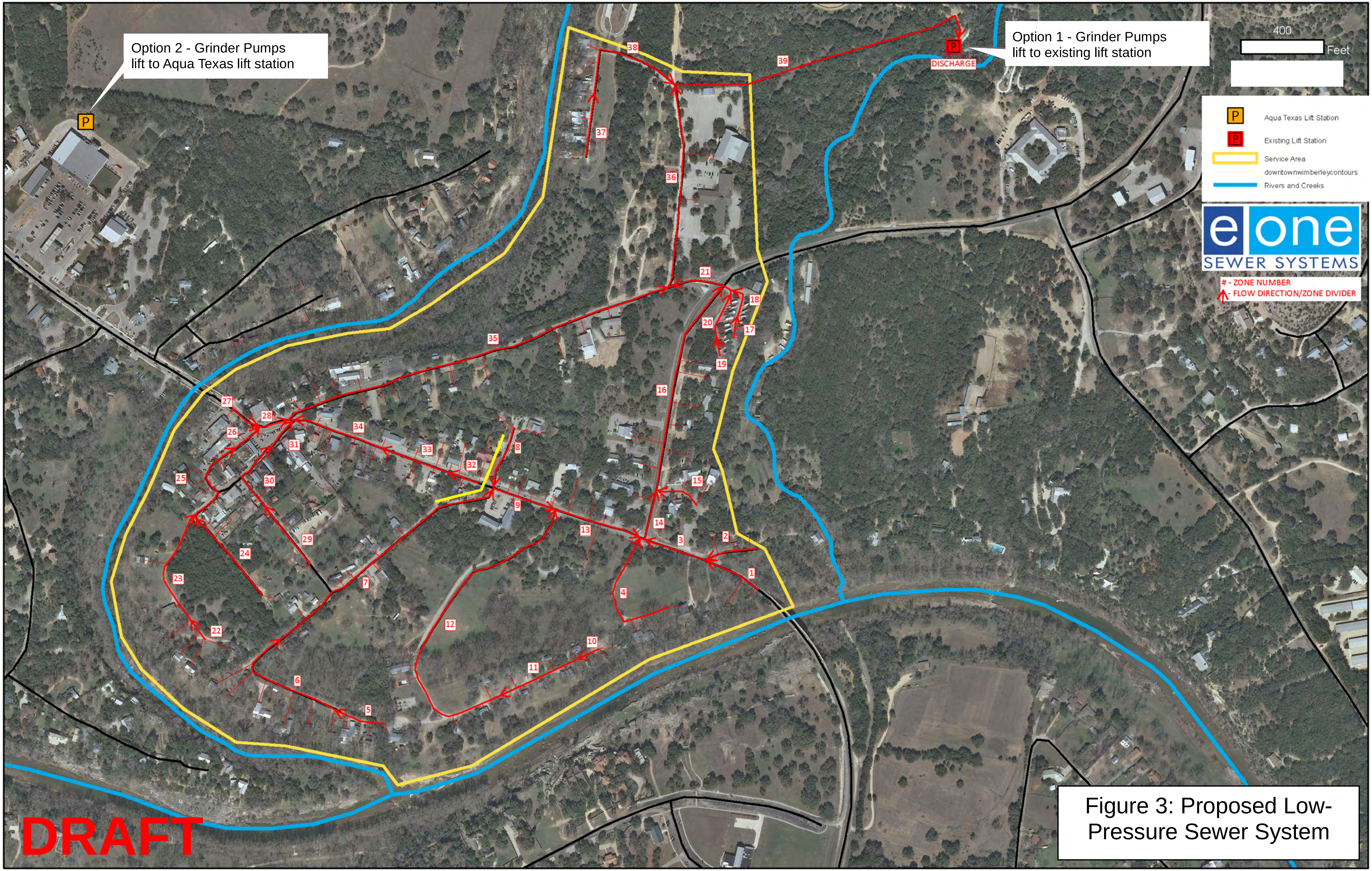



Figure 3: Proposed Low-Pressure Sewer System

Vacuum sewer system costs were provided by AIRVAC, the dominant supplier of vacuum sewer systems. These included both construction and operational / maintenance costs. The unit costs provided by AIRVAC to install vacuum sewer lines were adjusted by APAI to match the values used for installation of force mains in the other two options. The costs provided by AIRVAC were not realistic given the rocky conditions in Wimberley and the anticipated congestion that will be encountered during construction. In fact, it is possible that the cost of installing the vacuum lines could exceed the cost of the force main for several reasons: 1) the procedure for installing vacuum pipe is more complex than force main due to the required saw-tooth pattern that must be followed to maintain the vacuum, which would translate to higher labor costs, 2) the vacuum pipe must be both water tight and air tight, requiring more care during installation, and 3) the saw-tooth pattern requires a significant number of fittings when compared with installing force mains which would increase the cost of materials as well. Nevertheless, vacuum piping was assigned the same unit price as conventional force mains in developing cost estimates since projects of comparable size and scope were not available with which to compare these prices. Also added to the overall project cost was the addition of individual grinder pumps to serve Blue Hole Lane. The documents provided by AIRVAC identified the need for serving these customers via grinder pumps which would pump to a buffer tank. The cost of the buffer tank was included in AIRVAC’s estimate but the grinder pumps were not. Operational and maintenance costs were provided by AIRVAC as well, though a minor adjustment was made for energy costs to maintain consistency with the per-kilowatt hour charge used in developing O&M estimates for the other alternatives. The extent of the proposed vacuum system is shown in Figure 4.

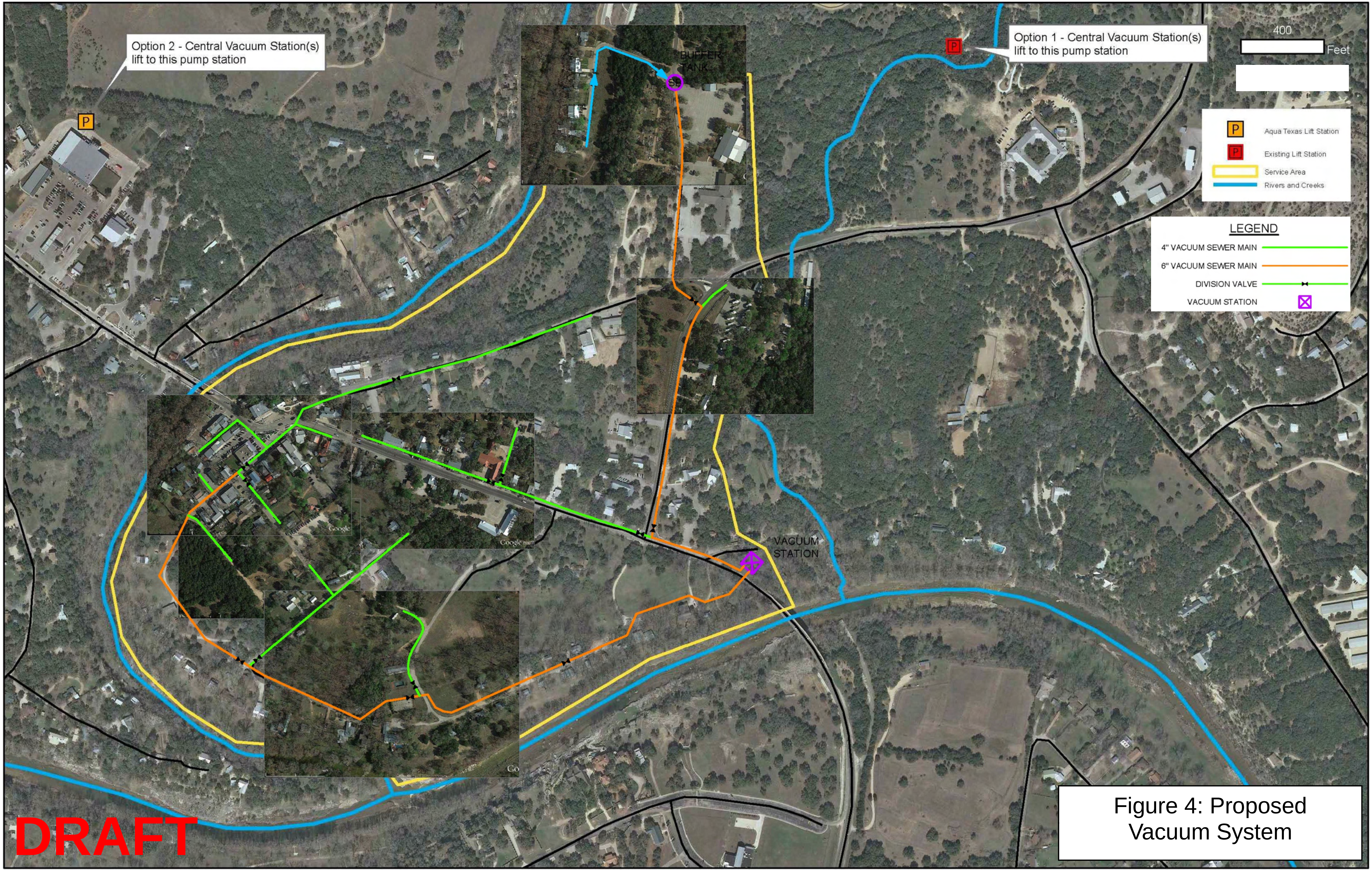



Figure 4: Proposed Vacuum System

The following table illustrates the estimated construction and O&M costs associated with installing a conventional, low-pressure or vacuum sewer system to serve Wimberley:

**Table 2: Estimated Construction and Annual Costs**

| | Conventional System | Low Pressure System | Vacuum System |
|---|---|---|---|
| **Construction Cost (millions)** | $1.93 | $2.06 | $1.81 |
| | | | |
| **Annual Debt Service on Loan** | $140,345 | $149,798 | $131,619 |
| **Annual Energy Cost** | $10,500 | $8,500 | $11,750 |
| **Annual Operations and Maintenance Costs** | $12,300 | $25,500 | $20,300 |
| | | | |
| **Total Annual Costs** | **$163,145** | **$183,798** | **$163,669** |

Note that construction costs do not include contingency, design, permitting, etc. Debt service based on annual interest of 4%, 20 year loan.

As illustrated above, the costs of constructing a vacuum sewer system are expected to be approximately 6% less than a conventional system and 12% less than a low pressure system. The bulk of the costs of the vacuum system are associated with the central vacuum station. The bulk of the costs with the low pressure system are due to the large number of grinder pump station installations. For the conventional system, as described earlier, the cost per foot for installing deep gravity sewer lines is considerable, as is the need for three lift stations.

The operational and maintenance costs of low-pressure and vacuum systems is appreciably higher than conventional systems due to the greater number of mechanical and electrical components, even when compared to a system with three lift stations. Due to the low horsepower of the grinder pumps used in a low-pressure system, the energy costs are less than those of operating either a vacuum station or several lift stations. However, the total operation and maintenance cost, inclusive of energy, labor, and parts repair/replacement is roughly 40% higher for the low-pressure and vacuum sewer options as compared with the conventional system. Since the low-pressure system is estimated to be the most costly both in terms of construction costs and O&M, installing this type of collection system is not seen as offering any significant benefit to Wimberley and was removed from further consideration.

### *3.2.2 Non-Cost Factors Comparison*

Any practice of evaluating options for serving the wastewater needs of a community should take into account the costs of such an endeavor as well as non-cost factors that can affect the success of the project. The non-cost factors considered for a collection system to serve Wimberley included evaluation of system complexity, operator familiarity, and the potential for and ramifications of system failures. Other criteria considered included the potential aesthetic impact of the system as well as the level of effort required to acquire land or negotiate user agreements for installing or operating the system.

As described previously, the vacuum sewer system consists of pneumatically controlled valves at service connections (typically installed on the property line to serve two connections with one valve) and a central vacuum station. The number of mechanical parts is therefore significantly higher than a conventional system with lift stations. The system operates on negative pressure, relying on proper operation of the central vacuum pumps as well as service valves. Should either of these malfunction, the loss of vacuum in the system could result in wastewater overflows. It is worthwhile to note that while not dependent on electrical supply, the pneumatically controlled valves can be subject to mechanical failures. If obstructed, the valves could fail to open, resulting in wastewater backup onto private property. They could also fail to close, which would expose the system to atmospheric pressure resulting in a loss of vacuum and potential wastewater overflows. The susceptibility of the vacuum pumps to failures is similar to that of conventional lift stations or individual grinder pumps in that a loss of power supply and/or mechanical malfunctions of the pumps could result in system failures and wastewater overflows.

Aside from the added complexity of the system operators that would serve the Wimberley area would not be as is familiar with a vacuum system as they would be with a conventional system. There are several vacuum sewer installations in Texas; however, according to information provided by AIRVAC, they are predominantly in coastal areas and east Texas. Lack of system familiarity has the potential of creating problems in operating the wastewater collection system, at least in the first several years following construction. Operators are instrumental in ensuring preventative maintenance is performed and taking note of unusual pump characteristics (vibrations, cavitation, etc.) or instrumentation abnormalities before they result in failures. If operators are not familiar with the system of which they are charged with maintaining, their ability to anticipate problems may not be as well developed and could result in more frequent issues within the system.

A useful tool for comparing alternatives for non-cost factors is a matrix by which each is rated for a certain criteria. In developing this matrix for a proposed collection system in Wimberley, each non-cost factor was grouped into appropriate criteria as defined by Wimberley City Council in the charge to the stakeholder committee to "identify and recommend a high quality, efficient, affordable and reliable wastewater system to serve central Wimberley that values local environmental and community interests." The non-cost factors were grouped into the criteria of high quality, efficient, and reliable since affordability could be addressed by a direct comparison of estimated implementation costs as shown in Table 3. The following table illustrates the results of analyzing the alternatives using this approach.

**Table 3: Non-Cost Factors Collection System Evaluation Matrix**

| | Conventional Collection | Pressure System | Vacuum System |
|---|---|---|---|
| **High Quality** | | | |
| Ability to address bacteria in creek | 5 | 5 | 5 |
| Potential for odor | 4 | 3 | 3 |
| Potential for noise | 4 | 4 | 3 |
| Aesthetic impact | 5 | 4 | 4 |
| | **4.5** | **4.0** | **3.8** |
| **Reliable** | | | |
| Operator familiarity with technology | 5 | 4 | 3 |
| Reliance on mechanical/electrical | 4 | 3 | 2 |
| Maintenance requirements | 5 | 3 | 2 |
| Potential for blockage | 4 | 3 | 3 |
| | **4.5** | **3.3** | **2.5** |
| **Efficient** | | | |
| Time to implement | 4 | 4 | 4 |
| Compatability with soil/topography | 3 | 5 | 4 |
| Need for additional land/user agreements | 4 | 3 | 3 |
| | **3.7** | **4.0** | **3.7** |
| **TOTAL NON-MONETARY** | **12.7** | **11.3** | **9.9** |

As shown in the table, odor is anticipated to be more of a problem with the low pressure system and vacuum system than it would be with a conventional system. This is due to the fact that low pressure systems have several hundred possible points of odor release as compared to conventional systems and vacuum stations pull air through the collection system, increasing the volume of release of odorous gases. Central vacuum stations are generally louder than conventional lift stations or grinder pumps. Aesthetically, both low pressure systems and vacuum sewers are more noticeable in that visible system equipment is located on each property (or property line).

In consideration non-cost factors, and due to the fact that the annual costs associated with a vacuum system and conventional system are expected to be very similar, a conventional collection system would best serve the wastewater collection needs of Wimberley.

## 4.0 EFFLUENT DISPOSAL AND WASTEWATER TREATMENT

The level of treatment required of any wastewater plant is governed in large part by the method of effluent disposal. For this reason, the two topics are discussed together in the following sections.

The alternatives for a collection and treatment system discussed in Section 5.0 Alternatives Evaluation were developed based on the methods of effluent disposal described below. An alternative in which wastewater would be pumped to Aqua Texas (a neighboring wastewater utility) for treatment was also evaluated. Since the treatment and effluent disposal methods utilized by Aqua Texas are already defined in their TCEQ-issued permit, discussion of this alternative is included in the alternatives evaluation section and not in the following paragraphs.

### 4.1 Effluent Disposal

The methods of effluent disposal considered for implementation into a Wimberley wastewater collection and treatment system included: 1) disposal of effluent by spray or subsurface drip irrigation and 2) disposal of effluent by beneficial reuse within Blue Hole Park and discharging to Deer Creek.

#### *4.1.1 Land Application of Treated Effluent*

The TCEQ authorizes land application of treated effluent through issuance of Texas Land Application Permits (TLAP). These permits specify the treatment levels necessary to protect human health and the environment when effluent is either sprayed on land or applied to land via subsurface drip irrigation.

The level of treatment required is dependent upon whether the public could come into contact with the treated effluent and are defined in Title 30 of the Texas Administrative Code (TAC), Chapter 309. Typical permit limits for plants that land apply to areas with which the public could come into contact such as golf courses with unrestricted public access are 20 mg/L carbonaceous biochemical oxygen demand (CBOD) and 20 mg/L total suspended solids (TSS). The effluent must also be disinfected prior to land application. There are no requirements for nutrient load limitations (i.e. phosphorous and nitrogen) in land application permits.

The total volume and rate at which effluent can be applied determines the total land area that must be designated for disposal. The land area and rates of application are also specified in the TLAP permit.

For spray irrigation applications, the total land area required for irrigation is calculated by performing a water balance based on annual precipitation, evaporation rates, and transpiration rates of the vegetation to which effluent is applied.

For subsurface irrigation applications in most of Texas (except eastern counties), land requirements are determined based on the geology of the region. Wimberley is located in an area that is limited to 0.1 gallons per day per square foot (gpd/$ft^2$). This rate is the maximum application rate and is only applicable when the subsurface irrigation system is constructed in accordance with the TCEQ rules of 30 TAC 222. These rules specify the required soil depth and distance between the drip lines and any restrictive soil horizons such as bedrock.

In addition to specifying the application rates, TLAP permits also include requirements for storage capacity for times when irrigation cannot take place, such as periods of rain. For spray systems, the volume of storage is also based on the outcome of the water balance. The required volume can range considerably, but is generally between 60 and 90 days. Since land can be irrigated using subsurface drip systems even during rain, the storage requirement for these systems is significantly less than that of spray systems. The TCEQ requires three (3) days of storage for subsurface applications, to account for time during which maintenance of the irrigation pumps is taking place.

The following table illustrates the expected land area and storage requirements that would be prescribed in a TLAP permit for a Wimberley wastewater treatment plant rated at 75,000 gpd. The spray irrigation rates and storage requirements were based on the permit limits outlined in Aqua Texas' permit, since the water balance calculated for both systems would be very similar due to their close proximity.

**Table 4: Land Application Acreage Requirements**

| Method of Effluent Disposal | Application Rate[1] | Acreage Needed for Irrigation | Storage Volume[2] |
|---|---|---|---|
| Spray Irrigation | 0.06 gpd/ft$^2$ | 28.70 | 1.75 acre pond |
| Subsurface Drip Irrigation | 0.1 gpd/ft$^2$ | 17.22 | 150,000 gallon tank |

[1] Rate based on Aqua Texas' permit authorizing 2.96 acre-ft per year per acre, 76 days storage capacity
[2] 76 days storage capacity (based on Aqua Texas' permit) with a 10 ft deep pond

As shown in Table 4, the land area required for disposing of effluent using irrigation is extensive. The rates used to calculate the acreage needed are conservative. This is because it is the responsibility of TCEQ to ensure adequate land and storage exists to prevent unauthorized discharge of effluent off site due to over-irrigation. A certain degree of safety is built into rates to protect against surface water runoff.

