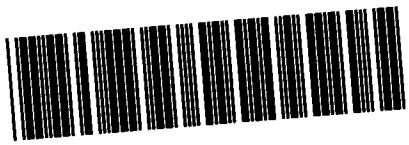

Control Number: 44205

Item Number: 2

Addendum StartPage: 0

House Bill (HB) 1600 and Senate Bill (SB) 567 83rd Legislature, Regular Session, transferred the functions relating to the economic regulation of water and sewer utilities from the TCEQ to the PUC effective September 1, 2014

LIBERTY HILL
REGIONAL WASTEWATER STUDY

Prepared For:

- Liberty Hill Chamber of Commerce
- Liberty Hill Water Supply Corporation
- Liberty Hill VFW
- Williamson County, Precinct No. 2
- Lookout Group
- Main Street Homes
- Liberty Hill Independent School District
- Chisholm Trail SUD
- Canady's Feed & Supply
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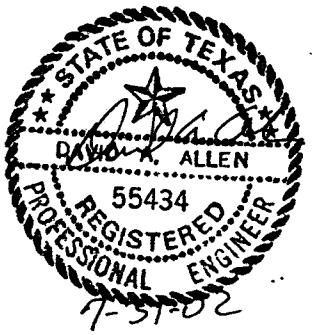

In Association with the Brazos-Colorado River Alliance

July 2002

Prepared By:
Baker-Aicklen & Assoc., Inc.
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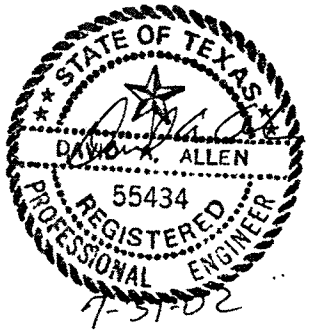

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EXECUTIVE SUMMARY

Baker-Aicklen & Assoc., Inc. was contracted by the Lower Colorado River Authority to develop a regional wastewater plan for the Liberty Hill area. The study consisted of the following elements:

- Service Area Identification
- Determination of Wastewater Flows
- Evaluation of Treatment Plant Site Alternatives
- Evaluation of Collection System Alternatives
- Evaluation of Treatment System Alternatives
- Environmental and Cultural Resource Assessment
- Phased Implementation Schedule
- Identification of Funding Options

Each of these elements is discussed in detail in report. The major conclusions of the study include the following:

1. The projected 20-year service area population (based upon population projections provided by the Central Area Metropolitan Planning Organization (CAMPO)) is approximately 5,500 persons. The year 2022 estimated employment is approximately 1,500 persons.
2. Wastewater flows are estimated to average over 600,000 gallons per day in 2022.
3. A regional wastewater treatment plant should be centrally located between US 183 and the core area of Liberty Hill. This location minimizes the length of collection system required to serve the Liberty Hill and projected future developments that are anticipated to occur east of the central area of Liberty Hill.
4. A low pressure sewer system for the core area of the City of Liberty Hill can be designed and constructed for significantly less than a gravity collection system, however, a net present value analysis indicates a gravity collection system may be more cost effective in the long-run.
5. Disregarding land costs, the preliminary opinion of probable costs for a steel, field erected, extended aeration treatment plant and an oxidation ditch are similar. The decision on which type of plant to construct should be based upon the availability of land, the preferences of the Owner/Operator, and other information such as soil borings as the design process proceeds.
6. There are no obvious environmental and/or cultural resources "red flags" raised with regard to any of the improvements. Further work needs to be conducted on the proposed treatment plant site since it was not under consideration at the time the environmental survey was conducted.

7. A phased implementation schedule for proposed wastewater improvements has been provided. The phasing recommends installation of a first phase wastewater treatment plant capacity of 300,000 gallons per day with construction completed in the summer 2004. A 300,000-gallon per day expansion would be required in approximately the 3rd quarter of 2009. A third expansion would not be needed until approximately 2015.
8. The Phase 1 opinion of probable cost for the wastewater treatment plant and effluent line, including engineering and surveying, is $2,615,000. This does not include easement costs for the effluent line, which are estimated to be $20,000.
9. The opinion of probable costs for serving the core area of Liberty Hill and the Liberty Hill Independent School District are approximately $1,288,000.

Various funding options are available for the City of Liberty Hill, however, with the exception of areas that may meet the strict requirements of low to moderate income (in which case a grant may be available), infrastructure improvements will require a loan. Three organizations that can provide funding or low interest loans are the Rural Utility Service, the Texas Water Development Board, or the Lower Colorado River Authority. Each of these options should be more fully investigated to determine which best suits the needs of the potential stakeholders in this regional planning process.

SECTION 1

Introduction and Background

Over the previous decade, Williamson County, one of the fastest growing counties in the country, experienced unprecedented population and employment growth. The cities of Georgetown, Leander and Cedar Park all experienced robust growth that exceeded 16 percent annually. Recognizing the ongoing growth and its implications, the citizens of Liberty Hill elected to incorporate in 1999.

The City of Liberty Hill is centered approximately 2.4 miles west of the intersection of U.S. Highway 183 (US 183) and Texas State Highway 29 (SH29), (also known as Seward Junction) in Williamson County, Texas as shown in Figure 1. Liberty Hill incorporated an area encompassing approximately 1190 acres extending from the River Bend Oaks subdivision on the west to approximately 4,400 feet east of the intersection of Seward Junction. The City of Georgetown lies on SH 29 eleven miles east of Seward Junction and the City of Leander is located approximately 6 miles south of Seward Junction on US 183. Liberty Hill's extraterritorial jurisdiction extends ½ mile beyond the city limits. The city is located in the

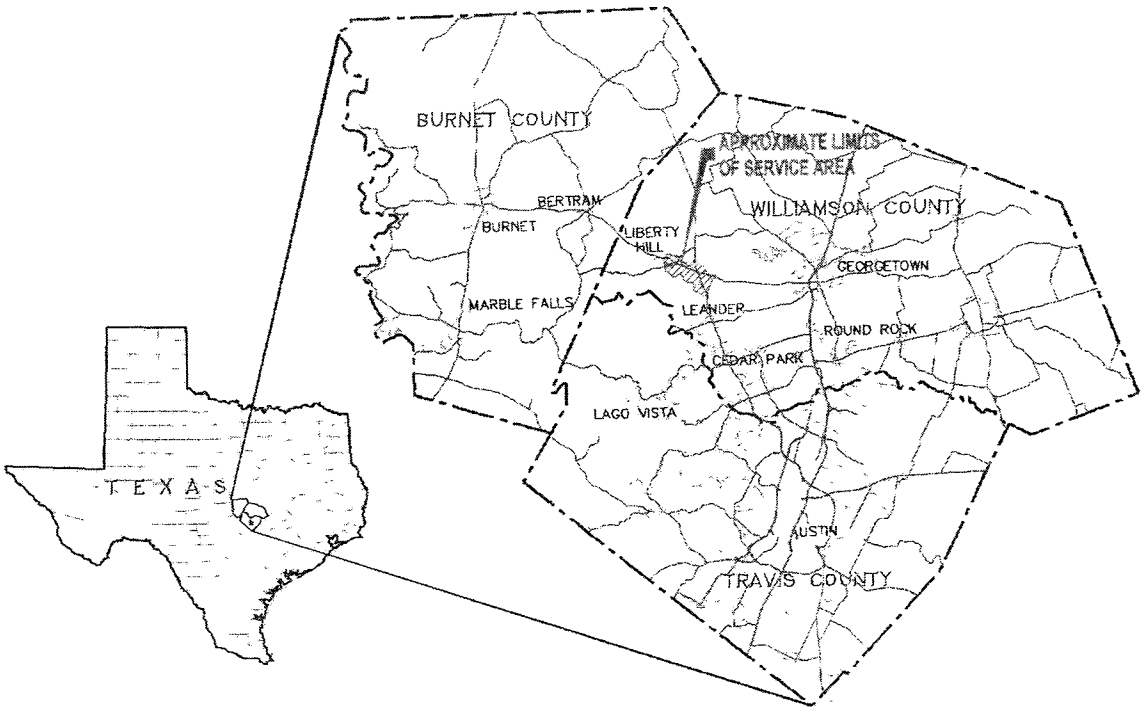

Figure 1 - Location Map

Brazos River Basin.

The Lower Colorado River Authority (LCRA) was contacted by the City of Liberty Hill to investigate the feasibility of providing wastewater service to the area. The LCRA and the Brazos River Authority (BRA) have teamed on numerous projects in Williamson County as the Brazos-Colorado River Alliance (hereinafter referred to as the Alliance). The LCRA and the BRA established the Alliance in 1996 to provide for regional growth and aquifer protection in the Brushy Creek watershed. LCRA owns and BRA operates the Brushy Creek Regional Wastewater Treatment Plant. Baker-Aicklen and Assoc., Inc., was retained by the Alliance to conduct the feasibility study. This report presents the results of that study.

Initially, the Alliance held two public meetings to assist in determining the regional scope of the study. The meetings helped to define existing needs and proposed development in the area. The proposed development and projected population and employment growth ultimately defined the study area limits.

This project was funded and coordinated by the Alliance with major financial contributions from the following businesses and organizations:

- Liberty Hill Chamber of Commerce
- Liberty Hill Water Supply Corporation
- Liberty Hill VFW
- Williamson County, Precinct No. 2
- Lookout Group
- Main Street Homes
- Liberty Hill Independent School District
- Chisholm Trail SUD
- Canady's Feed & Supply
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- Union State Bank
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This type of broad-based, community support is an essential element in working to resolve these regional issues.