*4.1.2 Discharge to Receiving Stream + Beneficial Reuse*

In contrast to securing a land application permit, municipalities can pursue a Texas Pollutant Discharge Elimination System (TPDES) permit. This permit authorizes the discharge of treated effluent to a receiving water body. Permit limits are developed by the TCEQ based on the requirement to protect the designated use (i.e. recreation, drinking water supply) of the receiving water body. In most cases, effluent limits associated with TPDES permits are more stringent than those prescribed in TLAPs. Discharge (TPDES) permits include a requirement for minimum dissolved oxygen (DO concentration) and may include limits to ammonia ($NH_3$-N) which can be toxic to aquatic life, total phosphorous and total nitrogen.

The prevalence of discharge permits with phosphorous limitations is increasing in the state for wastewater plants discharging to fresh water bodies. Total nitrogen limits are much less common and generally associated with discharges to salt water. The difference between the two practices is due to TCEQ's assessment of the effect each has on water quality.

In fresh water bodies in Texas, phosphorous has been determined through numerous studies to be the limiting nutrient. Minimizing its concentration in receiving streams is important in preventing excessive aquatic vegetation growth. Vegetation growth is dependent on both phosphorous and nitrogen and the ratio in which they exist. In fresh water, phosphorous is the limiting nutrient in that even with abundant nitrogen available, the lack of phosphorus would limit the rate at which aquatic vegetation grows. A certain amount of phosphorous is essential to plant life and necessary for ecosystem function; too much, however, can lead to excessive vegetative growth including algal blooms, which can deplete dissolved oxygen levels and harm aquatic life.

The key advantage and reason roughly 90% of the wastewater treatment plants in Texas discharge their effluent to surface waters is the lower capital costs associated with minimal land acquisition and/or site development requirements. In contrast to land application permits, TPDES permits do not require storage capacity. Since the authorized method of disposal is to a water body and not land, they do not require land designated for irrigation using effluent. These two provisions typically translate to notable cost savings.

Although discharge permits are common throughout the state, there exists a certain perception that wastewater effluent discharge is not an environmentally friendly method of wastewater disposal. This point can be argued in that the quality of effluent discharged to receiving water bodies is often times better than the baseline conditions of the stream or creek and is usually better than effluent which is land applied under a TLAP. Even so, the concern for discharging to Deer Creek, which flows to the Blanco River, was an issue that prompted evaluation of ways in which the City of Wimberley could minimize the frequency of discharge and possibly find a beneficial use for the treated effluent.

Beneficial reuse is a term used to describe the practice of meeting water demands that would typically use potable water, with treated wastewater effluent. Applications of beneficial reuse are usually irrigation, but can extend to fire suppression, toilet flushing, construction water for dust control, and other such uses. In the context of a proposed wastewater treatment plant in Wimberley, beneficially reusing wastewater effluent would offer several advantages. Reuse would offer the benefit of minimizing the frequency of discharge. Discharging to Deer Creek would still be necessary during periods of rain when spray irrigation cannot take place, but using effluent to irrigate park areas when possible reduces the volume of wastewater discharged to the creek. Additionally, irrigation using wastewater effluent would reduce the demand on the Trinity aquifer, which is a source of potable water supply.

To better demonstrate the potential benefit of wastewater reuse, APAI carried out an exercise to determine the expected number of days that discharging to Deer Creek might be necessary. The methodology involved analyzing precipitation and Blanco River flow data for the last six (6) years, identifying areas within the park to irrigate, and including a certain amount of storage capacity to further minimize discharge frequency. The parameters of the exercise included prohibiting irrigation if the 1-day rainfall exceeded 0.1 inches or 3-day rainfall exceeded 2 inches. The storage capacity was assumed to be 500,000 gallons. The total area of open spaces within the park identified for irrigation was 13 acres. This figure was calculated based on park plans and new aerial imagery and is higher than previous estimates when such information was not available. This acreage is already cleared, open area within the park in close proximity to the soccer fields and great lawn. There is ample space in other areas of the park on which effluent could be sprayed. Some utilities dispose of effluent by spraying cedar trees. Irrigation equipment could be installed near the perimeter of the expanded plant at minimal cost to utilize this method if additional acreage is required or the rate of application must be reduced.

The 13 acres described above could accept the permitted wastewater flow of 75,000 gpd if applied at a rate of 1.5 inches per week. Using these constraints, the results of the analysis of precipitation and river flow suggested that the number of days where discharging to Deer Creek would have occurred over the past six (6) years would be twelve (12) days, or an average of two (2) days per year. During times of discharge, the Blanco River flow would be high and the percentage of river flow attributable to wastewater effluent would be less than one-tenth of one percent.

It is important to note the differences in irrigation rates between irrigation within areas of Blue Hole Park if a TPDES permit is secured as compared with spray or drip irrigation rates associated with a TLAP. As discussed earlier, a TPDES permit does not require the applicant to prove land availability for effluent disposal since this is not the permitted disposal method. A land application permit (TLAP) includes these rates because the applicant is asking for authorization to dispose of effluent by irrigation only. The application rates authorized are very conservative since this is the only method the applicant has available for disposing of effluent.

Securing a TPDES relieves the requirement to designate specific areas for land application and storage but does not preclude the applicant from using effluent for irrigation purposes or other reuse applications providing the applicant also obtains Authorization for Reclaimed Water Use in accordance with 30 TAC Chapter 210 (210 authorization). This authorization includes limits for effluent quality, but does not require a specific method or rate of irrigation. Reclaimed water, under authorization by this rule, can be supplied to users on an as-needed basis. The applicant is, however, prohibited from over-irrigating which could result in an off-site discharge.

The permit limits that would be prescribed by the 210 authorization for irrigating the park spaces are listed below (maximum 30 day average):

CBOD = 5 mg/L

Turbidity = 3 NTU

Bacteria (Fecal Coliform or *E. Coli*) = 20 CFU / 100 mL

The permit limits for reclaimed water are generally stricter than those associated with a discharge. However, limits for discharge permits can compare with limits for reclaimed use if the receiving water body is of exceptional quality. The Blanco River is one such water body and, as such, preliminary modeling was performed to estimate the limits that may be imposed on a treatment plant discharging to its tributary, Deer Creek. Due largely to the distance between the discharge location on Deer Creek and the confluence with the Blanco River, as well as the low effluent quantities expected, permit limits are not anticipated to be exceptionally rigorous. Modeling suggests that effluent quality of 20 mg/L CBOD, 12 mg/L $NH_3$-N and 6 mg/L DO would be enough to ensure effluent discharge to the Blanco River does not adversely affect water quality.

However, due to the reuse requirement and the City's concern for the environment, any plant would be designed to achieve an effluent quality of 5 mg/L CBOD, 2 mg/L $NH_3$-N, 6 mg/L DO and 1 mg/L total phosphorous. These limits are consistent with typical permits for wastewater plants discharging to waters designated as exceptional aquatic life use.

## 4.2 Treatment

The treatment processes included in plant design are dependent upon the method of effluent disposal. If the method selected is beneficial reuse in conjunction with authorized discharge under a TPDES permit, effluent limits are more stringent. In this case, tertiary treatment of effluent would be necessary which would require the addition of filters. Although phosphorous removal using chemical addition may not be required by a TPDES permit, this process would be included in plant design due to the City's preference to treat to a high level. If a land application permit is secured, filters and phosphorous removal would not be incorporated into plant design. In both cases, the fundamental treatment units to achieve secondary effluent quality standards would include screening, sedimentation, aeration and disinfection. At the low flow rates expected, a steel tank package plant would be an appropriate and less costly type of plant than the permanent concrete style.

A stainless steel package plant currently serves the needs of the Deer Creek of Wimberley Nursing Home and Rehabilitation Center. The plant is rated at 25,000 gpd but only permitted for up to 15,000 gpd. Expanding the plant capacity to the anticipated 75,000 gpd would require the addition of one or more parallel package plants rated at 50,000 gpd (total capacity) and the modifications described previously if the effluent is to be treated to reclaimed water standards. The plant is currently permitted to discharge to subsurface pipes in an area to which the public does not have access and is therefore treating to levels less than that which would be required for reclaimed water.

## 5.0 ALTERNATIVES EVALUATION

In an effort to provide stakeholders, council members and Wimberley residents with a thorough evaluation of possible alternatives for treating wastewater, a total of eleven (11) options were considered. The first nine (9) discussed below include an analysis of the benefits, disadvantages and costs associated with a single phase of construction during which the entire collection and treatment system is constructed as one project. The latter two (2) took into account the effects of a phased approach to Options 1 and 7.

### 5.1 Alternatives Description

*Option 1*

In this option, the package plant on Blue Hole Park would be expanded to a permitted capacity of 75,000 gpd and designed to meet reclaimed water standards. The City of Wimberley would secure a TPDES permit for discharging wastewater to Deer Creek as well as a 210 authorization to irrigate areas in the park with treated effluent. In addition to the collection system illustrated in Figure 2, a force main would be installed in the right of way of Old Kyle Road between Lift Station 1 and the existing lift station which serves Deer Creek Nursing Home. The lift station would be upgraded to handle additional flow, and the 3-inch force main which currently conveys wastewater from the Deer Creek lift station to the existing package plant would be replaced with a 6-inch force main. The layout of the proposed system is illustrated in Figure 5.

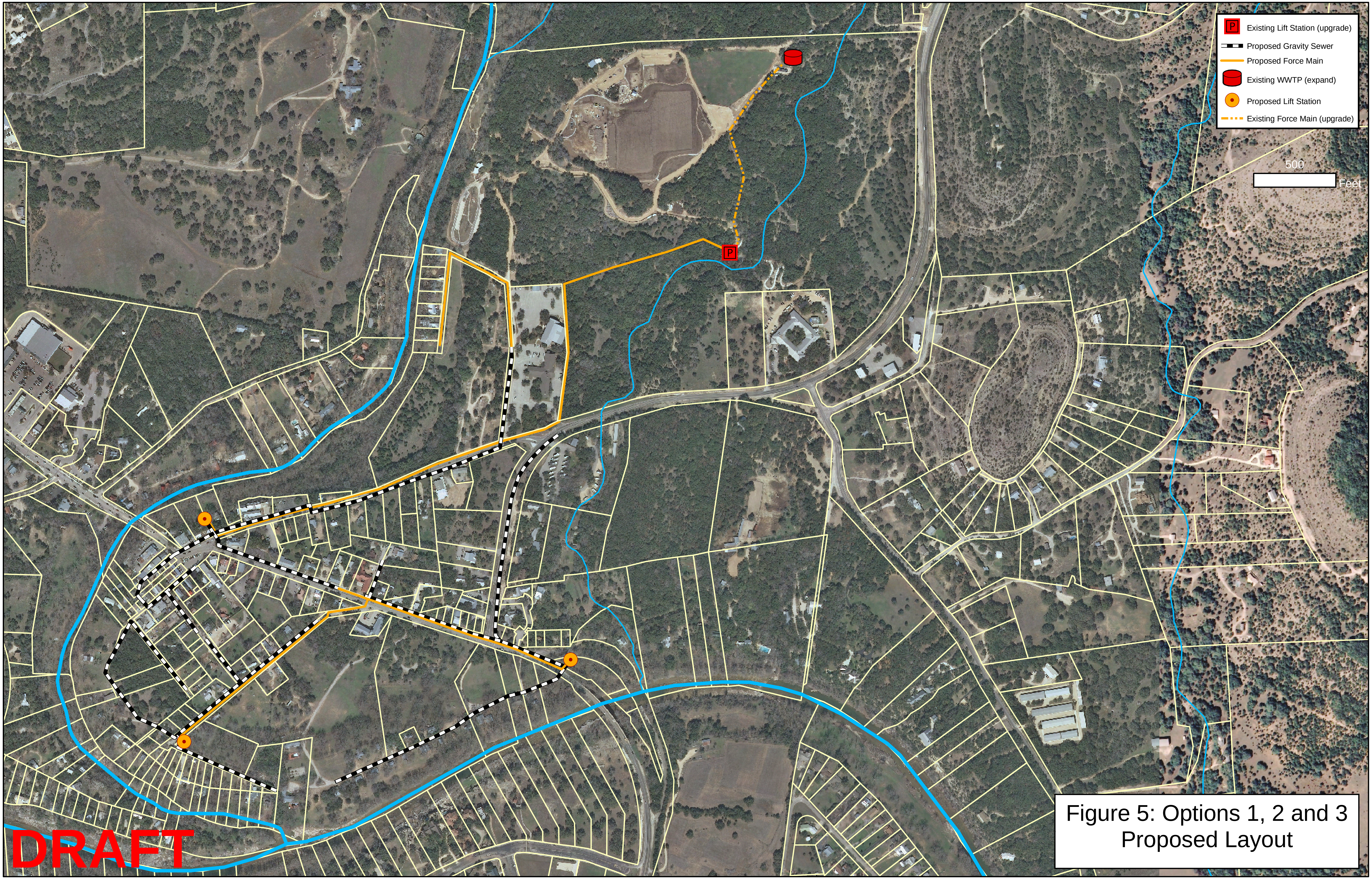



Figure 5: Options 1, 2 and 3 Proposed Layout

*Option 2*

Under Option 2, the collection system layout would be as described in Option 1 and the existing plant would be expanded to 75,000 gpd though filtration and chemical feed for phosphorous removal would not be incorporated into plant modifications.  A Texas Land Application Permit would be secured to dispose of effluent via spray irrigation.  A TPDES permit would not be in place so discharging to Deer Creek would not be permitted.  Construction costs for this option would require preparing 28 acres of park land for spray irrigation as outlined in the permit, and constructing a 1.75 acre clay-lined pond.  The pond would need to be located in a relatively flat area, which may require considerable site work.

*Option 3*

Option 3 would involve the same collection system layout and treatment plant as described for Option 2.  A TLAP would also be secured, though the method of disposal of effluent would be designated as subsurface drip irrigation.  This method of disposal would require less acreage and storage, but would require approximately 16,000 cubic yards of imported soil in order to comply with the design requirements of subsurface systems.  Soil importation and the site work involved in installing the irrigation system are expected to be similar to the costs of effluent disposal outlined in Option 2.

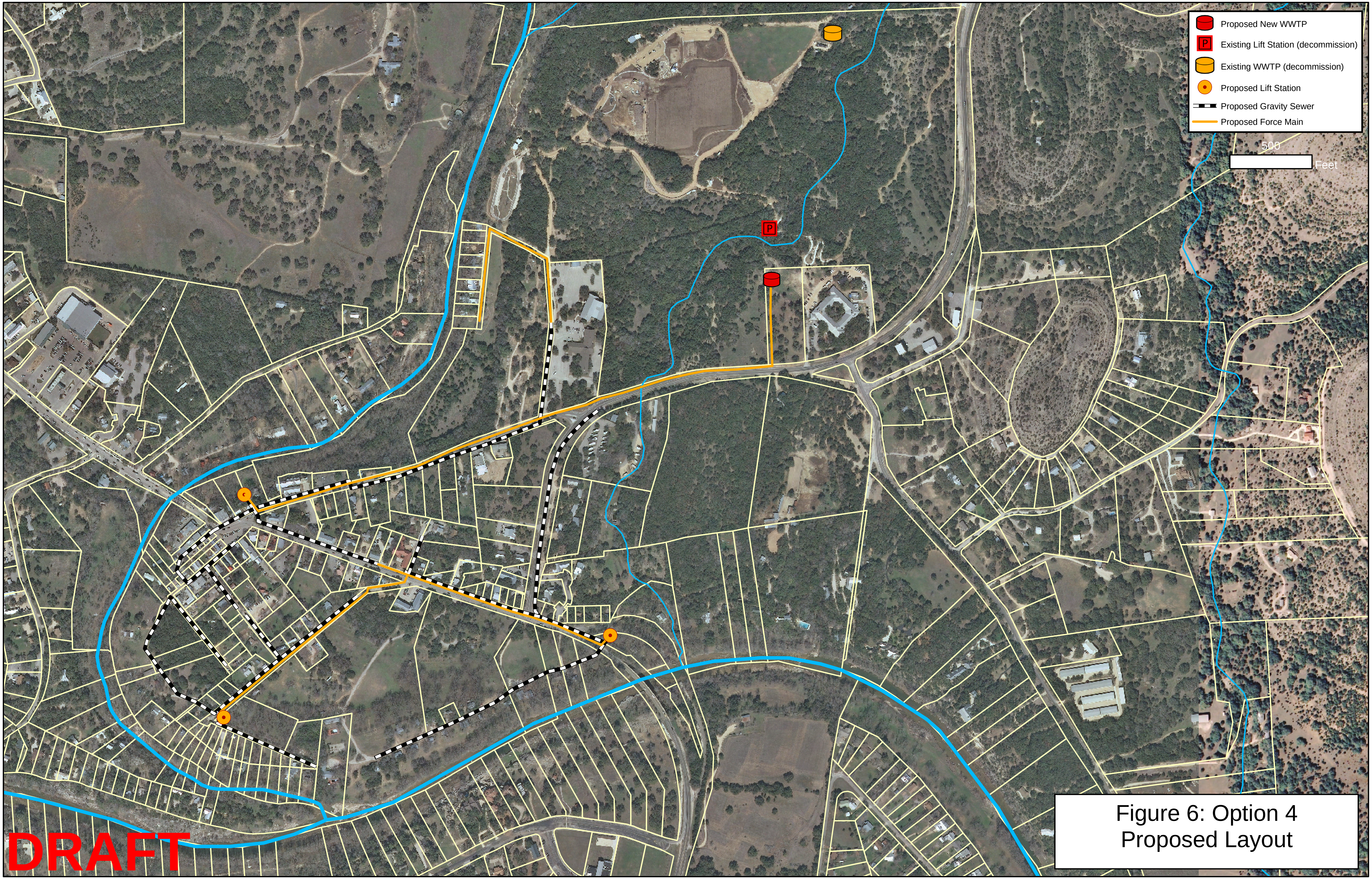
*Option 4*

In option 4, consideration was given to constructing a new package plant outside of the Blue Hole Park boundary which would treat to reclaimed water standards.  Effluent would be beneficially reused to the greatest extent possible by irrigating within the park, but could also be discharged.

Since there would be numerous potential locations on which to site a plant, several criteria were used to narrow the potential sites and thus limit the number of alternatives for which costs were developed to a more manageable number.  For comparison purposes, the criteria used to identify the potential new plant site included 1) proximity to Deer Creek since this option involves a discharge, 2) that the parcel was undeveloped 3) the parcel was within the general area served by the collection system and 4) a majority of the parcel was located outside the 100-year floodplain.

Base on these criteria, a parcel adjacent to the park fronting Old Kyle Road was selected for further evaluation as illustrated in Figure 6.

Constructing a new plant rather than expanding the existing plant would increase construction costs; however, the cost of conveying wastewater from Lift Station 1 to the new plant location would be considerably less. The most expensive aspect of implementing this alternative (after collection system construction) is expected to be land acquisition. The costs of purchasing this parcel are estimated to be nearly $750,000. This figure is based on applying a factor of 4 to the assessed value listed by Hays County Appraisal District for the property. The multiplier was a suggestion of stakeholders who are also involved in Wimberley’s real estate market and thus more knowledgeable of fair market values than is APAI.


Proposed New WWTP
Existing Lift Station (decommission)
Existing WWTP (decommission)
Proposed Lift Station
Proposed Gravity Sewer
Proposed Force Main
500
Feet
DRAFT
Figure 6: Option 4
Proposed Layout

*Options 5 and 6*

In Options 5 and 6, consideration was given to locating the plant outside the park but disposing of effluent via spray (Option 5) or subsurface (Option 6) irrigation. The reason for exploring this option was due to the fact that several acres of high quality soil exists along Winter's Mill parkway which would be ideal for installing an irrigation system to dispose of effluent. The makeup of the soil is such that importing 16,000 cubic yards, as required in Option 3, would not be necessary. Although this reduces the costs, there are several aspects to these options that would result in a cost increase when compared with those previously discussed.

The proposed plant location would be located along Winter's Mill parkway in order to capitalize on the availability of good soils. The general location and layout is shown in Figure 7. Constructing the added transmission capacity, increasing the size of pumps at the upgraded Deer Creek lift station, and acquiring a relatively expensive parcel of land (acquisition costs calculated as described for Option 4) resulted in these options being the most costly of those evaluated.

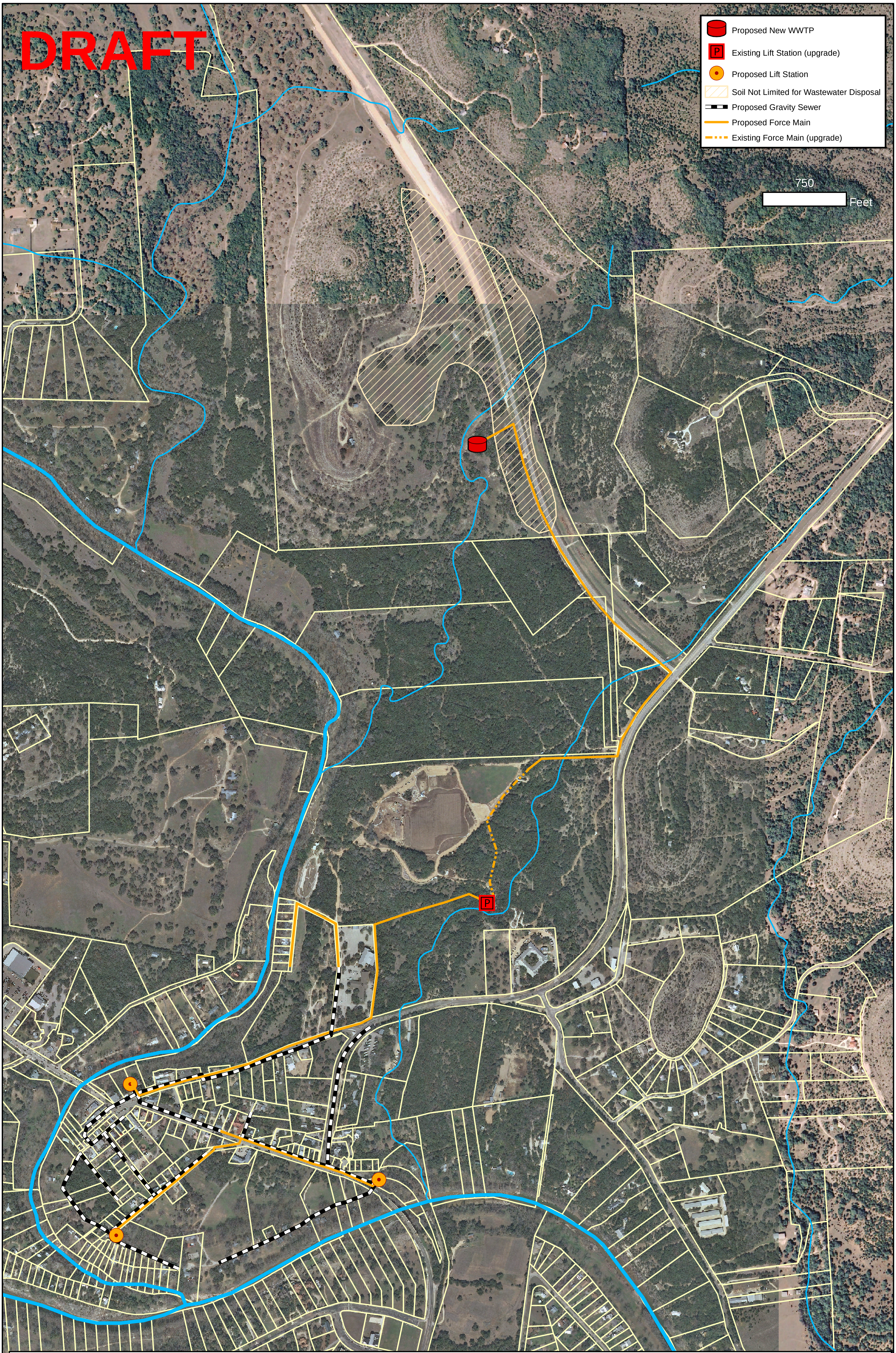



Figure 7: Options 5 and 6 Proposed Layout

*Option 7*

Rather than expanding a treatment plant or constructing a new one, Wimberley could choose to partner with Aqua Texas (Aqua) and pump wastewater across Cypress Creek to their system for treatment. Aqua Texas is a private water and wastewater provider that serves much of the area in Wimberley that is west and north of Cypress Creek. Their treatment plant and effluent holding pond is located on FM 2325 west of Jacob's Well Road. The current method of disposal used by Aqua is spray irrigation of the Woodcreek golf course. Through discussions with Aqua representatives prior to and during the stakeholder process, Aqua indicated that they had capacity in their system to accommodate 75,000 gpd in additional wastewater flow.

In this option, wastewater would be collected as described for previous options but would be pumped from Lift Station 1 under Cypress Creek to an existing Aqua lift station behind the Brookshire Brothers retailer. There would be no modifications to the wastewater treatment plant located on Blue Hole Park which would continue to treat waste generated from the Deer Creek nursing home. The proposed layout is illustrated in Figure 8.

The costs of implementing this option would include construction of the collection system, boring or tunneling under Cypress Creek, and Contribution In Aid of Construction (CIAC) which Aqua would charge each customer. In previous correspondence, Aqua representatives had indicated that the cost to cross Cypress Creek with a wastewater line would be $425,000. In discussions with Aqua during the stakeholder process, representatives committed to limiting this cost to be no more than what it would cost to pump wastewater from Lift Station 1 to the plant in Blue Hole Park. As illustrated in the cost estimates presented later, this value was reduced to $250,000. Other assumptions regarding CIAC fees and user rates are noted in further detail in the cost estimates.

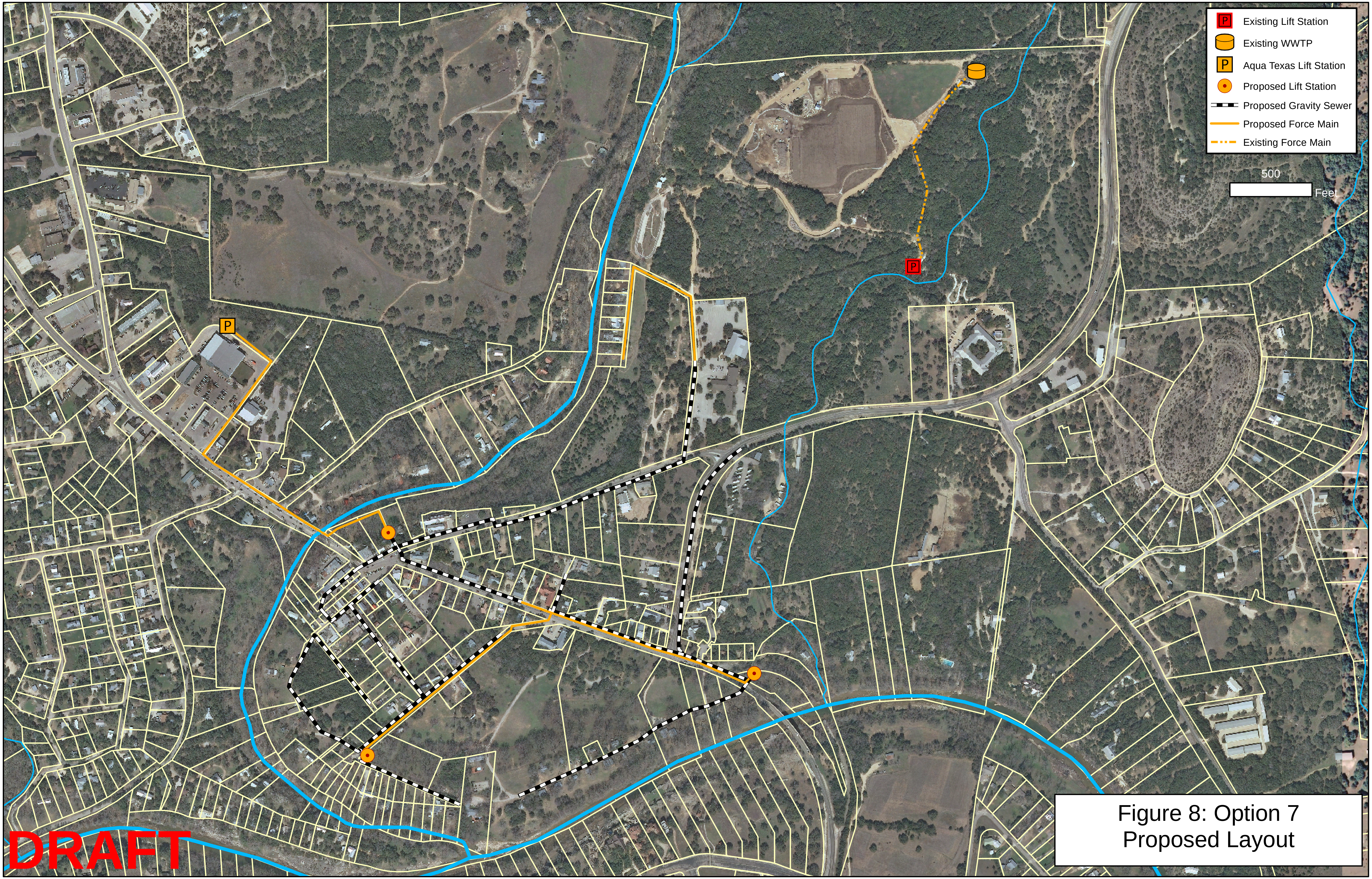



Figure 8: Option 7
Proposed Layout

*Option 8*

As described in the introduction of this report, a wastewater collection and treatment system in Wimberley is expected to improve the water quality of Cypress Creek by removing from operation those septic systems that are failing or are likely to fail in the near future. The extent of Wimberley's CCN is such that the area identified as being served by a collection system had, up until recently, been bounded by the creek. Limiting the service area in this way could impact the effectiveness of a collection system in addressing water quality by leaving septic systems in operation that also front the creek but are not included in the area receiving service. For this reason, the option of expanding the service area to include the west and north side of Cypress Creek was evaluated.

Under option 8, properties on the west and north side of the creek would be served by Aqua Texas, as would those identified in the central service area shown in Figure 2. The existing package treatment plant would continue to treat wastewater from the Deer Creek Nursing Home. The proposed layout is illustrated in Figure 9.

In designating the extent of the service area, properties within the Cypress Creek watershed in close proximity to the creek were included since these are expected to have the greatest impact on water quality. The number of parcels served and estimated wastewater flow attributed to them is 64 and 24,000 gpd, respectively.

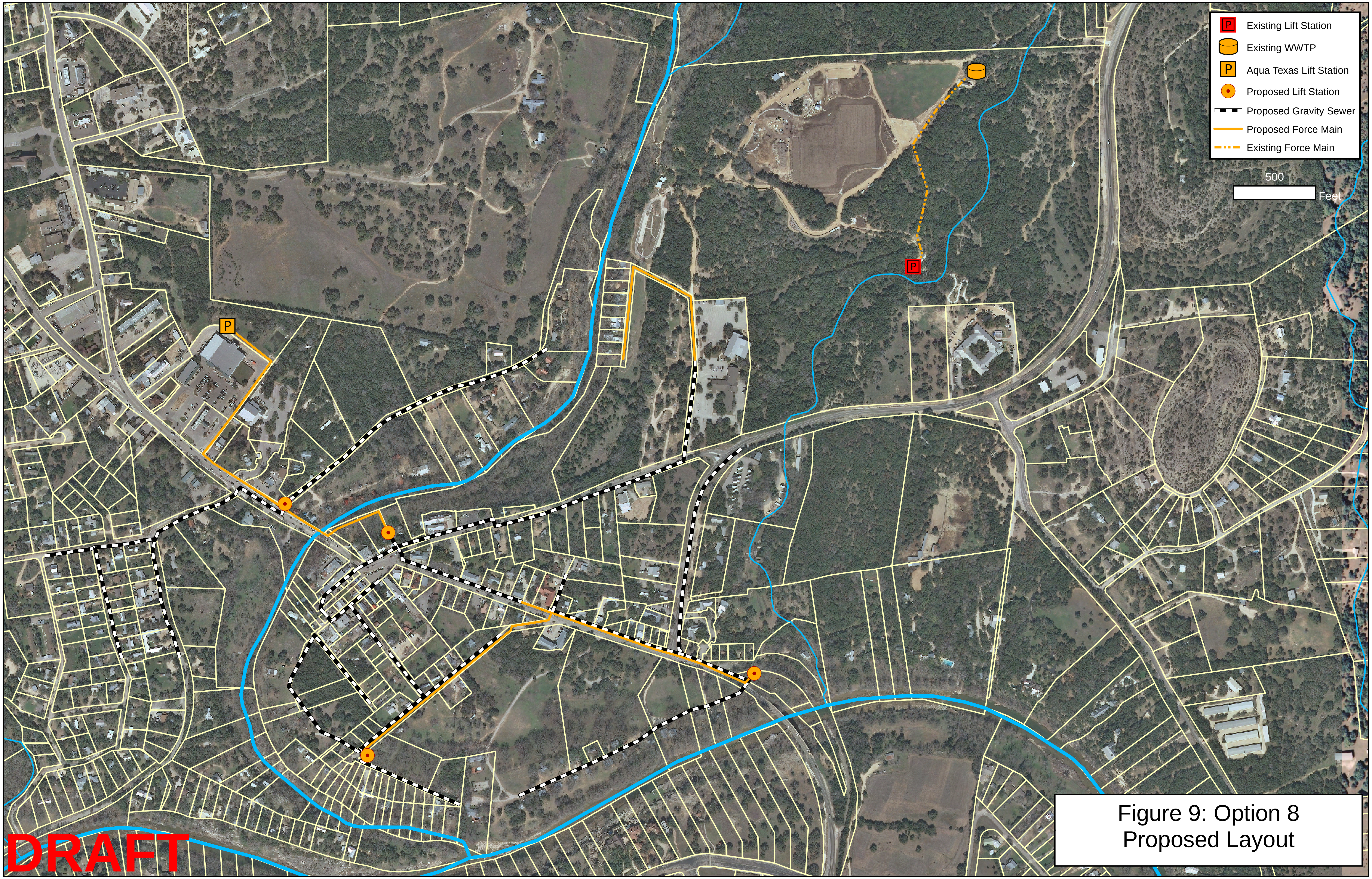



Figure 9: Option 8
Proposed Layout

*Option 9*

Option 9 is a variation of Option 8 in that only the properties in the expanded service area would be served by Aqua Texas. The rest of the service area, including Deer Creek Nursing Home, would be served by an expanded plant on Blue Hole Park. The expanded plant would be designed to treat to reclaimed water standards. An illustration of this option is provided in Figure 10.

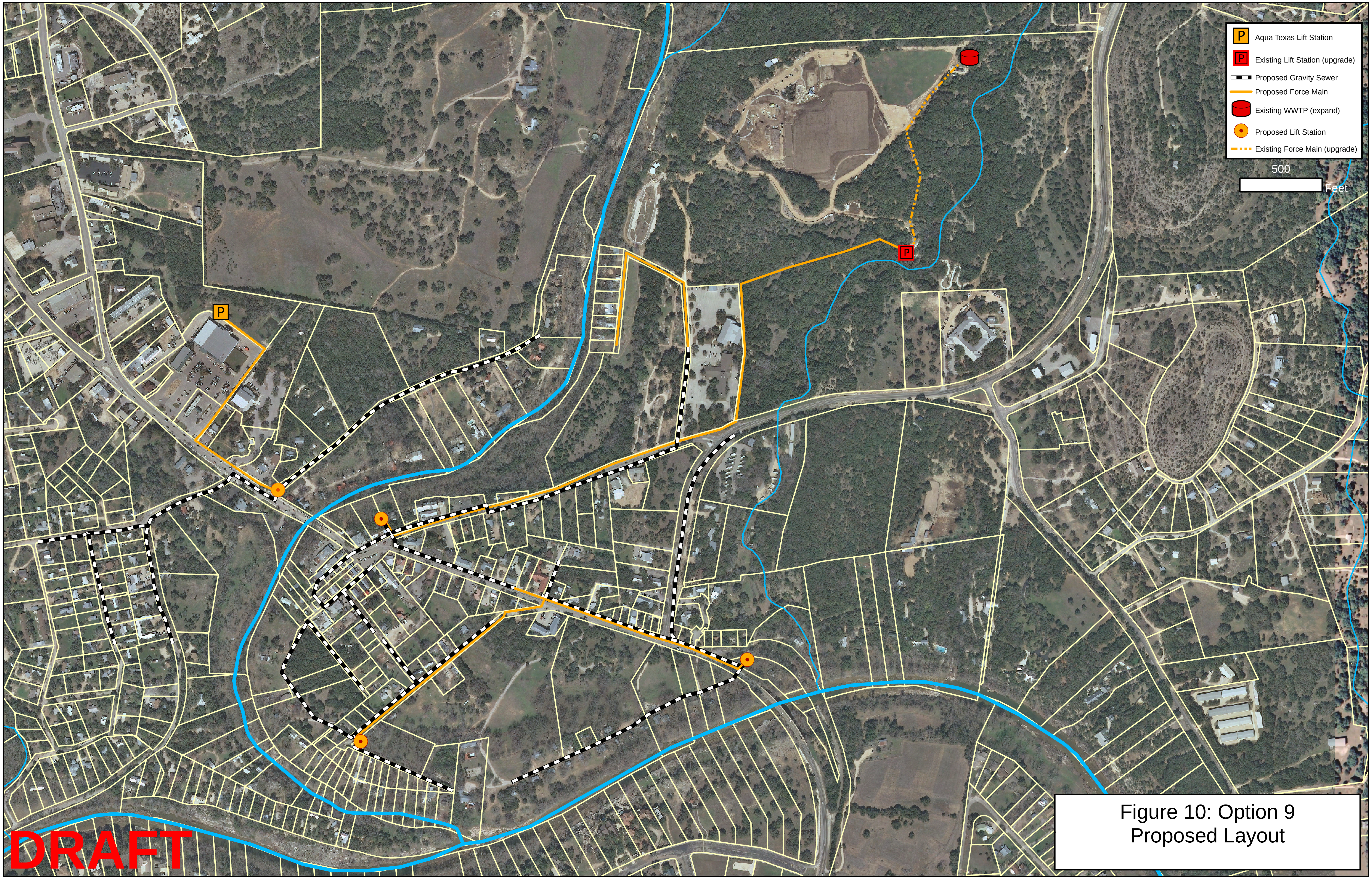



Figure 10: Option 9
Proposed Layout

*Options 10 and 11*

The discussion of a phased approach to the collection and treatment system was discussed during the stakeholder process as it related to costs. To answer this question, the cost impacts of constructing the first phase of the collection system were evaluated for the alternatives described by option 1 (city-owned plant on Blue Hole park) and option 7 (pump to Aqua). The extent of the collection system was limited to that which could be served by gravity sewers to the lift station near Cypress Creek Park (Lift Station 1).

Under option 10, flow would be pumped from this lift station to the plant at Blue Hole Park (see Figure 11). The plant would be expanded to 50,000 gpd rather than 75,000 gpd with the addition of one parallel treatment plant. Storage capacity would still be 500,000 gallons to minimize to the greatest extent possible the frequency of discharge when irrigation within the park cannot occur.

Under option 11, flow would be pumped from Lift Station1 to the lift station operated by Aqua Texas, located behind Brookshire Brothers (see Figure 12).

The details pertaining to costs associated with this option are explained in Section 5.2 Alternatives Comparison.