Report Structure

Section 2 – The process of determining a probable service area for a regional treatment facility is described in this section. It includes an identification of potential customers, development of a preliminary land use plan based upon existing conditions, development of population projections and development of a future land use plan incorporating the population projection data.

Section 3 – Describes the development of projected wastewater flows for the study area, and provides a summary of anticipated wastewater flows in 5-year increments.

Section 4 – Evaluates alternative treatment plant locations to serve the projected buildout and summarized pros and cons for two sites.

Section 5 – Evaluates collection system alternatives, provides opinions of cost for improvements and provides a net present worth analysis for two options to serve the core area of Liberty Hill. This section covers the core area of Liberty Hill in detail. Service to other areas is extrapolated from the data developed for Liberty Hill.

Section 6 – Evaluates disposal options and treatment system alternatives. Disposal options include discharge to the South Fork San Gabriel River and effluent irrigation. Two treatment alternatives are evaluated and compared including opinion of probable costs.

Section 7 – This section contains a preliminary environmental and cultural resources assessment, provided by LCRA staff for collection system routes and proposed treatment plant sites.

Section 8 – Describes a phased implementation schedule for the proposed improvements and a schedule of projected cash requirements.

Section 9 – Describes the funding options that are available to implement the regional plan.

SECTION 2

Service Area Delineation/Characterization

The determination of the proposed service area for a regional wastewater system is described in this section. A description of the soils and topography illustrates some of the challenges facing development of centralized sewer system in the area. Information is presented on existing land uses and projections are made for future land uses. Population projections are developed in 5-year intervals. Based upon the population projections and a future land use plan, a service area for a regional plant is identified, however, the boundaries should not be considered as final. The actual service area may vary depending upon the timing and extent of future development.

Soils and Topography

The study area consists primarily of land located in the watershed of the South Fork San Gabriel River. The study area extends in an east to west direction along SH 29 while the drainage sub basins in this reach of the South Fork are aligned principally in a north to south direction, the

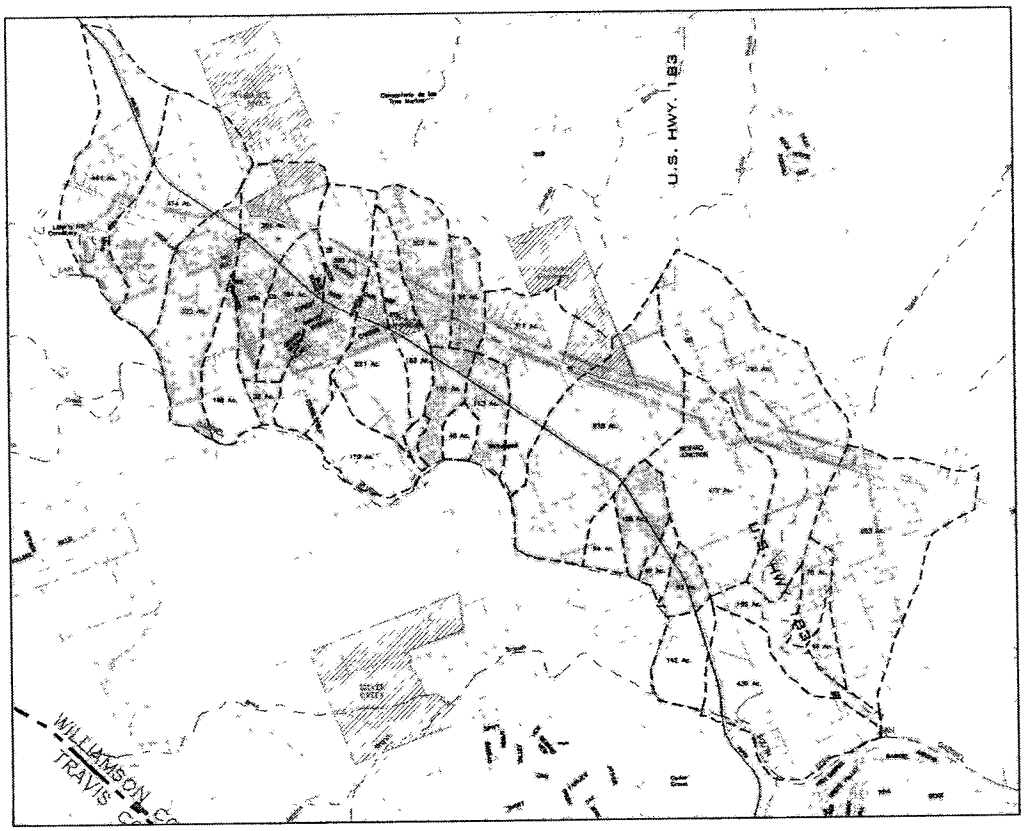


Figure 2 – Study Area Topography
Over 20 Drainage Sub-Basins Comprise the Area

result of which is that the area encompasses all or part of 20 small drainage basins, illustrated as shaded areas in Figure 2. The high number of drainage basins makes design of a gravity sewage collection system extremely challenging because of the need to cross over multiple ridges that separate the individual basins. Alternative collection systems such as low pressure sewer systems can provide an effective alternative for collecting and transporting wastewater in this type of rolling terrain.

The soils in the area are generally shallow, clayey soils overlaying weathered and or fractured limestone. Soils consist principally of Denton silty clays, 1 to 5 % slopes, Eckrant cobbly clays, 1- 8 % slopes, and small areas of Crawford clay, 1- 3 % slopes. Soil depths range from 13 inches for the cobbly clays to 36 inches for the tan, dark Denton clays. Although these soils are well drained, the high shrink swell capacity and low permeability of the clays and the moderate soil depth underlain by limestone or weathered limestone are all undesirable characteristics for septic tanks and absorption fields. The underlying fractured and weathered limestone can act as a pathway for groundwater contamination or surfacing of septic tank wastewater. These soils, although shallow, are suitable for rangeland, with some of the deeper clays suitable for crops such as hay, forages, and small grains.

The ground is gently to moderately sloping across the basin from north to south and from east to west. The highest elevation, approximately 1115 ft m.s.l., lies in the northwest quadrant of the area. The lowest elevation, 865 ft m.s.l., is located along the South Fork San Gabriel at the intersection of US 183.

Existing Land Use

Land use plans are essential elements for controlling and directing growth and ensuring adjacent developments are compatible. Developing adequate infrastructure depends upon being able to project both the type and location of development. Typically, commercial developments will be centered along major thoroughfares and major intersections such as SH 29 and at the intersection of SH 29 and US 183.

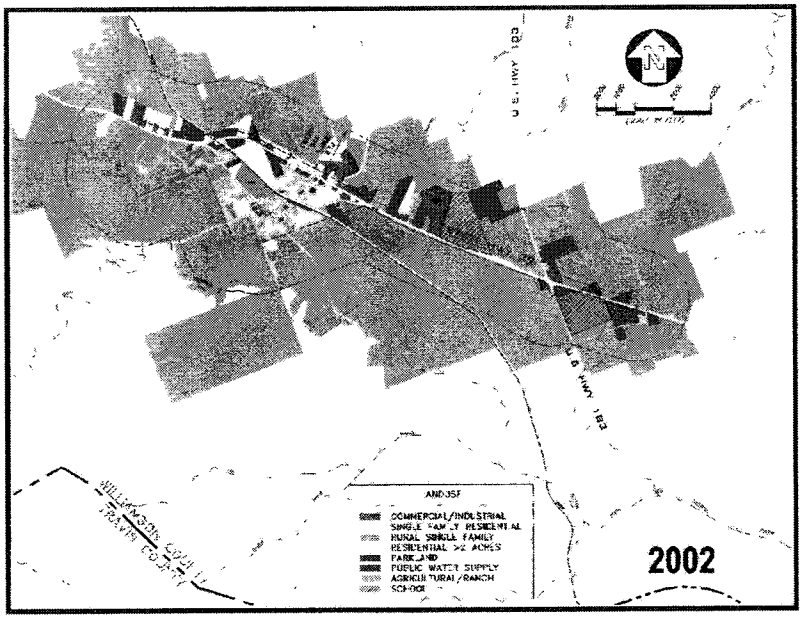


Figure 3 – Existing Land Uses

Existing land uses were identified from Williamson County tax appraisal records and field inspections. Land uses within the study area consist of single family residential, rural residential, commercial/industrial, parkland, and public such as schools, post office, churches, etc and are illustrated in Figure 3. The downtown area of Liberty Hill contains a central core of business/commercial entities near the intersection of FM 1869 and SH 29, with remaining commercial development along SH 29 and at Seward Junction. Areas of residential development are centered in the downtown area and on the west end of town near SH 29.

Wastewater from the existing developments is disposed of through septic tanks and drainfields. Although the newer developments have relatively large lots with sufficient land area available for sewage absorption fields that would mitigate the generally unfavorable soil conditions, many of the residential lots in the core or downtown area are on smaller lots, less than ½ acre in many instances, which makes the existing septic tank systems a potential health hazard and a potential source of contamination to shallow ground water supplies or surface waters.

Population Projections

Methodology

Population projections from several sources were reviewed to determine a model that would be appropriate for the study area. Population projections published by the Texas Water Development Board are developed by the Center for Demographic and Socioeconomic Research and Education Department of Rural Sociology, Texas A&M University. Projections are available for both counties and cities. Unfortunately, because the City of Liberty Hill was incorporated relatively recently, specific population estimates for Liberty Hill had not been published at the time of this report. However, they were reviewed for Williamson County and nearby cities including Leander, Georgetown, and Cedar Park.