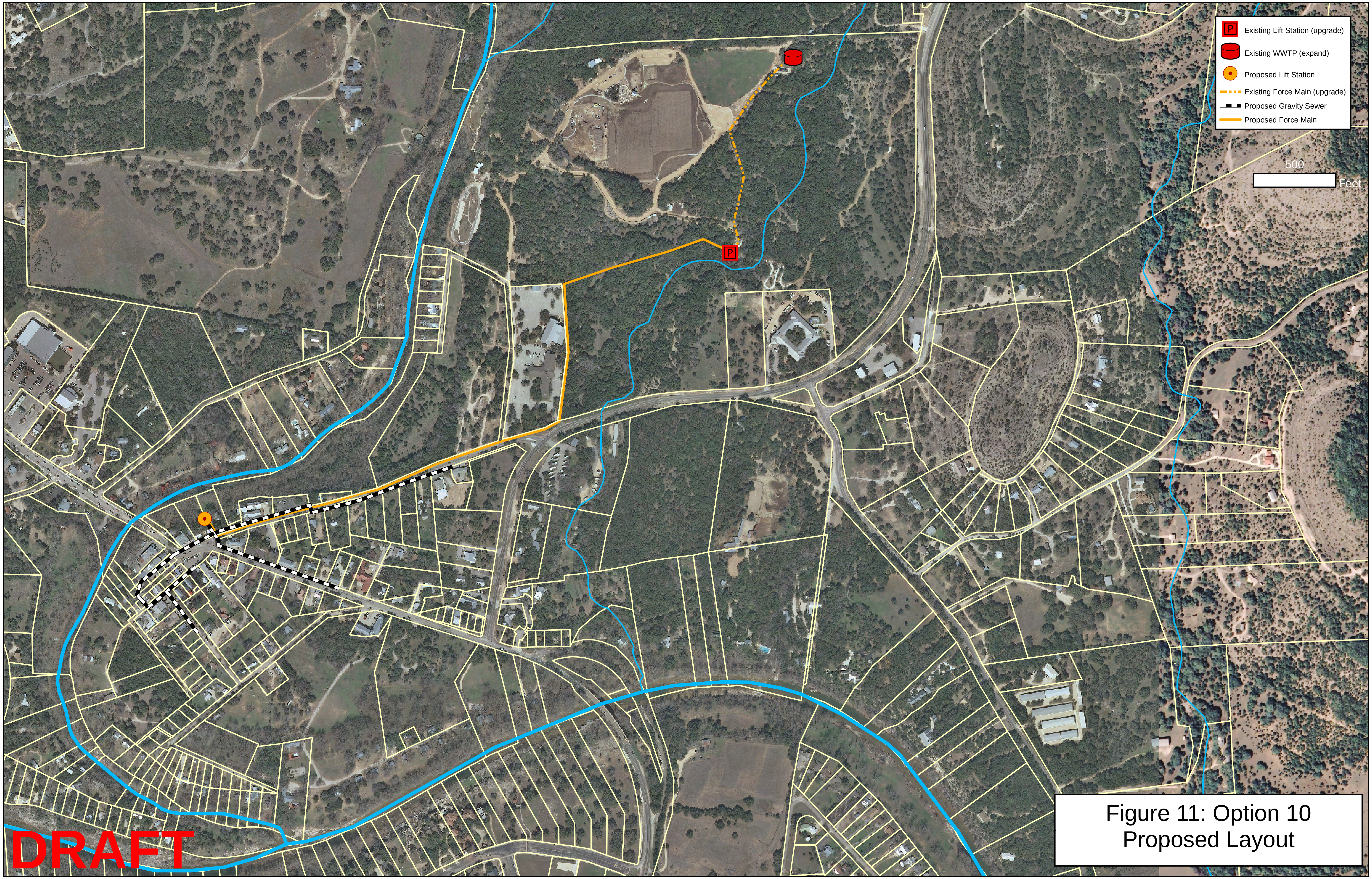



Figure 11: Option 10
Proposed Layout

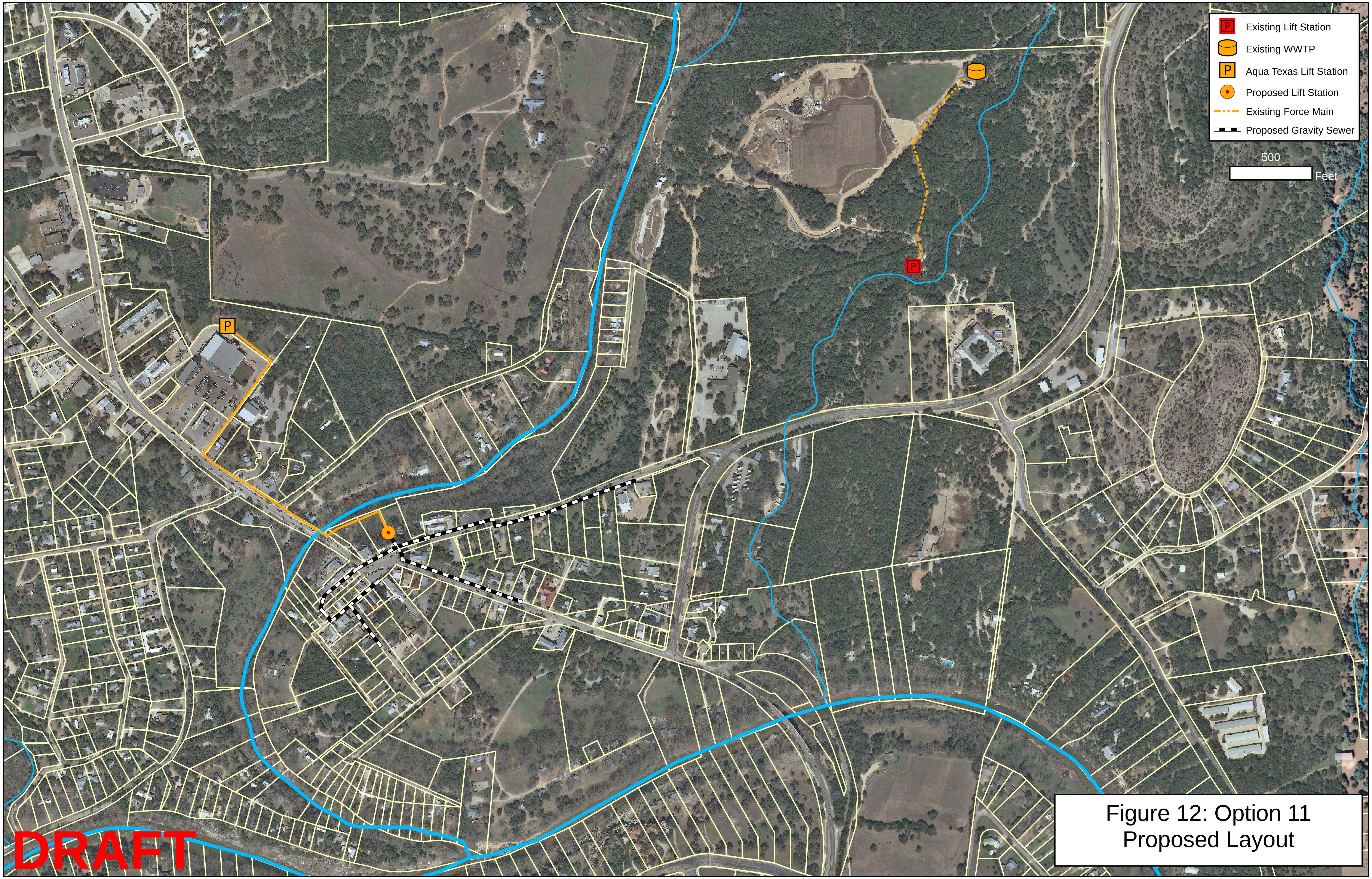



Figure 12: Option 11
Proposed Layout

*Decentralized Wastewater Collection Option*

Although not detailed during the stakeholder process or in previous feasibility studies, the option to construct several small, decentralized collection and treatment systems throughout Wimberley is evaluated herein to provide documentation as to why this method of wastewater disposal was not considered further.

Decentralized systems or ‘cluster’ systems are wastewater collection / treatment systems designed to treat the wastewater generated by a limited number of properties. The extent of the decentralized system is smaller, requiring less pumping capacity and smaller sewer lines. The method of effluent disposal of these systems varies but the use of drip irrigation is common.

In determining the applicability of decentralized systems in serving the wastewater needs of Wimberley, the following assumptions were made:

1) The method of disposal of treated wastewater would be drip irrigation at a rate of 0.1 $gpd/ft^2$ which is the same rate required for disposal under a TLAP for subsurface systems.
2) There would be approximately 8 decentralized systems serving the area based on topography constraints.
3) The area required for the septic system disposal area and associated buffer zone at each system would be approximately 2.5 acres.
4) The average cost per acre is $250,000, based on applying a factor of four (4) to average appraised values.
5) The existing package treatment plant that serves the Deer Creek Nursing Home would continue to operate as-is.

Based on the assumptions listed above, a total of approximately 20 acres of land would be required on which to install decentralized systems. The cost of land acquisition alone is expected to be approximately $5 million. Due to the expense of land acquisition, and because there are few locations in central Wimberley that are undeveloped and therefore suitable locations for decentralized systems, this option was not explored further.

## 5.2 Alternatives Comparison

The cost to implement any of the projects described in the preceding sections is expected to be significant. Retro-fitting a community for wastewater service, particularly a community with topographical constraints similar to Wimberley, is always challenging and costly. Selecting an alternative that meets the needs and priorities of the community but is also feasible from a funding standpoint is essential in ensuring the project moves forward. As such, detailed cost estimates were prepared for each of the alternatives. From these cost estimates, funding alternatives were explored by Raftelis Financial Consultants (Raftelis). These included various combinations of tax rates, assessments, user and capital recover fees. This information was shared with stakeholders with the intent of illustrating the potential avenues with which the City could finance project construction. A detailed description of the results of this analysis was prepared by Raftelis and is included in Appendix 2.

At the request of the stakeholders, and to verify the assumptions made for options involving Aqua Texas, the draft cost comparison table for the first nine (9) alternatives was provided to Aqua for comment. Aqua expressed concern for the wastewater flows estimated for residential properties and suggested using 210 gpd per residential connection rather than 300 gpd as used originally. Another change involved reducing the user fees for Aqua from $13.96 per thousand gallons to $12.50 per thousand gallons. The original figure is Aqua's current retail rate which they agreed to reduce for new Wimberley customers. Aqua representatives also committed to maintaining this rate through 2018 and to cap the CIAC fees to a maximum of $600,000.

Based on the adjustments listed above, three cost tables were prepared for review by stakeholders. The first included the original flow projections (300 gpd for residential connections) while the others included reduced flow projections (210 gpd for residential connections). Due to the fact that Aqua user fees are guaranteed only through 2018, an estimate was made with regards to how much this rate would increase annually beyond that date. In one cost table, the rate at which the user fees would increase was assumed to be 2%, which is the same rate at which annual O&M costs were estimated to increase. In the final cost table, this rate was assumed to increase 4% annually until such time as it matched the retail rate. After that point, the rate would increase 2% annually. Other assumptions are provided in the table footnotes.

In addition to evaluating the costs of each alternative, non-cost factors were identified and scored using the same approach as described for the collection system. The non-cost factors evaluation matrix is shown in Table 9 following the tables of cost estimates.

| Table 5: Original Flow Estimates, Annual Increase in O&M and Aqua Fees of 2% (Aqua Fees firm for 4 years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Option Description | Expand Exist.Plant to 75,000 GPD. TPDES Permit + Spray Irrigation | Expand Exist. Plant to 75,000 GPD. Spray Irrigation | Expand Exist. Plant to 75,000 GPD. Subsurface Irrigation | Construct New Plant + TPDES Permit + Spray Irrigation | Construct New Plant + Spray Irrigation | Construct New Plant + Subsurface Irrigation | Serve Exist Wimberley CCN - Pump to Aqua - Maintain Exist. Package Plant | Serve Expanded CCN - Pump to Aqua - Maintain Exist. Package Plant | Serve Expanded CCN - Pump to Aqua and Expanded Plant |
| Collection System | $2,259,000 | $2,259,000 | $2,259,000 | $2,169,000 | $2,607,000 | $2,607,000 | $2,009,000 | $2,671,000 | $2,986,200 |
| Aqua Transmission Cost | $0 | $0 | $0 | $0 | $0 | $0 | $250,000 | $250,000 | $0 |
| Treatment Plant Cost | $650,000 | $594,000 | $594,000 | $964,000 | $908,000 | $908,000 | $0 | $0 | $650,000 |
| Irrigation Cost | $38,000 | $548,000 | $1,514,000 | $45,000 | $432,000 | $861,000 | $0 | $0 | $38,000 |
| Storage Cost | $300,000 | $1,000,000 | $135,000 | $0 | $1,000,000 | $135,000 | $0 | $0 | $300,000 |
| Discharge Cost | $20,000 | $0 | $0 | $20,000 | $0 | $0 | $0 | $0 | $20,000 |
| Land Acquisition Cost | $44,000 | $44,000 | $44,000 | $784,000 | $941,600 | $588,000 | $44,000 | $44,000 | $44,000 |
| **Subtotal Construction Cost** | **$3,311,000** | **$4,445,000** | **$4,546,000** | **$3,982,000** | **$5,888,600** | **$5,099,000** | **$2,303,000** | **$2,965,000** | **$4,038,200** |
| | | | | | | | | | |
| Contingency (20%) | $662,200 | $889,000 | $909,200 | $796,400 | $1,177,720 | $1,019,800 | $460,600 | $593,000 | $807,640 |
| Planning and Design (15%) | $496,650 | $666,750 | $681,900 | $597,300 | $883,290 | $764,850 | $345,450 | $444,750 | $605,730 |
| Legal, Financial, Permitting | $175,000 | $75,000 | $75,000 | $175,000 | $175,000 | $175,000 | $25,000 | $25,000 | $175,000 |
| Debt Reserve | $232,243 | $303,788 | $310,605 | $277,535 | $406,231 | $352,933 | $156,703 | $201,388 | $281,329 |
| TWDB Loan Origination Fee | $90,226 | $118,021 | $120,670 | $107,822 | $157,821 | $137,114 | $60,879 | $78,239 | $109,296 |
| Aqua CIAC Costs[a] | $0 | $0 | $0 | $0 | $0 | $0 | $600,000 | $600,000 | $293,943 |
| **Total Construction Cost** | **$4,967,319** | **$6,497,559** | **$6,643,375** | **$5,936,057** | **$8,688,661** | **$7,548,697** | **$3,951,631** | **$4,907,377** | **$6,311,137** |
| | | | | | | | | | |
| Annual O&M of New System[b] | **$176,815** | **$177,728** | **$175,154** | **$163,137** | **$184,567** | **$181,993** | **$24,200** | **$24,200** | **$176,815** |
| Annual Aqua Charges[c] | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$253,219** | **$362,719** | **$109,500** |
| Total Annual Charges | **$176,815** | **$177,728** | **$175,154** | **$163,137** | **$184,567** | **$181,993** | **$277,419** | **$386,919** | **$286,315** |
| NPV of Annualized Costs | **$2,479,065** | **$2,491,866** | **$2,455,767** | **$2,287,292** | **$2,587,753** | **$2,551,654** | **$3,711,729** | **$5,170,075** | **$3,937,412** |
| | | | | | | | | | |
| Total Net Present Value | **$7,446,384** | **$8,989,425** | **$9,099,142** | **$8,223,349** | **$11,276,414** | **$10,100,351** | **$7,663,360** | **$10,077,452** | **$10,248,549** |
| GPD Served by City | **64,500** | **64,500** | **64,500** | **64,500** | **64,500** | **64,500** | **9,000** | **9,000** | **64,500** |
| GPD Served by Aqua Texas | - | - | - | - | - | - | **55,500** | **79,500** | **24,000** |
| NPV Cost Per 1,000 gal | **$115,448** | **$139,371** | **$141,072** | **$127,494** | **$174,828** | **$156,595** | **$118,812** | **$113,870** | **$115,803** |

[a]Based on $2,572 per 210 gpd for CIAC fees - applied to all connections, capped at $600,000

[b]Note that annual O&M is expected to increaase 2% annually

[c]Based on $12.50 per 1,000 gal; Aqua charges are expected to remain constant for first 4 years, after which point they are expected to increase 2% annually

NPV based on a discount rate of 5.5% and a 20 year period.

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## Table 6: Reduced Flow Estimates, Annual Increase in O&M and Aqua Fees of 2% (Aqua Fees firm for 4 years)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **Option Description** | **Expand Exist.Plant to 75,000 GPD. TPDES Permit + Spray Irrigation** | **Expand Exist. Plant to 75,000 GPD. Spray Irrigation** | **Expand Exist. Plant to 75,000 GPD. Subsurface Irrigation** | **Construct New Plant + TPDES Permit + Spray Irrigation** | **Construct New Plant + Spray Irrigation** | **Construct New Plant + Subsurface Irrigation** | **Serve Exist Wimberley CCN - Pump to Aqua - Maintain Exist. Package Plant** | **Serve Expanded CCN - Pump to Aqua - Maintain Exist. Package Plant** | **Serve Expanded CCN - Pump to Aqua and Expanded Plant** |
| **Collection System** | $2,259,000 | $2,259,000 | $2,259,000 | $2,169,000 | $2,607,000 | $2,607,000 | $2,009,000 | $2,671,000 | $2,986,200 |
| **Aqua Transmission Cost** | $0 | $0 | $0 | $0 | $0 | $0 | $250,000 | $250,000 | $0 |
| **Treatment Plant Cost** | $650,000 | $594,000 | $594,000 | $964,000 | $908,000 | $908,000 | $0 | $0 | $650,000 |
| **Irrigation Cost** | $38,000 | $548,000 | $1,514,000 | $45,000 | $432,000 | $861,000 | $0 | $0 | $38,000 |
| **Storage Cost** | $300,000 | $1,000,000 | $135,000 | $0 | $1,000,000 | $135,000 | $0 | $0 | $300,000 |
| **Discharge Cost** | $20,000 | $0 | $0 | $20,000 | $0 | $0 | $0 | $0 | $20,000 |
| **Land Acquisition Cost** | $44,000 | $44,000 | $44,000 | $784,000 | $941,600 | $588,000 | $44,000 | $44,000 | $44,000 |
| **Subtotal Construction Cost** | **$3,311,000** | **$4,445,000** | **$4,546,000** | **$3,982,000** | **$5,888,600** | **$5,099,000** | **$2,303,000** | **$2,965,000** | **$4,038,200** |
| | | | | | | | | | |
| **Contingency (20%)** | $662,200 | $889,000 | $909,200 | $796,400 | $1,177,720 | $1,019,800 | $460,600 | $593,000 | $807,640 |
| **Planning and Design (15%)** | $496,650 | $666,750 | $681,900 | $597,300 | $883,290 | $764,850 | $345,450 | $444,750 | $605,730 |
| **Legal, Financial, Permitting** | $175,000 | $75,000 | $75,000 | $175,000 | $175,000 | $175,000 | $25,000 | $25,000 | $175,000 |
| **Debt Reserve** | $232,243 | $303,788 | $310,605 | $277,535 | $406,231 | $352,933 | $156,703 | $201,388 | $281,329 |
| **TWDB Loan Origination Fee** | $90,226 | $118,021 | $120,670 | $107,822 | $157,821 | $137,114 | $60,879 | $78,239 | $109,296 |
| **Aqua CIAC Costs[a]** | $0 | $0 | $0 | $0 | $0 | $0 | $589,355 | $600,000 | $239,931 |
| **Total Construction Cost** | **$4,967,319** | **$6,497,559** | **$6,643,375** | **$5,936,057** | **$8,688,661** | **$7,548,697** | **$3,940,987** | **$4,907,377** | **$6,257,125** |
| | | | | | | | | | |
| **Annual O&M of New System[b]** | **$172,075** | **$174,513** | **$171,938** | **$159,318** | **$180,892** | **$178,317** | **$23,120** | **$23,120** | **$172,075** |
| **Annual Aqua Charges[c]** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$219,548** | **$308,927** | **$89,379** |
| **Total Annual Charges** | **$172,075** | **$174,513** | **$171,938** | **$159,318** | **$180,892** | **$178,317** | **$242,668** | **$332,047** | **$261,455** |
| **NPV of Annualized Costs** | **$2,412,606** | **$2,446,789** | **$2,410,689** | **$2,233,748** | **$2,536,218** | **$2,500,119** | **$3,248,145** | **$4,438,520** | **$3,602,981** |
| | | | | | | | | | |
| **Total Net Present Value** | **$7,379,925** | **$8,944,348** | **$9,054,065** | **$8,169,805** | **$11,224,879** | **$10,048,816** | **$7,189,132** | **$9,345,896** | **$9,860,107** |
| **GPD Served by City** | **57,120** | **57,120** | **57,120** | **57,120** | **57,120** | **57,120** | **9,000** | **9,000** | **57,120** |
| **GPD Served by Aqua Texas** | **-** | **-** | **-** | **-** | **-** | **-** | **48,120** | **67,710** | **19,590** |
| **NPV Cost Per 1,000 gal** | **$129,200** | **$156,589** | **$158,510** | **$143,029** | **$196,514** | **$175,925** | **$125,860** | **$121,834** | **$128,537** |

**[a]Based on $2,572 per 210 gpd for CIAC fees - applied to all connections, capped at $600,000**

**[b]Note that annual O&M is expected to increaase 2% annually**

**[c]Based on $12.50 per 1,000 gal; Aqua charges are expected to remain constant for first 4 years, after which point they are expected to increase 2% annually**

**Residential contribution assumed to be 210 gpd.**

**NPV based on a discount rate of 5.5% and a 20 year period.**

DRAFT

## Reduced Flow Estimates, Annual Increase in O&M of 2%, Annual Increase in Aqua Fees of 4% until Matches Retail Rate (Aqua Fees firm for 4 years)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **Option Description** | **Expand Exist.Plant to 75,000 GPD. TPDES Permit + Spray Irrigation** | **Expand Exist. Plant to 75,000 GPD. Spray Irrigation** | **Expand Exist. Plant to 75,000 GPD. Subsurface Irrigation** | **Construct New Plant + TPDES Permit + Spray Irrigation** | **Construct New Plant + Spray Irrigation** | **Construct New Plant + Subsurface Irrigation** | **Serve Exist Wimberley CCN - Pump to Aqua - Maintain Exist. Package Plant** | **Serve Expanded CCN - Pump to Aqua - Maintain Exist. Package Plant** | **Serve Expanded CCN - Pump to Aqua and Expanded Plant** |
| **Collection System** | $2,259,000 | $2,259,000 | $2,259,000 | $2,169,000 | $2,607,000 | $2,607,000 | $2,009,000 | $2,671,000 | $2,986,200 |
| **Aqua Transmission Cost** | $0 | $0 | $0 | $0 | $0 | $0 | $250,000 | $250,000 | $0 |
| **Treatment Plant Cost** | $650,000 | $594,000 | $594,000 | $964,000 | $908,000 | $908,000 | $0 | $0 | $650,000 |
| **Irrigation Cost** | $38,000 | $548,000 | $1,514,000 | $45,000 | $432,000 | $861,000 | $0 | $0 | $38,000 |
| **Storage Cost** | $300,000 | $1,000,000 | $135,000 | $0 | $1,000,000 | $135,000 | $0 | $0 | $300,000 |
| **Discharge Cost** | $20,000 | $0 | $0 | $20,000 | $0 | $0 | $0 | $0 | $20,000 |
| **Land Acquisition Cost** | $44,000 | $44,000 | $44,000 | $784,000 | $941,600 | $588,000 | $44,000 | $44,000 | $44,000 |
| **Subtotal Construction Cost** | **$3,311,000** | **$4,445,000** | **$4,546,000** | **$3,982,000** | **$5,888,600** | **$5,099,000** | **$2,303,000** | **$2,965,000** | **$4,038,200** |
| | | | | | | | | | |
| **Contingency (20%)** | $662,200 | $889,000 | $909,200 | $796,400 | $1,177,720 | $1,019,800 | $460,600 | $593,000 | $807,640 |
| **Planning and Design (15%)** | $496,650 | $666,750 | $681,900 | $597,300 | $883,290 | $764,850 | $345,450 | $444,750 | $605,730 |
| **Legal, Financial, Permitting** | $175,000 | $75,000 | $75,000 | $175,000 | $175,000 | $175,000 | $25,000 | $25,000 | $175,000 |
| **Debt Reserve** | $232,243 | $303,788 | $310,605 | $277,535 | $406,231 | $352,933 | $156,703 | $201,388 | $281,329 |
| **TWDB Loan Origination Fee** | $90,226 | $118,021 | $120,670 | $107,822 | $157,821 | $137,114 | $60,879 | $78,239 | $109,296 |
| **Aqua CIAC Costs[a]** | $0 | $0 | $0 | $0 | $0 | $0 | $589,355 | $600,000 | $239,931 |
| **Total Construction Cost** | **$4,967,319** | **$6,497,559** | **$6,643,375** | **$5,936,057** | **$8,688,661** | **$7,548,697** | **$3,940,987** | **$4,907,377** | **$6,257,125** |
| | | | | | | | | | |
| **Annual O&M of New System[b]** | **$172,075** | **$174,513** | **$171,938** | **$159,318** | **$180,892** | **$178,317** | **$23,120** | **$23,120** | **$172,075** |
| **Annual Aqua Charges[c]** | **$0** | **$0** | **$0** | **$0** | **$0** | **$0** | **$219,548** | **$308,927** | **$89,379** |
| **Total Annual Charges** | **$172,075** | **$174,513** | **$171,938** | **$159,318** | **$180,892** | **$178,317** | **$242,668** | **$332,047** | **$261,455** |
| **NPV of Annualized Costs** | **$2,412,606** | **$2,446,789** | **$2,410,689** | **$2,233,748** | **$2,536,218** | **$2,500,119** | **$3,529,143** | **$4,833,915** | **$3,717,378** |
| | | | | | | | | | |
| **Total Net Present Value** | **$7,379,925** | **$8,944,348** | **$9,054,065** | **$8,169,805** | **$11,224,879** | **$10,048,816** | **$7,470,130** | **$9,741,291** | **$9,974,503** |
| **GPD Served by City** | **57,120** | **57,120** | **57,120** | **57,120** | **57,120** | **57,120** | **9,000** | **9,000** | **57,120** |
| **GPD Served by Aqua Texas** | **-** | **-** | **-** | **-** | **-** | **-** | **48,120** | **67,710** | **19,590** |
| **NPV Cost Per 1,000 gal** | **$129,200** | **$156,589** | **$158,510** | **$143,029** | **$196,514** | **$175,925** | **$130,780** | **$126,989** | **$130,029** |

**[a]Based on $2,572 per 210 gpd for CIAC fees - applied to all connections, capped at $600,000**

**[b]Note that annual O&M is expected to increaase 2% annually**

**[c]Based on $12.50 per 1,000 gal; Aqua charges are expected to remain constant for first 4 years, after which point they are expected to increase 4% annually until rate equals existing retail rate, then increase with existing retail rate by 2% annually**

**Residential contribution assumed to be 210 gpd.**

**NPV based on a discount rate of 5.5% and a 20 year period.**

**Table 8: Cost Estimates - Phasing**

**Phasing Option 1: Original Flow Estimates**

| | City Phase 1 | Aqua Phase 1 |
|---|---|---|
| Collection System | $893,000 | $643,000 |
| Aqua Transmission Cost | $0 | $250,000 |
| Treatment Plant Cost | $383,000 | $0 |
| Irrigation Cost | $24,000 | $0 |
| Storage Cost | $300,000 | $0 |
| Discharge Cost | $20,000 | $0 |
| Land Acquisition Cost | $0 | $0 |
| Subtotal Construction Cost | $1,620,000 | $893,000 |
| | | |
| Contingency (20%) | $324,000 | $178,600 |
| Planning and Design (15%) | $243,000 | $133,950 |
| Legal, Financial, Permitting | $175,000 | $25,000 |
| Debt Reserve | $37,100 | $16,878 |
| TWDB Loan Origination Fee | $14,413 | $6,557 |
| Aqua CIAC Costs[a] | $0 | $257,200 |
| Total Construction Cost | $2,413,513 | $1,511,184 |
| | | |
| Annual O&M of New System[b] | $117,304 | $4,730 |
| Annual Aqua Charges[c] | $0 | $95,813 |
| Total Annual Charges | $117,304 | $100,542 |
| NPV of Annualized Costs | $1,644,680 | $1,342,364 |
| | | |
| Total Net Present Value | $4,058,193 | $2,853,549 |
| LUEs Served | 100 | 70 |
| GPD Served[d] | 30,000 | 21,000 |
| GPD Served by City | 30,000 | 0 |
| GPD Served by Aqua Texas | 0 | 21,000 |
| NPV Cost Per LUE | $40,582 | $40,765 |
| NPV Cost Per 1,000 gal | $135,273 | $135,883 |

[a]Based on $2,572 per 210 gpd for CIAC fees
[b]Note that annual O&M is expected to increaase 2% annually
[c]Based on $12.50 per 1,000 gal;
Aqua charges firm for 4 years, increase 2% annually after that
[d]LUE = 300 gpd (residential and non-residential)
NPV based on a discount rate of 5.5% and a 20 year period.

**Phasing Option 2: Reduced Flow Estimates**

| | City Phase 1 | Aqua Phase 1 |
|---|---|---|
| Collection System | $893,000 | $643,000 |
| Aqua Transmission Cost | $0 | $250,000 |
| Treatment Plant Cost | $383,000 | $0 |
| Irrigation Cost | $24,000 | $0 |
| Storage Cost | $300,000 | $0 |
| Discharge Cost | $20,000 | $0 |
| Land Acquisition Cost | $0 | $0 |
| Subtotal Construction Cost | $1,620,000 | $893,000 |
| | | |
| Contingency (20%) | $324,000 | $178,600 |
| Planning and Design (15%) | $243,000 | $133,950 |
| Legal, Financial, Permitting | $175,000 | $25,000 |
| Debt Reserve | $37,100 | $16,878 |
| TWDB Loan Origination Fee | $14,413 | $6,557 |
| Aqua CIAC Costs[a] | $0 | $250,586 |
| Total Construction Cost | $2,413,513 | $1,504,571 |
| | | |
| Annual O&M of New System[b] | $117,304 | $4,730 |
| Annual Aqua Charges[c] | $0 | $93,349 |
| Total Annual Charges | $117,304 | $98,078 |
| NPV of Annualized Costs | $1,644,680 | $1,372,541 |
| | | |
| Total Net Present Value | $4,058,193 | $2,877,112 |
| LUEs Served | 100 | 70 |
| GPD Served[d] | 29,460 | 20,460 |
| GPD Served by City | 29,460 | 0 |
| GPD Served by Aqua Texas | 0 | 20,460 |
| NPV Cost Per LUE | $40,582 | $41,102 |
| NPV Cost Per 1,000 gal | $137,753 | $140,621 |

[a]Based on $2,572 per 210 gpd for CIAC fees
[b]Note that annual O&M is expected to increaase 2% annually
[c]Based on $12.50 per 1,000 gal;
Aqua charges firm for 4 years, increase 2% annually after that
[d]LUE = 300 gpd non-residential and 210 gpd residential
NPV based on a discount rate of 5.5% and a 20 year period.

**Phasing - Option 3: Reduced Flow Estimates / User Fee Rate Increase Adjustment**

| | City Phase 1 | Aqua Phase 1 |
|---|---|---|
| Collection System | $893,000 | $643,000 |
| Aqua Transmission Cost | $0 | $250,000 |
| Treatment Plant Cost | $383,000 | $0 |
| Irrigation Cost | $24,000 | $0 |
| Storage Cost | $300,000 | $0 |
| Discharge Cost | $20,000 | $0 |
| Land Acquisition Cost | $0 | $0 |
| Subtotal Construction Cost | $1,620,000 | $893,000 |
| | | |
| Contingency (20%) | $324,000 | $178,600 |
| Planning and Design (15%) | $243,000 | $133,950 |
| Legal, Financial, Permitting | $175,000 | $25,000 |
| Debt Reserve | $37,100 | $16,878 |
| TWDB Loan Origination Fee | $14,413 | $6,557 |
| Aqua CIAC Costs[a] | $0 | $250,586 |
| Total Construction Cost | $2,413,513 | $1,504,571 |
| | | |
| Annual O&M of New System[b] | $117,304 | $4,730 |
| Annual Aqua Charges[c] | $0 | $93,349 |
| Total Annual Charges | $117,304 | $98,078 |
| NPV of Annualized Costs | $1,644,680 | $1,429,028 |
| | | |
| Total Net Present Value | $4,058,193 | $2,933,599 |
| LUEs Served | 100 | 70 |
| GPD Served[d] | 29,460 | 20,460 |
| GPD Served by City | 29,460 | 0 |
| GPD Served by Aqua Texas | 0 | 20,460 |
| NPV Cost Per LUE | $40,582 | $41,909 |
| NPV Cost Per 1,000 gal | $137,753 | $143,382 |

[a]Based on $2,572 per 210 gpd for CIAC fees
[b]Note that annual O&M is expected to increaase 2% annually
[c]Based on $12.50 per 1,000 gal;
Aqua charges firm for 4 years, increase 4% to retail rate, then 2% annually
[d]LUE = 300 gpd non-residential and 210 gpd residential
NPV based on a discount rate of 5.5% and a 20 year period.

| Table 9: Non-Cost Factors Treatment System Evaluation Matrix | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | "Do Nothing" | Expand Exist.Plant to 75,000 GPD. TPDES Permit + Spray Irrigation | Expand Exist. Plant to 75,000 GPD. Spray Irrigation | Expand Exist. Plant to 75,000 GPD. Subsurface Irrigation | Construct New Plant + TPDES Permit + Spray Irrigation | Construct New Plant + Spray Irrigation | Construct New Plant + Subsurface Irrigation | Serve Exist Wimberley CCN - Pump to Aqua - Maintain Exist. Package Plant | Serve Expanded CCN - Pump to Aqua - Maintain Exist. Package Plant | Serve Expanded CCN - Pump to Aqua and Expanded Plant |
| **High Quality** | | | | | | | | | | |
| Ability to address current/future water quality concerns in creek | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 |
| Treatment level | 1 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4.5 |
| Discharge control | 2 | 3 | 4 | 5 | 3 | 4 | 5 | 4 | 4 | 3.5 |
| Potential for odor (regular system operation) | 2 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 3.5 |
| Potential for noise | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Aesthetic impact | 5 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 4 |
| | **2.7** | **4.0** | **3.5** | **4.0** | **4.0** | **3.7** | **4.0** | **3.8** | **4.0** | **4.1** |
| | | | | | | | | | | |
| **Reliable** | | | | | | | | | | |
| Proven treatment process | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Reliance on other entities to perform | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3.5 |
| Maintenance requirements | 3 | 4 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| | **2.7** | **4.0** | **3.7** | **4.0** | **4.0** | **3.7** | **4.0** | **3.7** | **3.7** | **3.8** |
| | | | | | | | | | | |
| **Efficient** | | | | | | | | | | |
| Time to implement | 5 | 3 | 4 | 4 | 2 | 2 | 2 | 5 | 5 | 3 |
| Maintenance of park irrigation | 1 | 5 | 5 | 5 | 5 | 4 | 4 | 3 | 3 | 5 |
| Need for additional land/user agreements | 5 | 4 | 4 | 4 | 3 | 2 | 2 | 4 | 4 | 4 |
| | **3.7** | **4.0** | **4.3** | **4.3** | **3.3** | **2.7** | **2.7** | **4.0** | **4.0** | **4.0** |
| | | | | | | | | | | |
| **TOTAL NON-MONETARY** | **9.0** | **12.0** | **11.5** | **12.3** | **11.3** | **10.0** | **10.7** | **11.5** | **11.7** | **11.9** |

Based on the cost comparisons and evaluation of non-cost factors, several alternatives were removed from further consideration during the stakeholder process.

Options 5 and 6 which involved locating the plant along Winter's Mill parkway and disposing of effluent by spray or subsurface irrigation were the two most costly options. Although these options were attractive to some stakeholders due to the fact they did not involve a discharge, the stakeholders generally agreed that such a project would be cost-prohibitive for the City.

Although Option 4 was cost-competitive among the nine alternatives, the proposed location of the plant caused concern with stakeholders. The feasibility of securing this parcel was questioned by several, particularly those familiar with the real estate market in Wimberley.

The remaining alternatives were discussed at length with some stakeholders expressing preference for a plant located on Blue Hole Park and some with the opposite view. Whether a plant on Blue Hole Park is a benefit or detriment is a matter of opinion and not a question answered by engineering analysis. However, the use of treated effluent from the plant for irrigation of park land was identified in the Blue Hole Park Master Plan and would relieve demand on groundwater. Conversely, the concern of odors from the plant is also legitimate. This issue can be addressed in design by incorporating odor control treatment at the plant. Cost estimates prepared for this alternative included odor control.

In addition to the concern over the plant location, the stakeholders acknowledged the cost implications of going with a no-discharge facility as illustrated in the estimates for options 2 and 3. They also acknowledge the benefit in serving both sides of Cypress Creek as described by options 8 and 9. As such, the potential alternatives that were ultimately debated further included options 1, 7, 8 and 9.

An analysis of the phased approach to options 1 and 7 showed an increase in cost per thousand gallons of approximately 10 percent. The phased approach was also discussed in further detail in the stakeholder's conversation.

## 6.0 RECOMMENDATIONS

The current method of wastewater disposal in Wimberley is not sustainable both from an economic and environmental standpoint. Continued use of septic systems in areas which are not conducive to their use could impact the quality of ground and surface waters and further impact the operation of businesses that are vital to the economy of Wimberley.

It is therefore recommended that the City of Wimberley move forward with detailed design for a conventional wastewater collection system to serve the central area and plan to treat wastewater at an expanded facility at Blue Hole Regional Park. The plant should be designed to meet reclaimed water standards so that effluent can be used to irrigate areas within the park. A TPDES permit and 210 authorization will also be required under this recommended option. The collection system should be limited to Wimberley's CCN initially, but potentially expanded to serve areas on the other side of Cypress Creek upon completion of the first phase of the project.

As shown in the table of cost estimates, the cost of treating wastewater at an expanded plant or pumping wastewater to Aqua Texas for treatment is very similar. However, the non-cost evaluation revealed several factors which illustrate the benefits to the City in maintaining control of the treatment process.

Representatives from Aqua Texas have indicated that their treatment level will not be increased as a result of an agreement with Wimberley to handle additional waste. In this scenario, the quality of effluent is not something over which the City would have any influence. Conversely, expanding the existing package plant and upgrading the process units to achieve the effluent limits required under a reuse permit provides a higher degree of treatment. Effluent applied to land under this scenario would be of higher quality than that which is currently applied to the Woodcreek golf course by Aqua. The option of higher quality effluent is considered to be in line with Wimberley's concern for the environment.

In addition to maintaining control of the treatment quality to a greater degree by operating a plant on Blue Hole Park, the City of Wimberley would also have more control of system operation and maintenance. In the event the City is not satisfied with the performance of the entity contracted to operate the system, it would have the option of terminating the contract. In contrast, the City would have no recourse over the maintenance and operating practices of Aqua Texas' system. Since system maintenance is funded by users, there is benefit to City control of this aspect of wastewater collection and treatment.