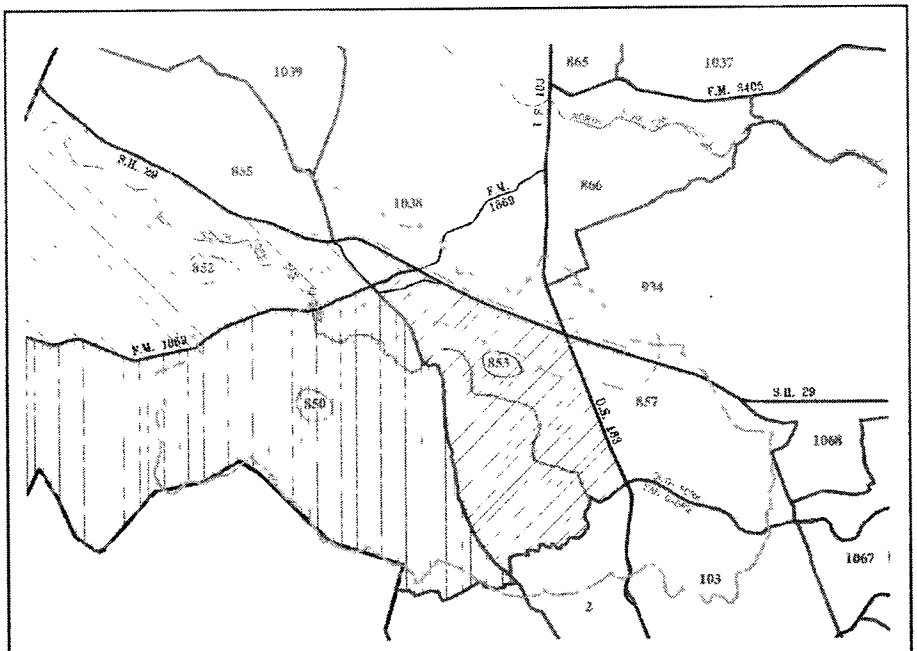


Figure 4 – Traffic Serial Zones 850, 852 & 853

The Capital Area Metropolitan Planning Organization (CAMPO), the official Metropolitan Planning Organization for the Austin, Texas metropolitan area, also publishes population projections. The purpose of CAMPO is to coordinate regional transportation planning with the State of Texas, and local regional public and governmental agencies. As such, CAMPO is tasked with identifying needs, and developing long-term transportation plans.

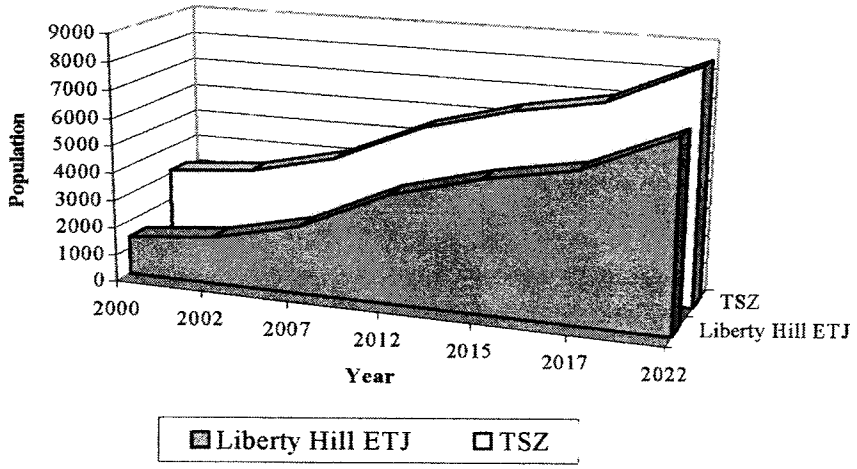
CAMPO divided Hays, Travis, and Williamson County into sub areas termed "Transportation Serial Zones " (TSZs). For each TSZ, population and employment projections were developed through the year 2025. The CAMPO population projections were determined to be the best available data to estimate growth for this project. The TSZs that encompassed the majority of the study area, 850, 852, and 853, are shown in Figure 4.

Population

Williamson County experienced rapid population and job growth during the 1990's and is projected to more than double from a 2000 population of over 229,000 to over 523,000 in 2020. As a whole, Williamson County population is projected to increase approximately 8 percent per year over the next 20 years.

The population projections for the TSZs in the study area were similar, with an average annual population increase of approximately 7.25 %. For the purposes of this study, we assumed the total projected population increase for the three zones in the study area would occur in TSZ 853 because of it's proximity to existing schools, a major roadway intersection, and the close proximity of a proposed development just north of SH 29. Based upon this assumption, the population for the planning area is expected to increase by over 5,000 persons as shown in Figure 5.

Figure 5 – Population Projections for the Planning Area



Population and employment projections, developed in 5-year increments to allow for a phased planning approach for wastewater improvements, are summarized in Table 1. The 2000 census population for the City of Liberty Hill was 1409; that for the subject TSZs was 3096. Population in the planning area is estimated to increase by 5386 persons to approximately 6,800 persons by the year 2022.

Table 1 – Population/Employment Projections

	2000	2002	2007	2012	2017	2022
Planning Area	1409	1708	2456	3898	5344	6795
TSZs	3096	3395	4143	5585	7031	8482
Employment		423	640	929	1340	1933

Liberty Hill Independent School District (LHISD)

LHISD operates four schools in Liberty Hill. The elementary school and intermediate school are located in the core downtown area. A middle school and high school are located to the east of town off SH 29 and LOOP 332. In March of 2002, the combined enrollment of the elementary and intermediate school was 811 students; that for the middle and high school was 851 students. Based upon the historical increase in student enrollment for the years 1997 through 2002, the total enrollment of LHISD was projected to increase to approximately 4,000 students by the year 2022.

Proposed Development

At the time of the writing of this report, the only known proposed development in the area was approximately 300 acres across two tracts located just north of SH 29 and west of Seward Junction. This area is projected to build out in 7 to 10 years at a density of approximately 8.6 persons per acres. It was assumed that other tracts would develop in a similar manner within the constraints of the planning period, i.e., the overall projected population growth in the area. Based upon this assumption, over 700 acres of residential development would occur over the next 20 years.

Future Land Use

The projected land use for the year 2022 is presented in Figure 6. The following assumptions were used in projecting the future land use:

1. Population would increase at approximately 7.25 % per year as previously discussed.
2. Future commercial/industrial growth was more likely to occur at the regions major intersection, that is Seward Junction.

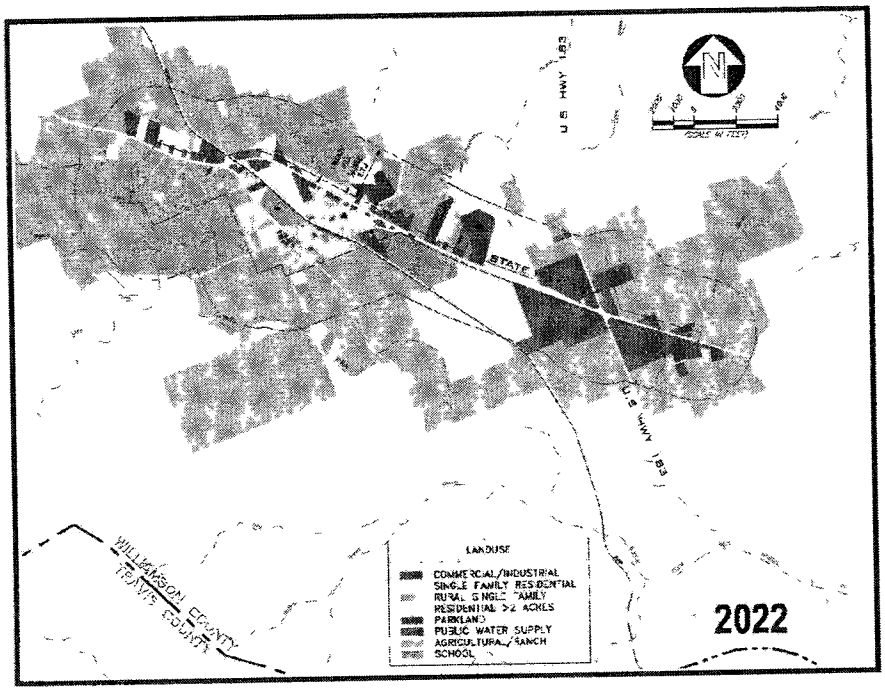


Figure 6 – 2022 Land Use Plan

3. Future residential developments would be developed at approximately 8.5 persons per acre (this assumes that 20 % of an area would be developed as right of way or open space and the remaining would be developed at 4 living units per acre and 2.6 persons per unit).
4. The initial residential development would occur on the two tracts owned by Lookout Partners just north of SH 29. Further residential development would occur in a location that could take advantage of the existing infrastructure.

Interim land use projections for the years 2012 and 2017 are presented in Appendix 1.

Proposed Regional Wastewater Plant Service Area

The type of development that can support a centralized wastewater treatment plant occurs in areas with the following characteristics:

1. Tracts that are large enough to be subdivided;
2. Areas that are close to schools and to potential retail/commercial centers that can support residential development; and
3. Areas that are close to major arterials.