Finally, the user rates under the Aqua option included in the cost tables are estimated beyond 2018. As discussed, Aqua has committed to fixing these rates through that year, but was not able to provide estimates for the rate of increase past 2018. Having said that, it is also important to point out that the rate of increase in operations and maintenance costs is also a prediction. However, as described previously, the City would have more control over these costs by managing a contract with an operator directly than they would in an agreement with Aqua.

**APPENDIX 1**

# Wimberley Wastewater Project: Preliminary Engineering Report

## Stakeholder Process

### INTRODUCTION

The Wimberley City Council appointed a Central Wimberley Stakeholder Committee on Sept. 13, 2013, to provide community input on a possible wastewater treatment system to the city and the engineering firm preparing a preliminary engineering report on the project.

A committee of seven stakeholders was appointed to identify concerns, address those concerns and make recommendations about a wastewater treatment system. The committee was given nine weeks to carry out its charge through a facilitated process organized by the consultant team of Alan Plummer Associates Inc., Laura Raun Public Relations and Raftelis Financial Consultants.

### STAKEHOLDER COMMITTEE

Stakeholder Committee members were appointed to represent individual and group interests, as listed below, in alphabetical order:

- Grady Burnette
- John David Carson, Wimberley Central Improvement Area
- Chris Nichols
- Gail Pigg, _________________
- Mike Stevens
- Randy Uselton, Wimberley Merchants Association
- Sheila Wollam, downstream property owners

### CHARGE FROM CITY COUNCIL

The City Council gave the following charge to the Stakeholder Committee on Sept. 13.

*The mission of the Central Wimberley Wastewater Stakeholder Committee is to identify and recommend a high quality, efficient, affordable and reliable wastewater system to serve central Wimberley that values local environmental and community interests. Stakeholder committee members shall work directly with the City's wastewater project engineer to:*

- *Identify community concerns regarding the wastewater project*
- *Examine alternatives approaches to wastewater collection and treatment and effluent disposal to address those concerns*
- *Analyze project costs and alternatives for project funding*

*Concerns and solutions identified in the stakeholder process shall be incorporated into the Preliminary Feasibility Report on the wastewater project and the Report's final recommendation.*

*It is important that stakeholders examine their positions with a "fresh eye" and the positions of others with an "open–mind" with a goal of discovering common values among differing views. The Committee shall complete its work no later than Friday, November 22, 2013.*

**STAKEHOLDER PROCESS**

The facilitation process was designed by Laura Raun Public Relations and the APAI team to enable stakeholders to examine their positions with a fresh eye so they could reach agreement through consensus on a set of recommendations related to a wastewater treatment system.

Laura Raun served as facilitator to guide discussion among the stakeholders toward a goal of consensus on recommendations for a successful treatment system. Discussions were informed by briefings and presentations from APAI, Raftelis and Aqua Texas throughout the eight meetings.

The facilitation process allowed for continuous discussion to identify underlying values and interests beneath the concerns expressed by Stakeholders.

- Goals of individual Members were explored
- Consequences and impacts of various goals were discussed
- Options and alternatives were identified

Various ranking methods were used to enable Stakeholders to:

- Prioritize options
- Assess how various options met the concerns expressed by Stakeholders
- Assess how options met the criteria provided by City Council

**Ground rules** were established and agreed upon by stakeholders to address procedures, communications and the definition of consensus.

**Meeting agendas** outlined the objectives of each meetings and enabled Stakeholders to see the progression of the facilitation process.

**Meeting notes** highlighted main ideas, stakeholder comments, critical facts, options and recommendations. **Action items** enabled Stakeholders to get answers and followup information to requests made during prior meetings.

**Informational handouts** were provided at all meetings and included aerial maps outlining wastewater treatment options; matrix analyses of system options, concerns and costs; reference materials on wastewater collection, treatment, disposal and finances.

A **situational analysis** was agreed upon by stakeholders to outline the reasoning and purpose behind recommendations for a wastewater system.

**Stakeholder concerns** were identified, condensed and then prioritized through a "dot voting" method. Stakeholders supported a concern by placing a dot beside it, creating a ranking system to help reach consensus.

## SCHEDULE OF STAKEHOLDER MEETINGS

A series of 8 meetings was held over 9 weeks, with each meeting lasting 2-3 hours.

Sept. 24

- Purpose of Stakeholder Process was explained
  - Presented the charge from City Council
  - Described the final deliverable
  - Led a discussion of ground rules for the Stakeholder process, which were accepted by the Committee
    - Communications
    - Consensus definition
    - Roles of participants
  - Explained facilitation process, provided overview of meetings

- Situational analysis and overview of wastewater project were presented

Oct. 1

- Revised Situational Analysis was discussed and accepted
- Community concerns were identified through discussion of relevant feelings, emotions and perceptions about issues related to a new wastewater treatment system.

Oct. 8

- Condensed list of community concerns was prioritized through “Dot” voting
- Briefing about collection system options was presented

Oct. 15

- Collection system options were analyzed by Stakeholder concerns in a matrix and discussed
- Wastewater treatment and disposal briefing was given

Oct. 22

- Collection system cost estimates were presented and discussed
- Collection system options were analyzed by mission statement criteria in a table
- Aqua Texas President & CEO Robert Laughman
- Wastewater system financials briefing was provided

Nov. 5

- Collection system recommendation was agreed
- Treatment/disposal system options were analyzed against Stakeholder concerns through a matrix and discussed
- Wastewater system cost estimates were presented and discuss
- Invitation to propose “Other recommendations” that don’t fall into existing categories

Nov. 12

- Briefing on wastewater system funding options was made and discussed

Nov. 19

- Stakeholder recommendations for a wastewater treatment system options were discussed

Nov. 20

- Stakeholder recommendations for a wastewater treatment system options were discussed and agreed

**RECOMMENDATIONS FROM STAKEHOLDERS**

*COLLECTION SYSTEM:*
The Wimberley Wastewater System Stakeholder Committee recommends that the City of Wimberley construct a conventional collection system because it is the most efficient, most reliable, highest quality and most affordable option.

*TREATMENT AND DISPOSAL SYSTEM:*

The Central Wimberley Wastewater Stakeholder Committee makes the following recommendations based upon objectives designed to take into consideration the following:

- Potential financial burden on the owners within Central Wimberley
    - The area recognized as Central Wimberley is generally described as follows: Beginning at the confluence of the Blanco River and Cypress Creek, then bounded to the south by the Blanco River to Ranch Road 12; then following Deer Creek as it runs parallel to the extension of Ranch Road 3237 to a point where Deer Creek intersects with RR 3237 (the Old Kyle Highway) as it turns west; then continuing on the north boundary of RR 3237 taking in Deer Creek Nursing Home and all of the Blue Hole Regional Park; from there following the most northerly boundary of the Blue Hole Regional Park to Cypress Creek; then following Cypress Creek in a southerly direction as it meanders through the Blue Hole Regional Park, and the Wimberley downtown square continuing on until it connects to the Blanco River, the Point of Beginning. The area comprises approximately 275 acres of land, of which 125 acres is made up of Blue Hole Regional Park, leaving a balance of approximately 150 acres comprising the business and residential portion of this area.
- The fact that there already exists a permitted wastewater treatment facility available for use (Aqua Texas), with available property for effluent disposal
- The desire to have a treatment plant in Blue Hole for watering purposes, as specified in the Blue Hole Master Plan
- Separation of the need for collection system from the location of treatment plant
- The need to show unity from the Stakeholder Committee

- A fall back alternative in the event that Objective II is not achievable
- The quality of treated effluent should be at the highest level so that it is beneficial to the community from an environmental standpoint
- The treatment plant would be under the control and authority of the City
- The City as a whole should have an interest in protecting our waterways
- The City can incorporate its wastewater system effectively into a master plan and provide for alternatives to handling future growth
- Establish a means for reuse of effluent along Winter's Mill Parkway

<u>Objective I: Collection System</u>

- A wastewater collection system should be constructed within Central Wimberley
- The cost of the collection system should be capped at an amount that ensures the cost does not exceed the cost estimates (including the projected contingency amount) of Alan Plummer Associates, Inc. by 10%
- Construction of the collection system would not begin until Objective II has been accomplished or is underway
- The capital cost of the collection system would be financed by a loan with the Texas Water Development Board and paid through assessments, impact fees or rates charged to the owners of property within Central Wimberley
- The design of the collection system should be a gravity flow system and capable of sending effluent either to Aqua Texas or a city plant

<u>Objective II – Treatment Plant</u>

- The city should proceed with the design and construction of a 5-5-2-1 treatment plant with an approved discharge permit (not to exceed 75,000 gallons per day), including odor control, a reuse system, and 500,000 gallons of storage within Blue Hole to minimize the chances of discharge
- Support for the Blue Hole Treatment Plant should come from the community, therefore the cost of the treatment plant and the associated infrastructure, and discharge permit should be paid by ad valorem taxes only if funding cannot be obtained by the city through sales tax revenue, donations, and/or grants
- The Blue Hole Treatment Plant should be permitted at 75,000 gallons per day with ultimate capacity not to exceed 100,000 gallons per day because of the sensitivity of park area where the plant is located
- All fees for securing any permits, including the discharge permit, and any legal and other fees associated with obtaining the permits should be paid for by city funds, not the owners within Central Wimberley

<u>Oversight</u>

- Collection: An oversight committee comprised of owners of property within Central Wimberley would be appointed by the City Council to work directly with the city administration in resolving issues related to the construction, including the design phase, bidding phase, construction phase of the collection system, vetting the costs and coordinating with the administration in terms of the connection fees, impact fees, and rates

- Treatment: An oversight committee comprised of members within the City of Wimberley should be appointed by the City Council to oversee and work with the administration in the design, planning and funding for the Blue Hole Treatment Plant as well as coordinate with the collection system oversight committee representing the owners within Central Wimberley in establishing connection fees, impact fees, and rates

<u>Alternative Position in the Event Objective II is Not Accomplished</u>

- In the event the construction costs for city treatment and reuse systems exceed the engineer's estimate (including contingency, relocation of plant within Blue Hole, and Winter's Mill reuse line) by more than 10%, if the City's expanded 5-5-2-1 plant permit is denied, or the City fails to commit the funds necessary to construct the treatment plant, the City shall negotiate with Aqua Texas to send the planned capacity to Aqua for wholesale treatment
- The oversight committee of property owners within Central Wimberley would assist the city administration in negotiating the best available contract with Aqua Texas and determine the feasibility of a complete or phased in approach

<u>System Recommendation</u>

- Option 1 from APAI (expand city's Blue Hole wastewater treatment plant capacity to 75,000 gallons per day; acquire Texas Pollutant Discharge Elimination System Permit, and allow for disposal of effluent through spray irrigation) with two modifications:
  - Extend a reuse line to Winter's Mill Parkway unless an agreement with appropriate agencies cannot be reached prior to construction
  - Relocate the Blue Hole Plant to the location outlined in the Blue Hole Master Plan
- Amend City of Wimberley Code of Ordinances to:
  - Limit any future expansion of Blue Hole plant to a <u>maximum</u> of 100,000 gallons per day
  - Require any expansion of Blue Hole plant to be accompanied by a pro rata increase in reuse capacity (drip or spray)
  - Require a two month notice period prior to <u>any</u> future change in capacity of Blue Hole plant
  - Notify citizens on the city website of any discharge event
  - Prohibit the sale of detergents exceeding 0.5% phosphorous to reduce nutrient load in waste stream
- Allow owners with a recently permitted system to defer hook up for up to seven (7) years for an engineered system and five (5) years for a conventional system from date of installation. Would avoid rates and impact fees prior to that time, but still pay assessment and/or tax.

- As a second phase to this project, the City should initiate a process to expand Aqua Texas' service area to currently un-served areas on the north side of Cypress Creek. This process shall not begin in any capacity until Option I of the project is finalized, confirmed, and under construction.

Funding Recommendation

- **Rates:** (A) Allocate partial capital costs to rates to incentivize water saving / help reduce impact fees; (B) Provide a lifeline rate to homesteads with financial need
- **Impact Fees:** Keep (relatively) low and/or offer payment plan for up to 5 years
- **Property Tax:** The cost of the treatment plant and the associated infrastructure, and discharge permit should be paid by ad valorem taxes only if funding cannot be obtained by the City through sales tax revenue, donations, and/or grants
- **Assessment within Central Wimberley Service Area:** As necessary to supplement rates and impact fees
- **Decommissioning and Service Line Expenses:** Roll decommissioning of septic tanks and installation of services lines into TWDB loan (note: recommend a max. amount of public funds per LUE). Seek grants, if available.

Ancillary Recommendations

- Initiate a water quality outreach program to: (A) inform citizens of Wimberley's existing water quality ordinances and associated buffer zones, open space, and natural area protections such as the unanimously adopted Water Quality Protection Ordinance (2011-005); (B) engage citizen input on needed revisions or updates to said ordinances and policies; and (C) educate the public as to best practices (from development to household habits) for protection of the water quality of the Wimberley Valley
- The City should identify and certify the number of on-site sewage facilities operated along both sides of Cypress Creek and the Blanco River within Wimberley. An effort should be made to partner with Woodcreek to identify all on-site sewage facilities located along all waterways to identify potential problem areas. Thereafter, the City should implement and conduct periodic inspections and recertification of such systems every 3 to 5 years. Additionally by identifying inadequate systems, the City would be able to begin to locate areas of multiple failed systems. Funding source will need to be identified.
- Enhance water quality testing program for pollutant loading (e.g., e. coli, nitrates, phosphorus) such that progress may be monitored, and additional areas of critical need may be identified. Prior to plant start-up, establish a base line of quality conditions including downstream segments potentially impacted by effluent discharge. Funding source will need to be identified.
- Inform the Downtown Master Planning process with the maximum capacity limitations of the City plant sited on Blue Hole as it relates to growth within the Central Wimberley service area and develop procedures to limit speculation on LUEs

- Educate citizens, particularly those within the service area, of the maximum capacity limitations of the Blue Hole Plant and that the cost of securing capacity for wastewater treatment today is not guaranteed to be the same as it may be in the future.
- Encourage the City Council and Planning and Zoning to maintain existing policies that preserve the village character of Central Wimberley such as: shallow setbacks, concealed surface parking, prohibited drive-thrus, etc. while promoting increased pedestrian connectivity
- Pursue additional grant funding opportunities for an expanded reuse program, including possible pipes into Central Wimberley area, etc.
- Animal waste deposited in or near waterways can contribute significant pollutant loading to streams and creeks. The city should examine the impact that bats under the bridge, deer, turkey, ducks, and livestock are having on the levels of e-coli in Cypress Creek.
- The City should provide accessible recycling centers or drop off locations for the disposal of hazardous household items, including paint and other hazardous materials.

<u>Rationale for System and Funding Recommendation</u>

- Acknowledges the need to address both sides of the creek without delaying solution for the area of most critical need
- City-controlled system (and pipes in Phase 2) gives citizens direct recourse for service, rate, or operational issues
- Phase 2 would develop a partnership with Aqua Texas to bring north side of Wimberley onto sanitary sewer
- Ensures the highest quality effluent is produced in some quantity
- Enables Wimberley to take a leadership role in reuse
- Positions Wimberley to pursue additional reuse applications in the future (e.g., Winters Mill)
- Protects limited water supplies by reducing aquifer draw of Blue Hole
- Consistent with Comprehensive Plan and the Blue Hole Master Plan
- Allows for limited future system growth, without changing the objective of maximum reuse, minimum discharge, and high quality effluent
- Achievable within existing funding mechanisms; efficient use of funds per LUE | 1000 gallons
- Reduce the upfront burden on users hooking onto the system
- Engages community in the beginnings of a comprehensive solution to protect water quality
- Encourages good planning practices for the City

- Establishes proactive measures to educate the public and help monitor the progress of the City's efforts
- This proposal meets the parameters of the mission statement: "*high quality, efficient, affordable, and reliable wastewater system to serve central Wimberley that values local environmental and community interests.*"

**CONCLUSION**

The Stakeholder Committee identified and recommended a high quality, efficient, affordable and reliable wastewater system to serve central Wimberley while valuing local environmental and community interests. During the facilitation process leading up to the recommendations, stakeholders accomplished the following:

- Identified community concerns regarding the wastewater project
- Examined alternative approaches to wastewater collection and treatment and effluent disposal to address those concerns
- Analyzed project costs and alternatives for project funding

**APPENDIX 2**

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December 4, 2013

Steve Coonan
Alan Plummer Associates, Inc.
1320 S. University Dr.
Suite 300
Fort Worth, TX 76107

Dear Mr. Coonan:

Raftelis Financial Consultants, Inc. ("RFC") is pleased to submit this letter report presenting the results of our Financial Feasibility Study for the wastewater system for the City of Wimberley, Texas (City). The purpose of this letter report is to document our approach, information presented and our analysis for presenting funding options to the Citizen Stakeholder Committee.

The letter report is organized into the following four sections describing the approach.

1. Overview;
2. Conceptual Financial Feasibility of a Wastewater System;
3. Analysis; and
4. Recommendation of the Citizen Stakeholder Committee.

In addition, relevant presentations and schedules from the model are attached to this letter report to provide additional support and documentation of our analysis.

## Section 1. Overview

Raftelis Financial Consultants, Inc. (RFC) was engaged by Alan Plummer Associates, Inc. (APAI) to conduct a financial feasibility analysis for the design, construction, and operation of a wastewater system for the City of Wimberley, Texas (City). This engagement was carried out during a nine week period during which a Citizen Stakeholder Committee (CSC), appointed by City Council, reviewed, deliberated, and recommended an approach to address wastewater issues within proposed wastewater service area in central Wimberley. Specifically, RFC, as a subcontractor to APAI, presented various funding options to the CSC, helped educate the committee on the implications and consequences of the options, and conducted sample analyses to provide resulting rates and fees based on engineering scenarios.

### Objective

It is very important to note that the objective during this phase of RFC's engagement was not to determine the rates and fees that will eventually need to be implemented; but was to facilitate the development of a recommendation by the CSC for the appropriate approach to be used to set the rates and fees that will be implemented. Costs for the various wastewater system collection, treatment, and operation approaches were provided by APAI and were used as the foundation of the financial feasibility analyses, but those costs were estimates at the time the analysis was conducted. New rates and fees will be set at the appropriate time, when more accurate cost projections are available. The rates and fees discussed in this Section are only example rates and fees based on preliminary estimates, and were developed to provide a reasonable basis for comparing and evaluating the advantages and disadvantages of the different funding alternatives. The cost basis and method of revenue recovery from certain rates and fees were the essential items deliberated and ultimately recommended by the Citizen Stakeholder Committee.

## Section 2. Conceptual Financial Feasibility of a Wastewater System

On October 22, 2013, RFC conducted a conceptual workshop with the Citizen Stakeholder Committee to educate the committee on the financial concerns of owning a wastewater utility. RFC's presentation is included as Appendix A. The costs and revenue requirements associated with designing, constructing, and operating an expanded system, as well as the various revenue recovery methods or funding options, were discussed during the workshop and are presented below.

### Revenue Requirements

The revenue requirements for the project include costs associated with the design, construction and operation of the collection system and treatment facility. Additionally, the project costs include miscellaneous costs, such as sludge disposal and contingencies. Regarding the design and construction costs, the City is planning to use financing through the Texas Water Development Board (TWDB), and therefore, the majority of the costs for the design and construction phase of the project will be in the form of annual debt service payments to the TWDB. The TWDB assists many utilities, large and small, with the financing of water and wastewater infrastructure. Operations costs will be developed based on the estimated power, chemicals, and labor for operating the collection system and treatment facility. APAI has developed preliminary estimates for several alternatives considered by the Citizen Stakeholder Committee.

### Revenue Recovery Options

In general, there are four revenue recovery options that were presented for consideration by the CSC. The funding options are introduced and described below. Additionally, as part of this stakeholder process, RFC provided Concern Matrices that highlighted the advantages and disadvantages of each option. The Funding Concern Matrix is attached as Appendix B.

**Ad Valorem Tax** – An ad valorem tax is a tax based on the value of real estate or personal property. This tax is typically assessed as a rate per $100 of property value and would be assessed to all property within the City's corporate boundaries. As a result, properties located both inside and outside of the proposed wastewater service area would be assessed a property tax to fund the wastewater system. Those properties outside of the service area, but within City limits, would pay the tax but not receive any direct benefit. The rationale for assessing an ad valorem tax would be that properties outside of the service area would be receiving indirect benefit. This benefit is based on the assumption that the Central Wimberley commercial district will not be able to sustain current business or growth without the implementation of a wastewater collection system. The indirect benefit would be the result of a successful Central Wimberley commercial district that generates significant sales tax revenue, which is, in turn, used to fund the majority of City services.

**PID Assessment** – Under this option, the wastewater system service area would be established as a public improvement district (PID) and a separate PID assessment would be charged to all property within the PID. The assessment would be modeled after an ad valorem tax, which is based on the value of real estate or personal property, and the PID assessment would only be levied against the property within the PID. All properties paying the PID assessment would have the ability to connect to the wastewater system and therefore, would benefit directly as a result of paying the assessment.

**Capital Recovery Fees** – In general, a capital recovery fee is a one-time capital charge assessed against new development as a way to offset or recover a proportional share of the costs of capital facilities constructed or to be constructed for its use. In this case, the capital recovery fee would be assessed to recover a portion of the collection system costs, and would be charged to customers connecting to the system based on their proportional use of the proposed system, typically determined by level of projected flow. Capital recovery fees are also referred to as an Impact Fee (when implemented by a City) or a Contribution In Aid of Construction (CIAC) when assessed by Aqua Texas. This is assessed as an upfront, one-time fee, although the City may decide to allow customers to pay over a period of several years to lessen the financial burden. If an approach that includes sending wastewater to Aqua Texas for treatment is selected, it is likely Aqua Texas will expect their CIAC fees to be paid in one lump sum when assessed.

**User Rates** – User rates will be assessed to customers on a monthly or quarterly basis based on their proportional use of the system and proportional treatment costs. The user rates will likely be charged as a rate per thousand gallons based on water flow, a rate per living unit equivalent (LUE), or a combination of the two. User rates will be designed to recover costs associated with the operation of the collection and treatment system, and may also include a portion of capital costs associated with the design and construction of the system.

## Section 3. Analysis

APAI proposed several wastewater treatment alternatives for the CSC to consider. As part of this process, APAI developed preliminary cost estimates for each of the alternatives. Alternatives 1 and 7 were selected by APAI to use as the basis for RFC's modeling and analysis. Alternative 1 corresponds to a City owned system with an expanded plant to accommodate 75,000 gallons of wastewater per day. Alternative 7 corresponds to an agreement with Aqua Texas to treat the wastewater flow of Central Wimberley (the service area). These two alternatives are described in greater detail in Section X. This section describes the modeling methodology and results.

## Assumptions

Several assumptions were used in the modeling of the alternatives and development of example rates and fees. The following list highlights the major assumptions used in the analysis.

- Financing – Based on conversations with TWDB staff, debt service costs are based on loans issued with a term of 20 years at 3.0% interest rate, and include issuance costs equal to 1.85% of total capital costs.
- Inflation Factors – Operations and maintenance costs were escalated at 2.0% per year based on an inflation factor supplied by APAI.
- City Contribution – The City has pledged $100,000 per year of General Fund excess revenue for the wastewater project. For this analysis, the pledge was used to offset associated capital costs.
- Customer Units – APAI supplied the applicable living unit equivalents (LUEs) for each alternative.
- Property Value – For the ad valorem tax calculation, the total taxable property value within City limits was referenced as the value used in the most recent planning and design (PAD) loan by the City through the TWDB. The property value of the service area for PID assessment calculation was referenced in the 2012 WRM Financial Feasibility Final Report.
- All other miscellaneous variables were supplied by APAI.

## Example Scenarios

Using the assumptions above and the detail provided by APAI for each alternative, RFC modeled Alternatives 1 and 7 and developed estimated rates and fees for consideration by the CSC. It is important to note again that the goal was not to determine what the rates and fees should be, but instead, the committee was asked to consider the advantages and disadvantages of raising or lowering certain rates and fees, and the impact or consequences on the other fees. Therefore, to facilitate this discussion, RFC presented several funding scenarios for each alternative. These funding scenarios incorporated various modifications of the User Fees or Capital Recovery Fees, which impacted the Ad Valorem Tax rates and Local (PID) Assessment rates.

Exhibit 1 is an excerpt from Appendix C that shows the analysis and what was presented to the Citizen Stakeholder Committee at the meeting on November 12, 2013. In addition to rates and fees, the analysis shows the expected impact on one representative or sample residential customer, and one commercial customer to better understand what the rates and fees would mean to a property owner. For this example, the User Fee was developed solely based on the City's expected O&M costs and number of LUEs in Scenario 1, and is held constant from Scenario 1 to Scenario 2. However, the one-time, upfront Capital Recovery Fee assessed to every LUE is doubled from Scenario 1 to Scenario 2. By recovering a greater level of revenue from the Capital Recovery Fee, the Ad Valorem Tax or Local Assessment Rates do not need to recover the same level of revenue, and that impact, or reduction, can be seen under Scenario 2. It is important to point out that the analysis presented to the CSC showed the full level of ad valorem tax rate and full level of the local assessment rate as if each were treated as the sole funding source. Ultimately, the Citizen Stakeholder Committee is recommending a combination of the two funding sources, but for this exercise, RFC presented the rate at which the ad valorem tax should be set or the rate at which the local assessment should be set. The remaining funding scenarios for alternatives 1 and 7 presented to the CSC are included in Appendix C.

Exhibit 1. Example funding scenarios for Alternative 1.

| **Example Funding Scenarios*** Alternative 1 | | User Fees Per 1,000 gal | "AND" | Capital Recovery Fee Fee per LUE | "AND" | Ad Valorem Tax Rate per $100 | "OR" | Local Assessment Rate per $100 |
|---|---|---|---|---|---|---|---|---|
| **Scenario 1** | | | | | | | | |
| Fees and Charges | | $8.09 | | $2,550.00 | | $0.0400 | | $0.6069 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $2,550.00 | | $79.93 | | $1,213.75 |
| LUE's | 1 | 9,000 gal/mo. | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $7,650.01 | | $139.88 | | $2,124.07 |
| LUE's | 3 | 27,000 gal/mo. | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 2** | | | | | | | | |
| Fees and Charges | | $8.09 | | $5,100.01 | | $0.0355 | | $0.5394 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $5,100.01 | | $71.05 | | $1,078.89 |
| LUE's | 1 | 9,000 gal/mo. | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $15,300.02 | | $124.33 | | $1,888.06 |
| LUE's | 3 | 27,000 gal/mo. | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |

### Revised Scenarios

The same exercise as above was repeated after the alternatives were slightly revised following the November 12th CSC meeting. RFC used the same modeling approach, and modified only the assumptions and preliminary cost estimates developed by APAI. The resulting funding scenarios are included in Appendix D and were provided to the CSC on November 19th, 2013. Appendix D includes an additional schedule that presents another alternative that incorporates a phase-in approach to Alternative 7. In the schedule, the revised Alternative 7 is compared to Alternative 7 Phase-In. This also was provided to the CSC during the November 19th meeting for their consideration.

## Section 4. Recommendation of Citizen Stakeholder Committee

After review of the funding scenario exercises and deliberation of the inherent advantages and disadvantages, the Citizen Stakeholder Committee reached consensus on the following recommendations regarding the implementation of the various funding options and overall revenue recovery approach, which were included as part of the Recommendations to Wimberley City Council drafted on November 20th, 2013.

### Capital Cost Recovery

- The capital cost of the collection system would be financed by a loan with the Texas Water Development Board and paid through assessments, impact fees or rates charged to the owners of property within Central Wimberley [Service Area].

- Support for the Blue Hole Treatment Plant should come from the community, therefore the cost of the treatment plant and the associated infrastructure, and discharge permit should be paid by ad valorem taxes only if funding cannot be obtained by the city through sales tax revenue, donations, and/or grants

## Funding Recommendation

- Rates: (A) Allocate partial capital costs to rates to incentivize water saving / help reduce impact fees; (B) Provide a lifeline rate to homesteads with financial need
- Impact Fees: Keep (relatively) low and/or offer payment plan for up to 5 years
- Property Tax: The cost of the treatment plant and the associated infrastructure, and discharge permit should be paid by ad valorem taxes only if funding cannot be obtained by the City through sales tax revenue, donations, and/or grants
- Assessment within Central Wimberley Service Area: As necessary to supplement rates and impact fees
- Decommissioning and Service Line Expenses: Roll decommissioning of septic tanks and installation of services lines into TWDB loan (note: recommend a max. amount of public funds per LUE). Seek grants, if available.

We appreciate the opportunity to provide service for Alan Plummer Associates and to the City of Wimberley. If you have any questions, comments, or concerns, please do not hesitate to contact me at (512) 687-3409.

Best Regards,

Rocky Craley
RAFTELIS FINANCIAL CONSULTANTS, INC.

Attachment A:

*Financial Feasibility*
Conceptual Workshop
Presented on October 22, 2013

# CITY OF WIMBERLEY

## FINANCIAL FEASIBILITY

**Conceptual Workshop**
**October 22, 2013**

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# WORKSHOP OBJECTIVES

1. Understanding all revenue requirements involved
2. Education of revenue recovery methods
3. Acknowledging other key considerations
4. Discussion of preferred revenue recovery alternative(s)

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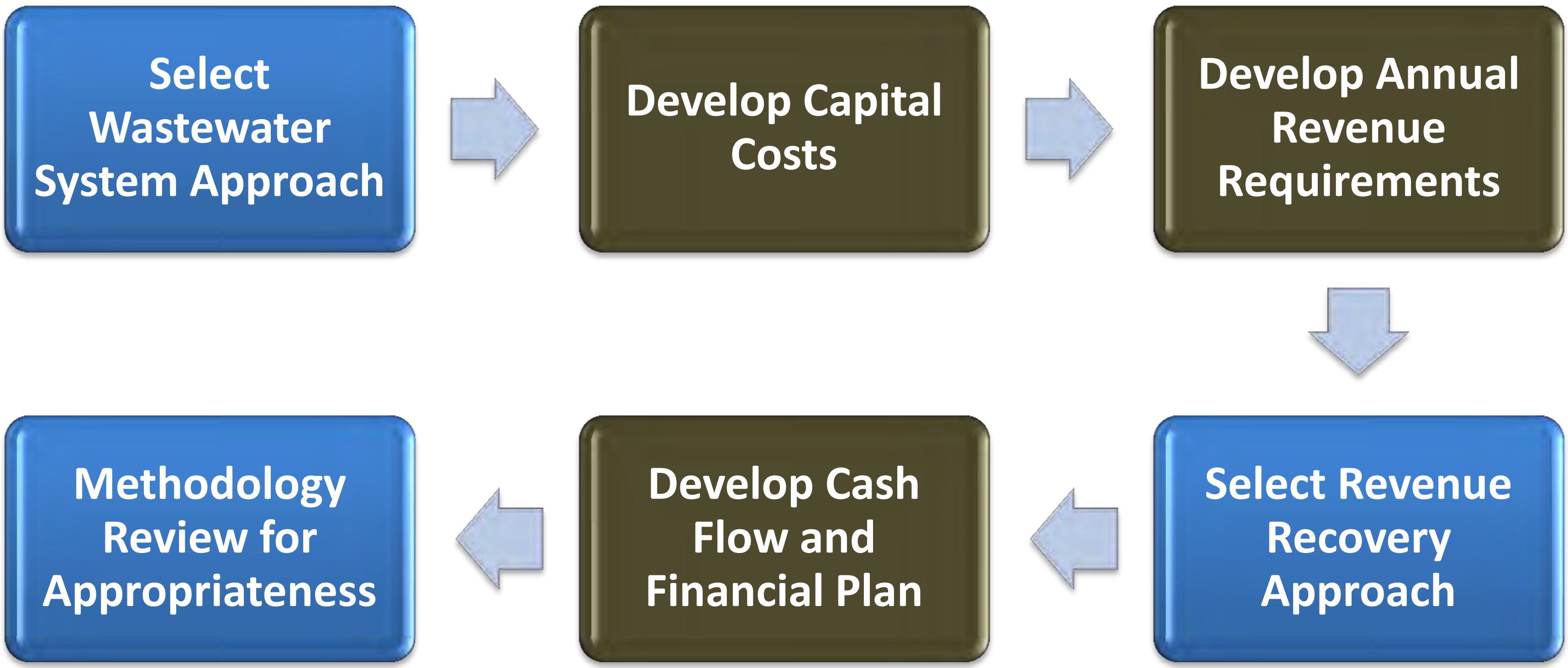
# OVERVIEW



Select Wastewater System Approach
Develop Capital Costs
Develop Annual Revenue Requirements
Select Revenue Recovery Approach
Develop Cash Flow and Financial Plan
Methodology Review for Appropriateness

# CAPITAL COSTS

## Selection of System

- APAI will develop the capital costs as applicable
  - Design
  - Treatment Facility
  - Collection System
  - Disposal
  - Contingencies
  - Other Project Costs

## Financing through TWDB

- Repayment Structure
- Term
- Interest Rate
- Origination Costs
- Potential requirements depending on type
  - Coverage
  - Reserve Fund

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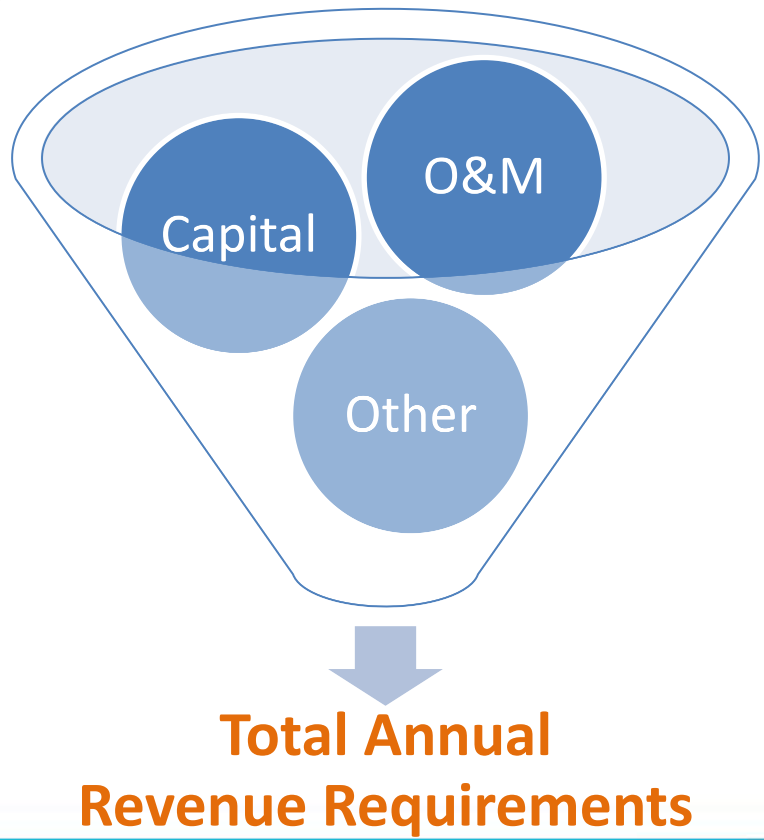
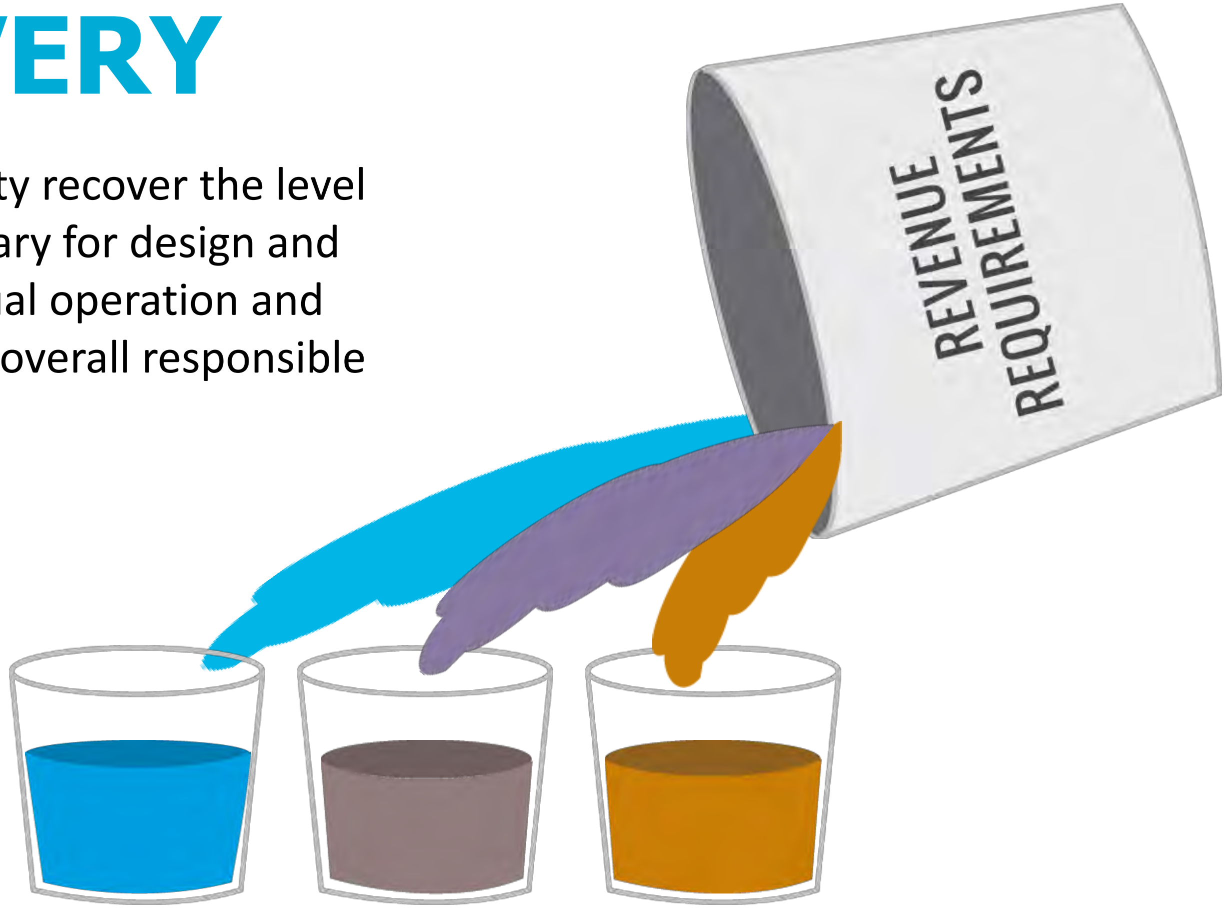
# ANNUAL REVENUE REQUIREMENTS

- Debt service payments for capital costs
- Operation and maintenance costs
  - Including inflation
- Other
  - Annual rate funded capital
    - Good stewardship
    - Addresses coverage requirement
  - Reserves
    - General operating reserve
    - Emergency fund
    - Debt service reserve



# REVENUE RECOVERY

How should the City recover the level of revenue necessary for design and construction, annual operation and maintenance, and overall responsible fiscal planning?