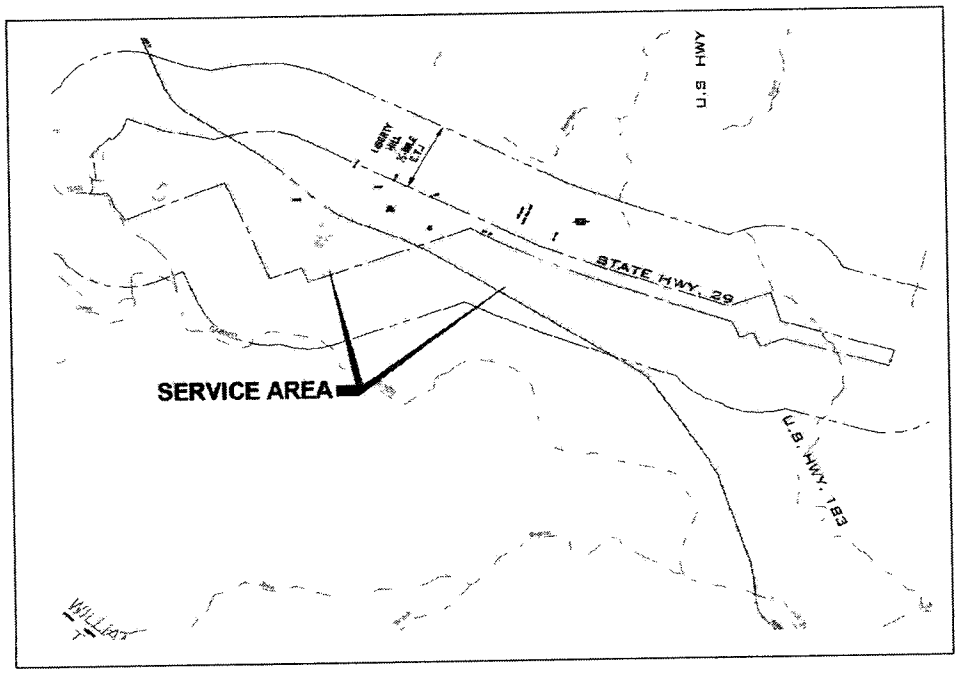


Figure 7 – Proposed Service Area

The area located just west of Seward Junction, provides these key elements. A development is planned for the north side of SH 29 as previously indicated. This area is close to a major intersection that is well suited for retail/commercial development, Liberty Hill Independent School District schools are nearby, and the completion of US 183A will facilitate traffic into and out of the Austin metropolitan area.

The proposed areas that would be served by a regional wastewater treatment facility are shown in Figure 7. It was assumed that existing development on relatively large lots would remain on septic systems. Wastewater from the core area of Liberty Hill and wastewater from future development would be collected and treated at the regional treatment plant.

SECTION 3

Determination of Wastewater Flows

This section explains the development of wastewater flows for the planning area. Observed water consumption from existing residences, a useful tool for estimating wastewater flows, is utilized to estimate sewerage flows for the existing Liberty Hill core area. Historical usage is combined with an assumed per capita flow rate of 100 gallons per day to project future wastewater flows. This, in turn, is utilized in subsequent sections to develop a phased implementation schedule for proposed improvements.

Methodology

Wastewater flows were determined separately for the existing residences in the downtown Liberty Hill area and for proposed future developments. For the downtown area, water use records from the Liberty Hill Water Supply Corporation (LHWSC) were evaluated to determine historical usage. Wintertime water consumption, usually indicative of residential wastewater flows because it is generally confined to activities that produce wastewater, was used.

For future residential development, an average daily wastewater flow of 260 gallons per residence was assumed (2.6 persons per residence and 100 gallons per capita per day). Flow projections for raw residential land were determined by assuming 80% of the land was developable, (i.e., not roads, easements, or open space) and a density of four units per acre. Future commercial flows were estimated from the employment projections prepared for the traffic serial zones, assuming a per employee wastewater production rate of 20 gallons per day.

Historical Water Usage

Water use records for the years 1999 through April 2002 were evaluated to estimate realistic wastewater flow rates for the core area of Liberty Hill. Average water consumption was determined for the entire service area of the water supply corporation. Water use information from commercial and residential developments served by Chisholm Trail Special Utility District was used for comparison purposes. In order to estimate wastewater flows, water consumption during the winter months of December, January, and February was averaged.

Average water consumption varied significantly, from approximately 150 gallons per connection per day for Liberty Hill downtown businesses, to over 300 gallons per day for some residential users. The average residential consumption for the downtown or core area of Liberty Hill was approximately 230 gallons per connection per day. Average water use for two other local developments, Sundance and Gabriels Overlook, were similar and ranged from approximately

168 to 207 gallons per day. The estimated overall residential water usage for Liberty Hill was 192 gallons per day. Based upon an average of three persons per household (determined from census data and an estimate of the number of occupied residential lots), the per capita water consumption was approximately 64 gallons per capita per day. For the purposes of determining wastewater flows, the water consumption observed for the core downtown area, 230 gallons per day, was used.

Liberty Hill Independent School District

Based upon a 5-day week, the LHISD Elementary and Middle schools consumed approximately 6,790 gallons per day; the Middle and High schools consumed approximately 4,000 gallons per day (wintertime flows). This correlates to 9 gallons per student per day and approximately 6 gallons per student per day respectively. If a centralized wastewater collection and treatment system is provided, it is assumed that these unit rates will rise, especially for the high school. For the purpose of estimating future wastewater flows, it was assumed that the Elementary/Intermediate School and Middle/High School would produce 10 and 15 gallons per student per day respectively.

Projected Wastewater Flows

Projected wastewater flows are presented in Figure 8 and summarized in Table 2. Existing wastewater flow from the core area of downtown plus Liberty Hill Elementary, Intermediate, Middle, and High School is estimated to be approximately 46,000 gallons per day. Total wastewater flows are estimated to increase to approximately 650,000 in the year 2022. Wastewater projections for the school were based upon the historical population growth and a per student wastewater generation rate of 10 gpd for elementary and intermediate school students and 15 gpd for middle and high school students.

It should be noted that the largest water customer served by LHWSC was the Meridell Achievement Center located north of SH 29, just to the west of the proposed development by Lookout Partners. This facility used an average of approximately 15,000 gpd. Incorporation of this property along with others not yet identified into the regional plant could help defray costs for implementing a regional treatment solution.

Figure 8- Projected Wastewater Flows

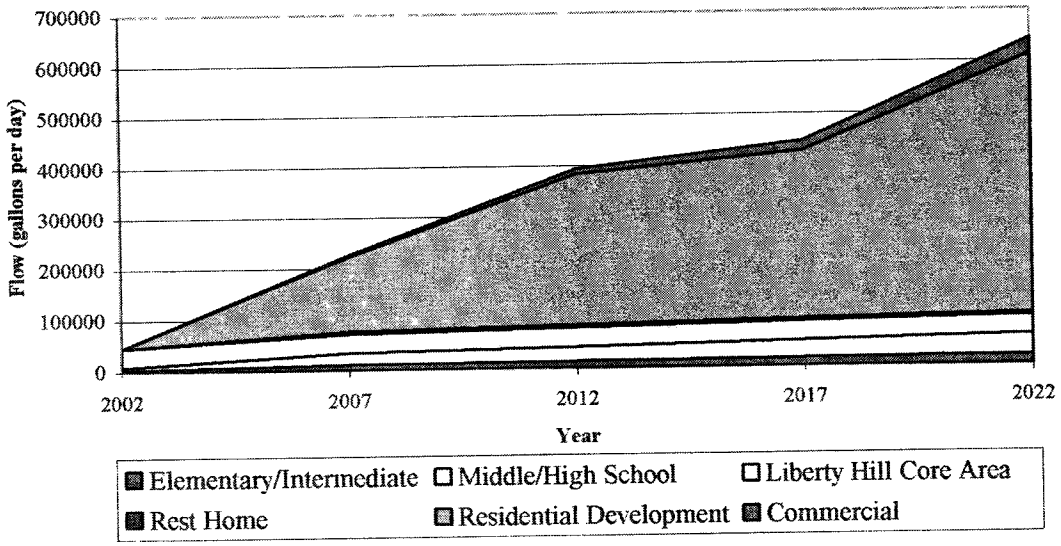


Table 2 – Projected Wastewater Flows

Source	2002	2007	2012	2017	2022
Elementary/Intermediate	4,055	10,954	13,799	16,643	19,487
Middle/High School	4,255	22,709	28,397	34,086	39,774
Liberty Hill Core Area	37,720	37,720	37,720	37,720	377.20
Rest Home		5,000	5,000	5,000	5,000
Residential Development		146,500	297,500	333,250	511,000
Commercial		4,340	10,120	18,340	30,200
TOTAL	**46,030**	**227,223**	**392,536**	**445,038**	**643,181**

*All units are gallons per day

SECTION 4

Evaluation of Treatment Plant Sites

The site selection process for a regional wastewater treatment plant is presented in this section. Because of the rolling topography of the service area, conventional wisdom that dictates locating wastewater treatment plants at the lower reaches of a service area is open to other alternatives. In an area where the topography dictates either the use of gravity collection systems with multiple lift stations or alternative collection systems such as low pressure sewer systems, treatment plant location can be influenced by other factors such as availability of land, power, etc.

General

For the purposes of this study, the evaluation of treatment plant location was broken down into two basic alternatives. One alternative, would locate the plant down gradient of existing or future wastewater sources. The other alternative, in this particular case, was to locate the plant on property provided by a developer.

After careful consideration, it was determined that the plant location would have to satisfy the following criteria:

1. The site needed to maximize the number of future connections that could be served;
2. Treatment plant location should be such that future development could be served as well as the core area of downtown Liberty Hill and Liberty Hill Independent School District; and
3. Treatment plant location should be such that initial development costs are minimized.

The pros and cons of each alternative are discussed below.

Site Selection

Typically, wastewater treatment plants are located close to a point of discharge or reuse. In this particular instance, location near a point of discharge would suggest construction of the plant near the South Fork San Gabriel River. The intent of locating the plants downstream is to maximize the areas that can be served by gravity.

Because of the large number of drainage basins in the study area, there is not a single location that stands out as ideal. For this reason, several sites close to the San Gabriel were evaluated as well as a site located near the proposed development north of SH 29 as indicated in Figure 9.

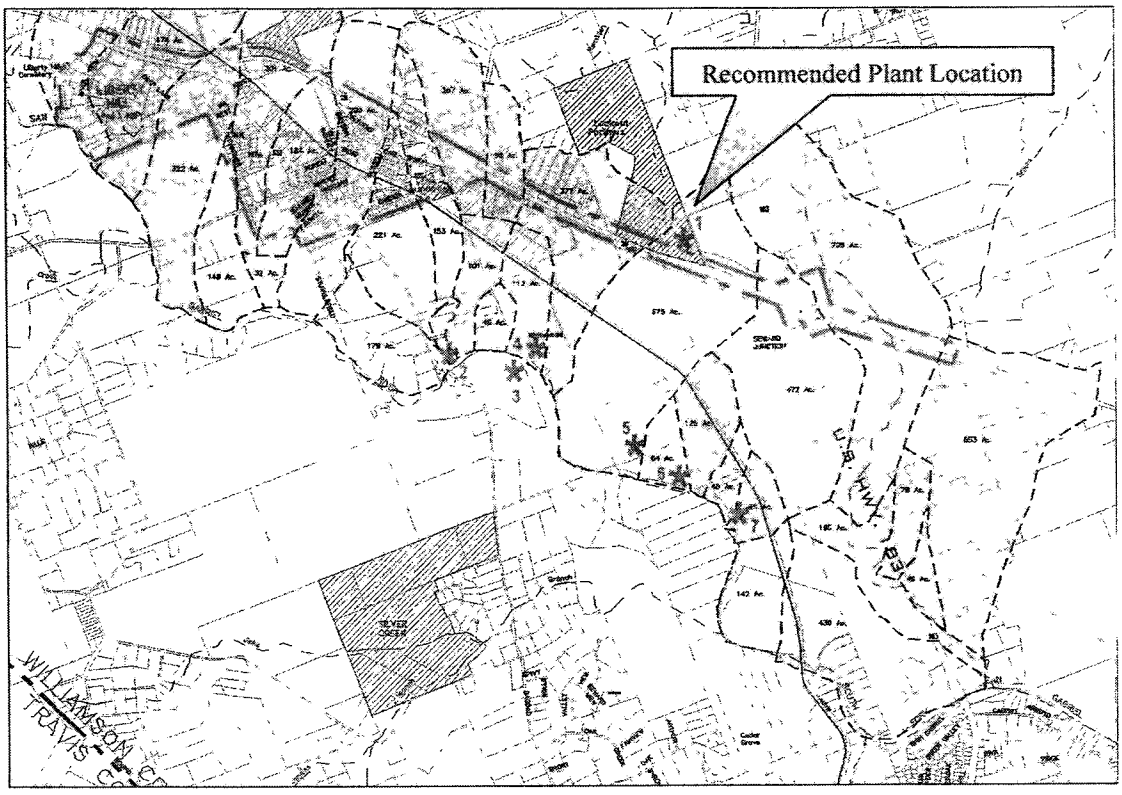


Figure 9 – Alternative Treatment Plant Locations

For the locations near the South Fork San Gabriel, Site No. 5 came closest to meeting the criteria for the following reasons: (1) it is downstream of the second largest sub drainage basin in the area (640 acres), hence; it will maximize the area that can be served by gravity; and (2) it is centrally located to the existing areas of Liberty Hill that are to be served, proposed development, and projected future development.

The alternative location next to SH 29 (on the proposed development by Lookout Partners), Site No. 1, also meets the requirements of the selection criteria. The site is centrally located, and is physically closer to the areas of Liberty Hill that will be served and the proposed development north of SH 29, which will help to minimize initial development costs. The proposed SH 29 location (Site 1) near the top of the watershed is atypical and requires pumping wastewater to the plant. However, this is mitigated by the fact that the service consists of many drainage sub-basins that will require pumping stations in any event.

Locating the plant next to the South Fork of the San Gabriel at Site No. 5 requires the construction of approximately 8,400 feet of all-weather access road at an estimated capital cost of over $180,000 (15 foot wide road with 1 ½ inches HMAC). Additionally, the availability of

land for a treatment plant is an unknown. According to the electrical provider (Pedernales Electric Cooperative), an approximate 2-mile extension of transmission lines with associated easements would also be required. The negative issues associated with this site could be mitigated should future development provide the needed access the to site.

For these reasons, the location adjacent to SH 29 is the recommended site for at least the first phase of development. This location satisfies the selection criteria and minimizes initial development costs. The SH 29 site also has good access to existing roads and power.

SECTION 5

Evaluation of Collection System Alternatives

One of the primary goals of this study was to evaluate providing wastewater service to the City of Liberty Hill and the Liberty Hill Independent School District. Two alternatives were identified to serve the central core area of Liberty Hill. Alternative 1 evaluated installation of a gravity collection system and force main to the proposed treatment plant site. Alternative 2 evaluated the installation of a low pressure sewer system. These same alternatives were evaluated for the remaining area, but with a slightly different methodology. Detailed opinions of probable costs were developed for each alternative based upon recent construction bids for similar work and are presented in Appendix 4.

Liberty Hill Core Area

General

Initially, Williamson County parcel information and tax records were reviewed to identify the areas that appeared to be most in need of a central sewer system. Current regulations require a minimum of ½ acre for on-site systems with a central water supply. A number of lots that are on

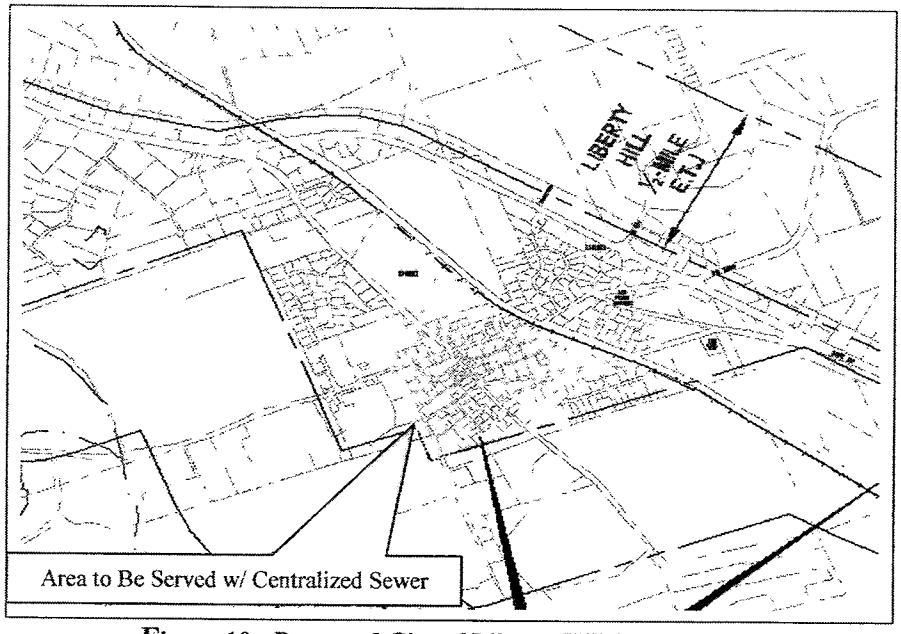


Figure 10 - Proposed City of Liberty Hill Service Area

septic systems in the downtown or core area of Liberty Hill do not meet existing minimum State criteria for on-site sewerage facilities while lots in other, newer areas of Liberty Hill do. The

area selected for the design of a central sewage collection system included this downtown core area plus the two schools as shown in Figure 10.

Alternative 1 – Gravity Collection System

The gravity collection system was designed per LCRA design criteria. Minimum line sizes, per LCRA criteria, are 8-inch diameter. Preliminary plan and profile drawings were developed for each of the wastewater lines. Contours were developed from United States Geological Survey digital elevation models (DEMs). Quantity take-offs were obtained for the different depths of sewer pipe, for appurtenances, erosion sedimentation control, etc.

The proposed gravity collection system for the core area of Liberty Hill is shown is Figure 11, individual preliminary plan and profile drawings are presented in Appendix 2. The proposed system collects sewerage from the downtown area and the Elementary and Intermediate schools and consists of approximately 15,200 linear feet of 8-inch gravity sewer line, 53 manholes, a 200 gpm lift station and approximately 12,000 linear feet of 6-inch force main. The collection system is laid out in an east west direction with a lift station located off Stubblefield Road. The lift station and associated force main transport the wastewater to the proposed wastewater treatment plant location north of SH 29.

Alternative 1 A– Gravity Collection System with High School Lift Station

Alternative 1A was identical to Alternative 1, however, the lift station and force main required to serve the Middle and High School that are presently served by a treatment plant and evapotranspiration beds are included. Inclusion of this into the net present worth analysis ensures comparison of alternatives that provide the same level of service, i.e., both the Liberty Hill core area and the school complexes are served.