Ad Valorem Tax

Impact Fee Assessment

User Fees

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# AD VALOREM TAXES

- A tax based on the value of real estate or personal property
- Applied to:
  – Only those in the service area
  – Expanded beyond proposed service area
- The City has the system in place to assess an ad valorem tax
  – (rate currently $0.00)

# IMPACT FEES

One-time capital charges assessed against new development as a way to provide or cover a proportional share of the costs of capital facilities constructed or to be constructed for its use.

- The **marginal-incremental** cost approach focuses on the cost of adding additional facilities to serve new customers. It is most appropriate in situations where existing utility facilities do not have available capacity to provide service to new customers.
- The **system buy-in** approach is based on the concept that existing users, through user fees and other miscellaneous charges, develop a valuable public capital facility. This method is appropriate for utility systems with capacity already in place, and it provides an estimate of the cost of providing a unit of capacity based on the net equity of the existing assets.

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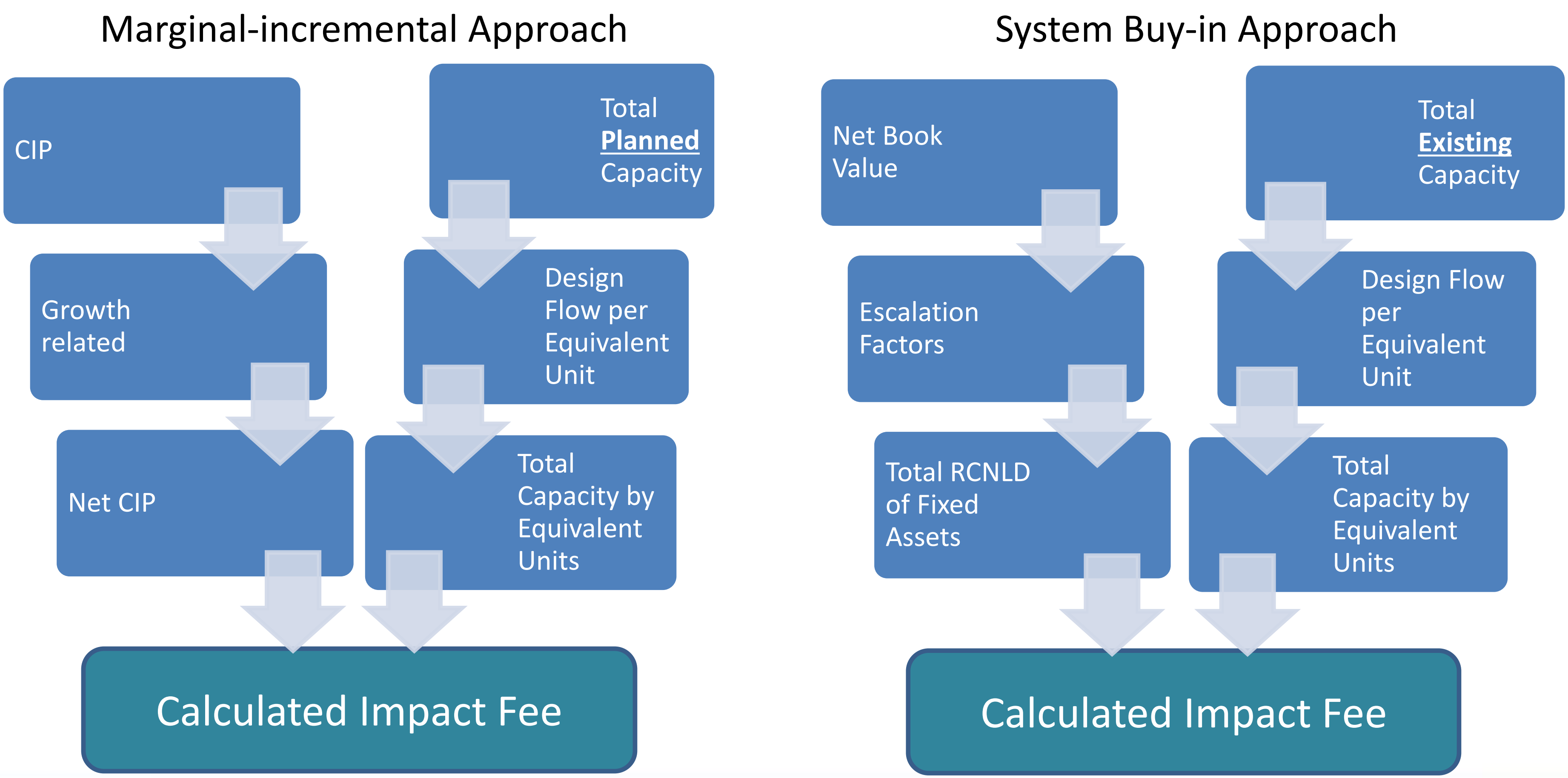
# IMPACT FEES

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# USER FEES

***Fixed Charges***

- Per Account
- Per LUE

- Potential Costs to Include:
  - Customer Service
  - Billing and Collection
  - Billing information
  - Debt Service

***Volumetric Charges***

- Per Unit of Flow
- Per LUE

- Potential Costs to Include:
  - Operation and Maintenance
  - Annual R&R
  - Debt Service
  - Reserve

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# ASSUMPTIONS

- Previous Study (WRM 2012)
  - Assumed certain service area
  - Assessed Property Value
  - LUEs
  - Future growth
  - Estimated Flows
    - Using water consumption data extrapolated to LUEs

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# OTHER CONSIDERATIONS

- Critical Issues
  - Billing possibilities and capabilities
  - Understanding impact on City's customer base
  - Recourse for non-payment
  - Conservatism
  - Data Availability
    - Classification of Customer by Type
    - Level of Demand
      - Flow
      - LUE

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# WRAP UP – THANK YOU!

- Discussion and Q&A
- Notes

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# Attachment B:

# Funding Concern Matrix

**CITY OF WIMBERLEY**
**CENTRAL WIMBERLEY WASTEWATER SYSTEM**
**FUNDING CONCERN EVALUATION**

| Concern | Ad Valorem | Local Assessment | Capital Recovery | User Fee |
|---|---|---|---|---|
| Equity | ◉ | ● | ● | ● |
| Spread Cost over Time to minimize upfront financial burden | ● | ● | ○ | ● |
| Ease of Implementation | ◉ | ◉ | ◉ | ● |
| Revenue Stability/Reliability | ● | ● | ◉ | ◉ |
| Community Acceptance | ○ | ◉ | ◉ | ● |
| Simple to Understand and Update | ● | ● | ◉ | ● |
| Affordability | ● | ● | ◉ | ● |
| Avoid higher taxes | ○ | ◉ | ● | ● |
| Economic Development | ● | ● | ◉ | ● |
| Equitable Contributions from New Customers | ≠ | ● | ● | ● |
| Impact on property values | ◉ | ◉ | ≠ | ≠ |
| Less reliance on future growth to pay for system | ≠ | ● | ● | ● |
| Would the creation of a PID impact funding | ≠ | ● | ≠ | ≠ |
| Existing septic users *allowed* to opt out of new system | ○ | ○ | ● | ● |
| Existing septic users *not allowed* to opt out of new system | ● | ● | ● | ● |
| Consider phasing systems | ○ | ○ | ● | ● |
| Impact of effluent disposal | ≠ | ≠ | ≠ | ● |

≠ Concern is not applicable
○ Concern is not addressed
◉ Concern is partially addressed
● Concern is addressed or can be incorporated into the design

# Attachment C:

## Example Funding Scenarios for Alternatives 1 and 7
Presented on November 12, 2013

**Example Funding Scenarios***
Alternative 1

| | | User Fees<br>Per 1,000 gal | "AND" | Capital Recovery Fee<br>Fee per LUE | "AND" | Ad Valorem Tax<br>Rate per $100 | "OR" | Local Assessment<br>Rate per $100 |
|---|---|---|---|---|---|---|---|---|
| **Scenario 1** | | | | | | | | |
| Fees and Charges | | $8.09 | | $2,550.00 | | $0.0400 | | $0.6069 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $2,550.00 | | $79.93 | | $1,213.75 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $7,650.01 | | $139.88 | | $2,124.07 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 2** | | | | | | | | |
| Fees and Charges | | $8.09 | | $5,100.01 | | $0.0355 | | $0.5394 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $5,100.01 | | $71.05 | | $1,078.89 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $15,300.02 | | $124.33 | | $1,888.06 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 3** | | | | | | | | |
| Fees and Charges | | $8.09 | | $7,650.01 | | $0.0311 | | $0.4720 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $7,650.01 | | $62.17 | | $944.03 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $22,950.04 | | $108.79 | | $1,652.05 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 4** | | | | | | | | |
| Fees and Charges | | $8.09 | | $10,200.02 | | $0.0266 | | $0.4046 |
| Customer Impacts | | | | | | | | |
| Residential | | $72.77 | | $10,200.02 | | $53.29 | | $809.17 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $218.31 | | $30,600.05 | | $93.25 | | $1,416.04 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 5** | | | | | | | | |
| Fees and Charges | | $11.08 | | $5,100.11 | | $0.0249 | | $0.3776 |
| Customer Impacts | | | | | | | | |
| Residential | | $99.70 | | $5,100.11 | | $49.73 | | $755.24 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $299.11 | | $15,300.34 | | $87.04 | | $1,321.67 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | O&M + Partial Capital | | Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 6** | | | | | | | | |
| Fees and Charges | | $13.95 | | $5,100.30 | | $0.0147 | | $0.2225 |
| Customer Impacts | | | | | | | | |
| Residential | | $125.51 | | $5,100.30 | | $29.31 | | $445.07 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $376.54 | | $15,300.91 | | $51.29 | | $778.87 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | O&M + Additional Capital | | Partial Capital | | Remaining Capital | | Remaining Capital |

*All rates and fees are based on preliminary numbers and will change based on final design and construction estimates. The purpose of the rates and fees in this matrix is to provide a demonstration only of how different funding alternatives can be utilized.

## Example Funding Scenarios*

Alternative 7

| | | **User Fees** Per 1,000 gal | *"AND"* | **Capital Recovery Fee** Fee per LUE | *"AND"* | **Ad Valorem Tax** Rate per $100 | *"OR"* | **Local Assessment** Rate per $100 |
|---|---|---|---|---|---|---|---|---|
| **Scenario 1** | | | | | | | | |
| Fees and Charges | | $13.96 | | $2,572.00 | | $0.0322 | | $0.5208 |
| Customer Impacts | | | | | | | | |
| Residential | | $125.64 | | $2,572.00 | | $64.33 | | $1,041.51 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $376.92 | | $7,716.00 | | $112.58 | | $1,822.65 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only Aqua Charges | | Only Aqua CIAC | | All City O&M + Capital | | All City O&M + Capital |
| **Scenario 2** | | | | | | | | |
| Fees and Charges | | $15.25 | | $2,572.00 | | $0.0254 | | $0.4118 |
| Customer Impacts | | | | | | | | |
| Residential | | $137.21 | | $2,572.00 | | $50.87 | | $823.50 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $411.64 | | $7,716.00 | | $89.01 | | $1,441.13 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M Charges | | Only Aqua CIAC | | All City Capital | | All City Capital |
| **Scenario 3** | | | | | | | | |
| Fees and Charges | | $15.25 | | $5,054.85 | | $0.0211 | | $0.3418 |
| Customer Impacts | | | | | | | | |
| Residential | | $137.21 | | $5,054.85 | | $42.22 | | $683.51 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $411.64 | | $15,164.55 | | $73.88 | | $1,196.14 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M Charges | | Aqua CIAC + Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 4** | | | | | | | | |
| Fees and Charges | | $15.25 | | $7,537.70 | | $0.0168 | | $0.2718 |
| Customer Impacts | | | | | | | | |
| Residential | | $137.21 | | $7,537.70 | | $33.57 | | $543.51 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $411.64 | | $22,613.09 | | $58.75 | | $951.15 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M Charges | | Aqua CIAC + Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 5** | | | | | | | | |
| Fees and Charges | | $15.25 | | $10,020.55 | | $0.0125 | | $0.2018 |
| Customer Impacts | | | | | | | | |
| Residential | | $137.21 | | $10,020.55 | | $24.92 | | $403.52 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $411.64 | | $30,061.64 | | $43.62 | | $706.15 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M Charges | | Aqua CIAC + Additional Capital | | Remaining Capital | | Remaining Capital |

*All rates and fees are based on preliminary numbers and will change based on final design and construction estimates. The purpose of the rates and fees in this matrix is to provide a demonstration only of how different funding alternatives can be utilized.

# Attachment D:

## REVISED Example Funding Scenarios for Alternatives 1 and 7
Presented on November 19, 2013

| **Alternative 1**<br>**Example Funding Scenarios*** | | **User Fees**<br>Per 1,000 gal | *"AND"* | **Capital Recovery Fee**<br>One-time Fee per LUE | *"AND"* | **Ad Valorem Tax**<br>Annual Rate per $100 | *"OR"* | **Local Assessment**<br>Annual Rate per $100 |
|---|---|---|---|---|---|---|---|---|
| **Scenario 1** | | | | | | | | |
| Fees and Charges | | $8.71 | | $2,499.93 | | $0.0406 | | $0.6170 |
| Customer Impacts | | | | | | | | |
| Residential | | $78.39 | | $2,499.93 | | $81.26 | | $1,233.98 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $235.16 | | $7,499.78 | | $142.21 | | $2,159.47 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 2** | | | | | | | | |
| Fees and Charges | | $8.71 | | $4,999.85 | | $0.0369 | | $0.5597 |
| Customer Impacts | | | | | | | | |
| Residential | | $78.39 | | $4,999.85 | | $73.71 | | $1,119.35 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $235.16 | | $14,999.56 | | $129.00 | | $1,958.86 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 3** | | | | | | | | |
| Fees and Charges | | $8.71 | | $7,499.78 | | $0.0331 | | $0.5024 |
| Customer Impacts | | | | | | | | |
| Residential | | $78.39 | | $7,499.78 | | $66.16 | | $1,004.72 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $235.16 | | $22,499.33 | | $115.79 | | $1,758.26 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 4** | | | | | | | | |
| Fees and Charges | | $8.71 | | $9,999.70 | | $0.0293 | | $0.4450 |
| Customer Impacts | | | | | | | | |
| Residential | | $78.39 | | $9,999.70 | | $58.61 | | $890.09 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $235.16 | | $29,999.11 | | $102.58 | | $1,557.65 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only O&M | | Additional Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 5** | | | | | | | | |
| Fees and Charges | | $10.96 | | $4,999.91 | | $0.0298 | | $0.4518 |
| Customer Impacts | | | | | | | | |
| Residential | | $98.66 | | $4,999.91 | | $59.50 | | $903.58 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $295.98 | | $14,999.74 | | $104.13 | | $1,581.27 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | O&M + Partial Capital | | Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 6** | | | | | | | | |
| Fees and Charges | | $13.92 | | $5,000.04 | | $0.0204 | | $0.3102 |
| Customer Impacts | | | | | | | | |
| Residential | | $125.27 | | $5,000.04 | | $40.85 | | $620.39 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $375.81 | | $15,000.13 | | $71.49 | | $1,085.68 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | O&M + Additional Capital | | Partial Capital | | Remaining Capital | | Remaining Capital |

*All rates and fees are based on preliminary numbers and will change based on final design and construction estimates. The purpose of the rates and fees in this matrix is to provide a demonstration only of how different funding alternatives can be utilized.

## Alternative 7
## Example Funding Scenarios*

| | | User Fees | "AND" | Capital Recovery Fee | "AND" | Ad Valorem Tax | "OR" | Local Assessment |
|---|---|---|---|---|---|---|---|---|
| | | Per 1,000 gal | | One-time Fee per LUE | | Annual Rate per $100 | | Annual Rate per $100 |
| **Scenario 1** | | | | | | | | |
| Fees and Charges | | $12.50 | | $2,572.00 | | $0.0277 | | $0.4479 |
| Customer Impacts | | | | | | | | |
| Residential | | $112.50 | | $2,572.00 | | $55.33 | | $895.86 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $337.50 | | $7,716.00 | | $96.84 | | $1,567.76 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Only Aqua Charges | | Only Aqua CIAC | | All City O&M + Capital | | All City O&M + Capital |
| **Scenario 2** | | | | | | | | |
| Fees and Charges | | $13.86 | | $2,572.00 | | $0.0219 | | $0.3538 |
| Customer Impacts | | | | | | | | |
| Residential | | $124.71 | | $2,572.00 | | $43.70 | | $707.53 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $374.12 | | $7,716.00 | | $76.48 | | $1,238.17 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M | | Only Aqua CIAC | | All City Capital | | All City Capital |
| **Scenario 3** | | | | | | | | |
| Fees and Charges | | $13.86 | | $5,032.34 | | $0.0181 | | $0.2936 |
| Customer Impacts | | | | | | | | |
| Residential | | $124.71 | | $5,032.34 | | $36.27 | | $587.25 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $374.12 | | $15,097.03 | | $63.48 | | $1,027.68 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M | | Aqua CIAC + Partial Capital | | Remaining Capital | | Remaining Capital |
| **Scenario 4** | | | | | | | | |
| Fees and Charges | | $14.99 | | $2,572.00 | | $0.0194 | | $0.3149 |
| Customer Impacts | | | | | | | | |
| Residential | | $134.89 | | $2,572.00 | | $38.90 | | $629.71 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $404.66 | | $7,716.00 | | $68.07 | | $1,101.99 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M + Some Capital | | Only Aqua CIAC | | Remaining Capital | | Remaining Capital |
| **Scenario 5** | | | | | | | | |
| Fees and Charges | | $14.99 | | $5,032.38 | | $0.0157 | | $0.2547 |
| Customer Impacts | | | | | | | | |
| Residential | | $134.89 | | $5,032.38 | | $31.47 | | $509.43 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $404.66 | | $15,097.15 | | $55.07 | | $891.50 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M + Some Capital | | Aqua CIAC + Additional Capital | | Remaining Capital | | Remaining Capital |

*All rates and fees are based on preliminary numbers and will change based on final design and construction estimates. The purpose of the rates and fees in this matrix is to provide a demonstration only of how different funding alternatives can be utilized.

| **Alternative 7**<br>**Example Funding Scenarios*** | | **User Fees**<br>Per 1,000 gal | *"AND"* | **Capital Recovery Fee**<br>One-time Fee per LUE | *"AND"* | **Ad Valorem Tax**<br>Annual Rate per $100 | *"OR"* | **Local Assessment**<br>Annual Rate per $100 |
|---|---|---|---|---|---|---|---|---|
| **Alternative 7** | | | | | | | | |
| Fees and Charges | | $13.86 | | $2,572.00 | | $0.0219 | | $0.3538 |
| Customer Impacts | | | | | | | | |
| Residential | | $124.71 | | $2,572.00 | | $43.70 | | $707.53 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $374.12 | | $7,716.00 | | $76.48 | | $1,238.17 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M | | Only Aqua CIAC | | All City Capital | | All City Capital |
| **Alternative 7 - Phase** | | | | | | | | |
| Fees and Charges | | $13.15 | | $2,572.00 | | $0.0084 | | $0.1365 |
| Customer Impacts | | | | | | | | |
| Residential | | $118.37 | | $2,572.00 | | $16.86 | | $272.95 |
| LUE's | 1 | | | | | | | |
| Property Value | $200,000 | | | | | | | |
| Commercial | | $355.12 | | $7,716.00 | | $29.50 | | $477.66 |
| LUE's | 3 | | | | | | | |
| Property Value | $350,000 | | | | | | | |
| Costs Included | | Aqua + O&M | | Only Aqua CIAC | | All City Capital | | All City Capital |

*All rates and fees are based on preliminary numbers and will change based on final design and construction estimates. The purpose of the rates and fees in this matrix is to provide a demonstration only of how different funding alternatives can be utilized.