Alternative 2 – Low Pressure Sewer System

Environment One Corporation (E-One) developed the preliminary layout for the pressure sewer system. E-One is a manufacturer of pumps used in low pressure sewer system and has a proprietary program for designing pressure sewer systems. E-One offers this service to areas that are considering or installing pressure sewer systems. Baker-Aicklen and Assoc., Inc. used the input from E-One for layout purposes, however, based upon our engineering experience, we increased their proposed line sizes by one pipe diameter.

The proposed pressure sewer system, shown in Figure 12, consists of approximately 20,000 linear feet of 2-inch through 6-inch pressure sewer system and appurtenances, 1-1/2 inch service connections, 161 "Gator Grinder" pump systems, one 45 gpm lift station for the elementary/intermediate school, a 200 gpm lift station located at the high school, and

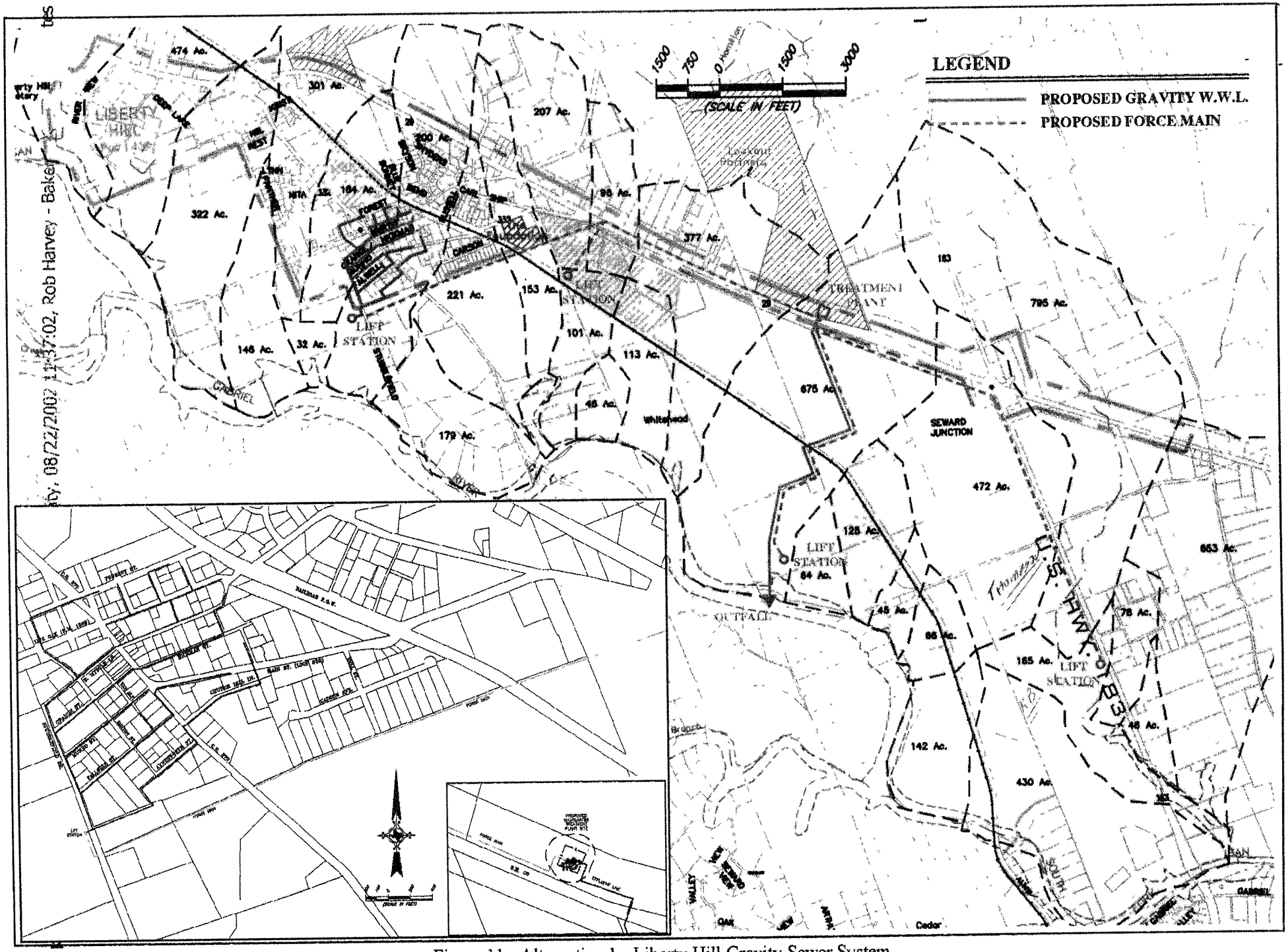


Figure 11 - Alternative 1 - Liberty Hill Gravity Sewer System

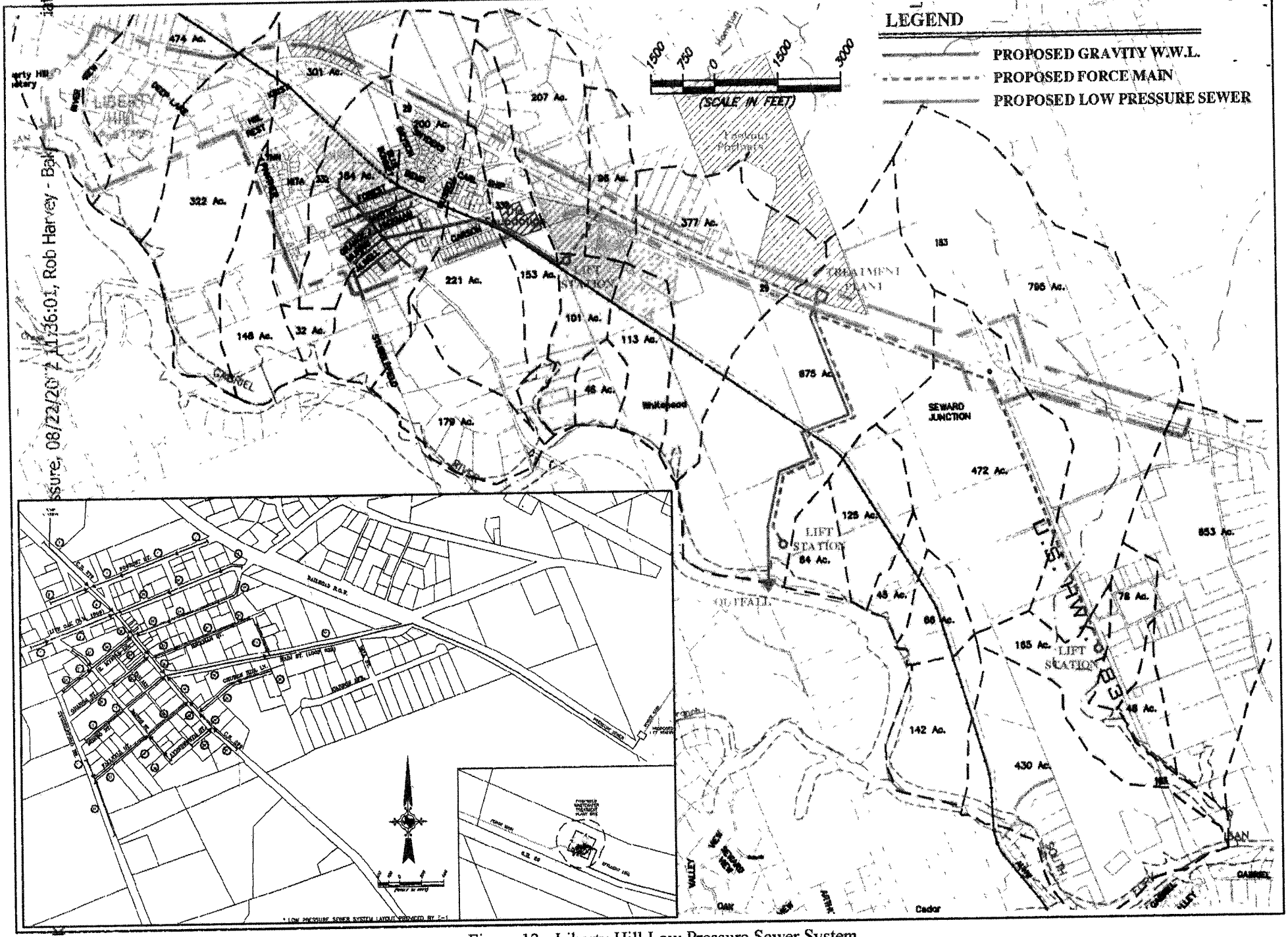


Figure 12 - Liberty Hill Low Pressure Sewer System

approximately 7,000 linear feet of 6-inch force main. Preliminary system design summaries are presented in Appendix 3.

Cost Comparison for the Liberty Hill Core Area

A net present worth analysis was performed for each of the alternatives for Liberty Hill based upon the opinions of probable cost for the capital improvements and operation and maintenance (O&M) costs. O&M costs for the gravity collection system were based upon data published by the EPA Office of Wastewater Management and the American Society of Civil Engineers and the Water Environment Research Federation (1,2). O&M costs for the low pressure sewer system were obtained from Environment 1 Corporation. O&M costs include electrical costs for the lift stations and grinder pump stations. Individual cost estimates are presented in Appendix 4.

The assumptions used in the net present worth analysis were as follows:

- 50 year life for the gravity collection system and the pressure sewer system
- 20 year life for the lift station pumps and controls
- 15 year life for the grinder pumps and controls
- 3.5 % discount rate and 5 % interest rate

Summaries of capital, O&M, and net present worth are presented in Table 2. The low pressure sewer system offers significantly lower initial capital outlay, but higher annual operating costs and a higher net present worth. Inclusion of the High School lift station did not have a significant impact on the the annual O&M costs or net present worth for the gravity collection system.

Table 3 – Capital, O&M, and Present Worth Comparisons**

Alternative	Capital Cost	Annual O&M	Present Worth
Alternative 1 - Gravity Collection System w/ Liberty Hill Force Main (w/o High School Lift Station)	$1,455,500	$6,663	$1,658,254
Alternative 1 A - Gravity Collection System w/ Liberty Hill Force Main (w/ High School Lift Station)	$1,532,700	$6,723	$1,748,469
Alternative 2 - Low Pressure Sewer System w/ High School Lift Station & Force Main	$1,096,200	$10,389	$1,998,231

** Costs include a 20 % contingency but do not include land, easement or engineering and surveying.

Because of the significantly lower capital expense but the higher annual O&M, selection of the alternative best suited for this area should be based upon other considerations with public input. Such considerations would include the overall monthly rates associated with each alternative, the preferences of the system operator, and the relative impacts of installing a gravity system with its more expansive excavations versus a low pressure sewer.

Seward Junction

Given the rolling terrain and large number of watersheds, it is difficult to project what a wastewater collection system for the remaining area will look like. As such, any analysis on the type of system that may be installed is more qualitative than quantitative in nature.

For the purposes of this study, we assumed the gross capital cost per acre for the core area of Liberty Hill could be used to estimate the cost of providing service to the Seward Junction area. The capital cost per acre for the low pressure sewer system was $6,575; that for the gravity collection system was $11,470. The lift station cost was not included in the total low pressure sewer system unit costs because it is believed that this area can be served without the need for an additional lift station.

The two alternatives previously evaluated, gravity collection with a lift station and force main or a low pressure sewer system, are also applicable to the area. The largest sub-basin in the study area lies along US 183 and consists of six separate small drainage basins covering over 2,200 acres. For the 20 year planning horizon, it is anticipated that future growth in this area will be primarily commercial/industrial in nature and will produce a total wastewater flow of 30,000 gallons per day, or less than 5 % of the total projected flow. It is believed that this growth will be concentrated near Seward Junction. We estimate that the gross commercial area developed will be in the range of 380 to 600 acres or only 17 to 27 % of the total basin area. Estimated capital cost for a low pressure sewer system range from $2,498,500 to $3,945,000; capital costs for a gravity collection system are estimated to be $4,612,000 to $7,04,000. The net present value for these alternatives would be similar to those for the core area.

Based upon the location of existing commercial development at Seward Junction and the general topography of the area, installation of a pressure sewer system is recommended. This will allow service to be provided to existing developments while minimizing capital costs. In our opinion, this alternative offers the most flexibility, the lowest initial expense, and minimizes the risk of locating improvements in areas where the timing of development is uncertain.

Other Service Areas

Most of the remaining proposed service area lies in the second largest drainage basin south of the proposed development by Lookout Partners. The entire drainage basin covers approximately 675 acres. The same alternatives are available to serve this area, low pressure sewer system or gravity collection system or a combination. However, because of the higher projected densities, the unit acre cost would rise significantly. Assuming that the unit cost for line work will not change significantly, what impacts the total cost most are the number of grinder pumps for the low pressure sewer and the number of services for the gravity system.

The core area of Liberty Hill contained approximately 1.31 services per acre. It is anticipated that new development will produce a net density of approximately 3.2 services per acre. Based on this, unit cost for a low pressure sewer system will increase form $6575 to $12,315 per acre; cost for a gravity system will increase by a smaller percentage because the cost of the service is less than the cost of the grinder pump, from$11,738 to $14,038 per acre.

While O&M costs would not change significantly for a gravity system, they would increase significantly for the low pressure sewer system because of the increased number of pumps. Each pump has an estimated yearly operating cost of approximately $55 (E-One Corporation). If we assume we can compare the operating costs on a per acre basis, the annual operating cost for the gravity system would remain at approximately $54 per acre. The annual operating cost for the low pressure sewer system would increase from $76 to over $200 per acre simply because the number of pumps has increased from 1.3 to 3.2 per acre.

SECTION 6

Evaluation of Disposal / Treatment System Alternatives

Evaluations of alternatives available for the treatment and disposal of wastewater are presented in this section. Disposal options are discussed first because the selection of the method for ultimate disposal of wastewater will determine the nature and extent of treatment required for the wastewater. Opinions of probable construction costs for the proposed treatment alternatives are presented in Appendix 5.

Disposal Options

The two options available for disposal of effluent from a wastewater treatment facility are direct discharge to a receiving water or effluent irrigation. For this particular case, discharge would be to the South Fork of the San Gabriel River in the approximate location shown on Figure 13. For the case of irrigation, a suitable site would have to be determined. There are distinct advantages and disadvantages to either alternative as discussed below. Regardless of the disposal method

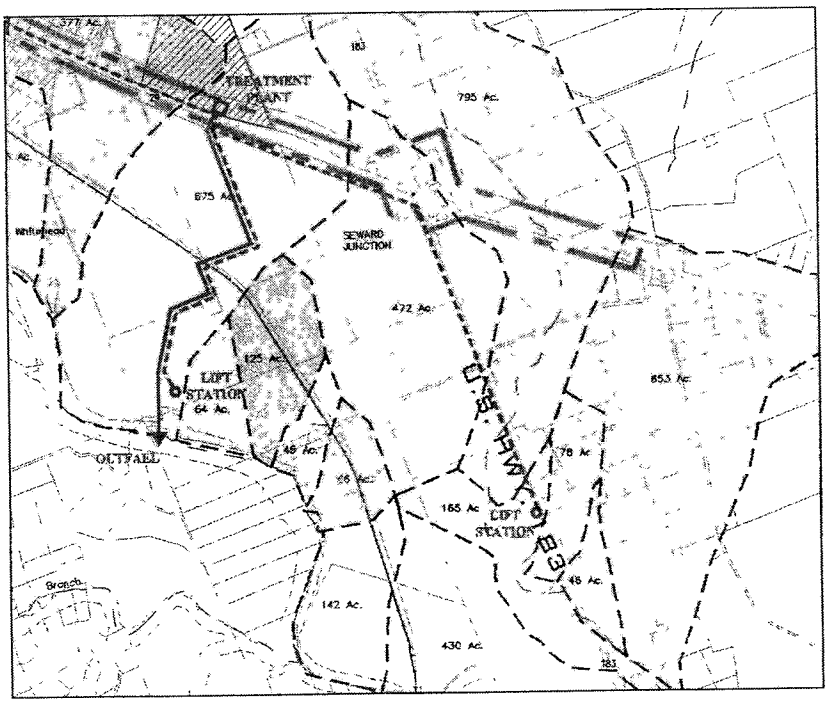


Figure 13 – Proposed Discharge Location

selected, a permit must be acquired from the Texas Natural Resource Conservation Commission (TNRCC). The permitting process is involved and can require upwards of 1-½ years to navigate.

The proposed discharge location into the South Fork San Gabriel is approximately 18 miles upstream from the Edwards Aquifer Recharge Zone. As such, it does not fall into a zone with special effluent requirements as required by Chapter 30 Texas Administrative Code Section 213, Edwards Aquifer. In a personal communication, TNRCC staff indicated that they did not for see any technical reasons a discharge at this location was not possible. However, historically, the TNRCC has required a high level of treatment for plants discharging into hill country streams and indicated we could probably anticipate an effluent limitation of 5 mg/L biochemical oxygen demand, 5 mg/L total suspended solids, 2 mg/L ammonia nitrogen, and possibly 1 mg/L phosphorus. The strict effluent discharge limitations will require a more complicated treatment system with additional unit processes such as filtration and/or chemical addition, which add to the capital, and O&M costs. A second factor that can be viewed as a negative for this alternative is the permitting process that can prove to be more contentious with a discharge permit versus that for irrigation.

Effluent disposal via irrigation typically requires only secondary treatment or 20 mg/L biochemical oxygen demand and 20 mg/L total suspended solids. However, as the disposal facility is in the contributing zone to the Edwards, it would reasonable to expect higher limitations such as enhanced secondary treatment or 10 mg/L biochemical oxygen demand and 15 mg/L solids.

Although overall treatment costs are reduced because of the less stringent effluent requirements, land disposal systems require effluent storage, suitable land, and an irrigation system. Effluent storage and required irrigable land are based upon a water balance that takes into consideration crop requirements, soil leaching requirements, and the need to provide storage during rainy periods. For the central Texas area, storage is typically in the range of 50 to 65 days and allowable land application rates are approximately 3 feet per year. Assuming 60 days of storage and 3 feet effluent irrigation, the projected year 2022 wastewater flow of approximately 645,000 gallons per day would require 119 acre-feet of storage and 240 acres of land. The cost of the pond and irrigation pumps and equipment will easily exceed the additional treatment plant costs for the discharge option. Assuming the storage pond was 5 feet deep with a 60 mil PVC liner, we estimate construction costs could exceed $3,000,000 for the pond alone. Additional costs would be required for the pumping facilities and irrigation network to distribute the effluent.

Since there are no known technical issues that would prevent discharge and because of the land requirements, increased capital costs for storage, and capital and O&M costs for the irrigation network, the discharge option is recommended. However, reuse of treated effluent to reduce raw water requirements should be encouraged where economically viable.

Treatment Alternatives

The selection of a treatment system is influenced by several factors including the required effluent standards, the degree of complexity of the system, and the amount of on-site operator supervision versus remote monitoring. For treatment plants serving smaller cities, the extended aeration mode of the activated sludge process is often the preferred alternative. Activated sludge is a term that refers to a treatment system in which naturally occurring bacteria are used to breakdown the organic materials in wastewater prior to ultimate disposal. The bacterial breakdown of organics in activated sludge is an aerobic process, or one that requires the addition of air, or, more specifically, oxygen.

The extended aeration mode of activated sludge is characterized by a comparatively long hydraulic residence time, which is the theoretical amount of time it takes for wastewater entering the process to pass through and exit the system. Hydraulic residence times vary from 16 to 24 hours for extended aeration facilities compared with 6 to 8 hours for what is termed a complete mix activated sludge system. The advantage the longer retention time offers lies in the fact that these systems are not as sensitive to fluctuations in flow or influent quality that can require more highly trained operators and more oversight.

Two variations of the extended aeration process were evaluated for this study: (1) a field erected, extended aeration facility; and (2) an oxidation ditch. The primary difference between these alternatives is the manner in which air is mixed in the activated sludge basin. For the field-erected steel or pre-cast concrete tank, air compressors force air through diffusers, comparable to the manner in which air is provided through a diffuser stone in an aquarium. For the oxidation ditch, air is mechanically introduced into the activated sludge by physical agitation.

Either of these alternatives in conjunction with filtration and possibly chemical addition, should phosphorus limits be imposed, is capable of achieving what we anticipate will be the required effluent standards. It is assumed that liquid sludge will be removed from the facility for off-site treatment and disposal.

A discussion of plant phasing, design wastewater characteristics, and preliminary site layouts and opinions of probable cost are presented in the following sections.

Treatment Plant Phasing

Based upon the previously presented population projections, the 2007 estimated yearly wastewater flow is approximately 227,000 gallons per day. Since TNRCC requires that engineering and financial planning be initiated upon a facility reaching 75 % of the design flow (for three consecutive months), we recommend a Phase 1 design flow of 300,000. TNRCC also requires that approvals be obtained so that construction may commence when the three-month

average flow reaches 90 percent of the design flow for a facility. For this particular case, flow would exceed this criterion in 2008, and a second 300,000-gallon per day plant would be required. Should the area experience growth that exceeds the population projections, a third phase, possibly 300,000 gallons, would be required in 2017. Because of the modular nature of plant design, making a mid-course correction as required to either provide more or less capacity can be accommodated.

Wastewater Characteristics

Design wastewater characteristics for municipal treatment plants are well documented and fall within a small range. As previously indicated, we anticipate the need to construct the first phase of the regional wastewater facility to treat 300,000 gallons per day. A summary of the characteristics used for the preliminary design of Phase 1 is presented in Table 4.

Table 4 – Design Wastewater Characteristics
Liberty Hill Regional Wastewater Study Phase 1

Average Dry Flow (gpd)	250,000			
Wet Weather Maximum 30 Day (gpd)	300,000			
Peaking Factor	1.99	Peak Factor = [(18+(0.0206*F)^.5/(4+(0.0206*F)^.5		
Peak Flow (gpd)	1,248,260	Includes 750 gpd/acre I&I		
Overall Peak Factor	4.2			
Influent BOD5				
Average Day	200	mg/L	417	lb/day
Maximum Month	250	mg/L	521	lb/day
Influent TSS				
Average Day	200	mg/L	417	lb/day
Maximum Month	250	mg/L	521	lb/day
Influent Ammonia				
Average Day	15	mg/L		
Maximum Month	20	mg/L		
Influent Phosphorus				
Average Day	7	mg/L	15	lb/day
Maximum Month	10	mg/L	21	lb/day

Field Erected Extended Aeration Treatment Facility

The field erected extended aeration facility would consist of either steel tanks, typically circular tanks with a centrally located clarifier which takes advantage of common wall construction

(concentric design), or prefabricated concrete tanks or concrete tilt wall construction with an external clarifier. Each material offers advantages and disadvantages. Capital costs for the steel plant can be lower than that for a prefabricated concrete or concrete tilt wall construction, however long term maintenance costs for painting may increase the overall life cycle costs for the steel plant versus the concrete plant. The final decision on the choice of materials will ultimately depend upon preferences of the operating authority.

For the purposes of this study, we assumed the installation of a steel plant with the concentric design configuration. A conceptual design for this type of facility is presented in Figure 14. The system consists of an influent lift station, aeration basin, clarifier, effluent filtration, ultraviolet disinfection, and a sludge holding tank. Ultraviolet disinfection was preferred over chlorination for disinfection to avoid the potential need to dechlorinate the wastewater prior to discharge.

The facility layout is such that it can be constructed in up to three phases. As previously stated, the Phase 1 average daily flow is 300,000 gallons per day; the peak daily flow is 1,248,000 gallons per day. The total fenced area for this site is approximately 1 acre, while the required buffer zone covers approximately 3.5 acres. The buffer zone is a 150-foot radius zone required by TNRCC to insulate residential and commercial properties from treatment plant operations.

The opinion of probable construction cost for the extended air facility, including a 20 percent contingency but not engineering and surveying, is approximately $1,761,600. A detailed cost breakdown for this option is presented in Appendix V.

Oxidation Ditch

An oxidation ditch, also known as a racetrack because of its oval shape, is also a typically employed treatment option used in the anticipated range of flow. An oxidation ditch consists of a concrete lined, trapezoidal channel, usually 5 to 6 feet in depth. Because of limitations usually associated with the aerators, the top width of the channel is limited to about 22 feet. This system requires an external clarifier with return activated sludge pumps, filters and disinfection. Depending upon the preference of the owner/operator, a sludge holding tank may or may not be required.

A conceptual level site plan is presented in Figure 15. The facility layout allows for the installation of parallel treatment systems for expansion. First phase average and peak design flows would be the same as previously discussed. The total fenced area for this site is approximately 3 ½ acres while the buffer zone would extend over 6 acres. The preliminary opinion of probable construction cost for this alternative is $1,742,400; a detailed cost breakdown is presented in Appendix V.

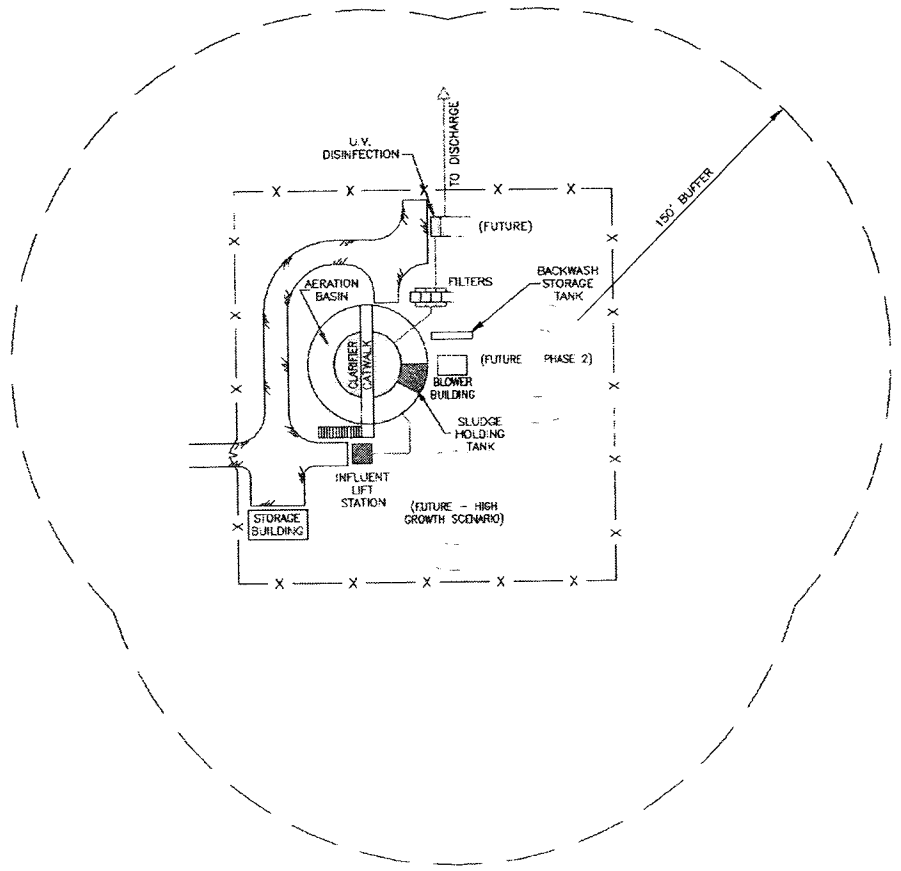


Figure 14 – Conceptual Site Layout
Extended Aeration Treatment Facility

Comparison of Alternatives

There is not a significant difference in the overall construction costs for either of the alternatives investigated. What was not included in the analysis was the cost for land. Smaller land requirements are obviously an advantage for the extended aeration facility, however, assuming land costs of approximately $7,500 per acre, the overall impact on the project would be minimal. Electrical costs, the single largest expenditure for a treatment facility, will likely be lower with the oxidation ditch because the brush aerator is more efficient than diffused air in the extended aeration process.

Historically, the major shortcoming for the oxidation ditch has been poor durability of the shaft and bearings on the brush aerator. The aerator manufacturers addressed this issue, however, some installations continue to experience the problem. Another issue arises from the fact that the changing depths in the ditch at different flows affect the efficiency of aeration. This issue can be overcome, however, by using motor operated weirs to control the water level.

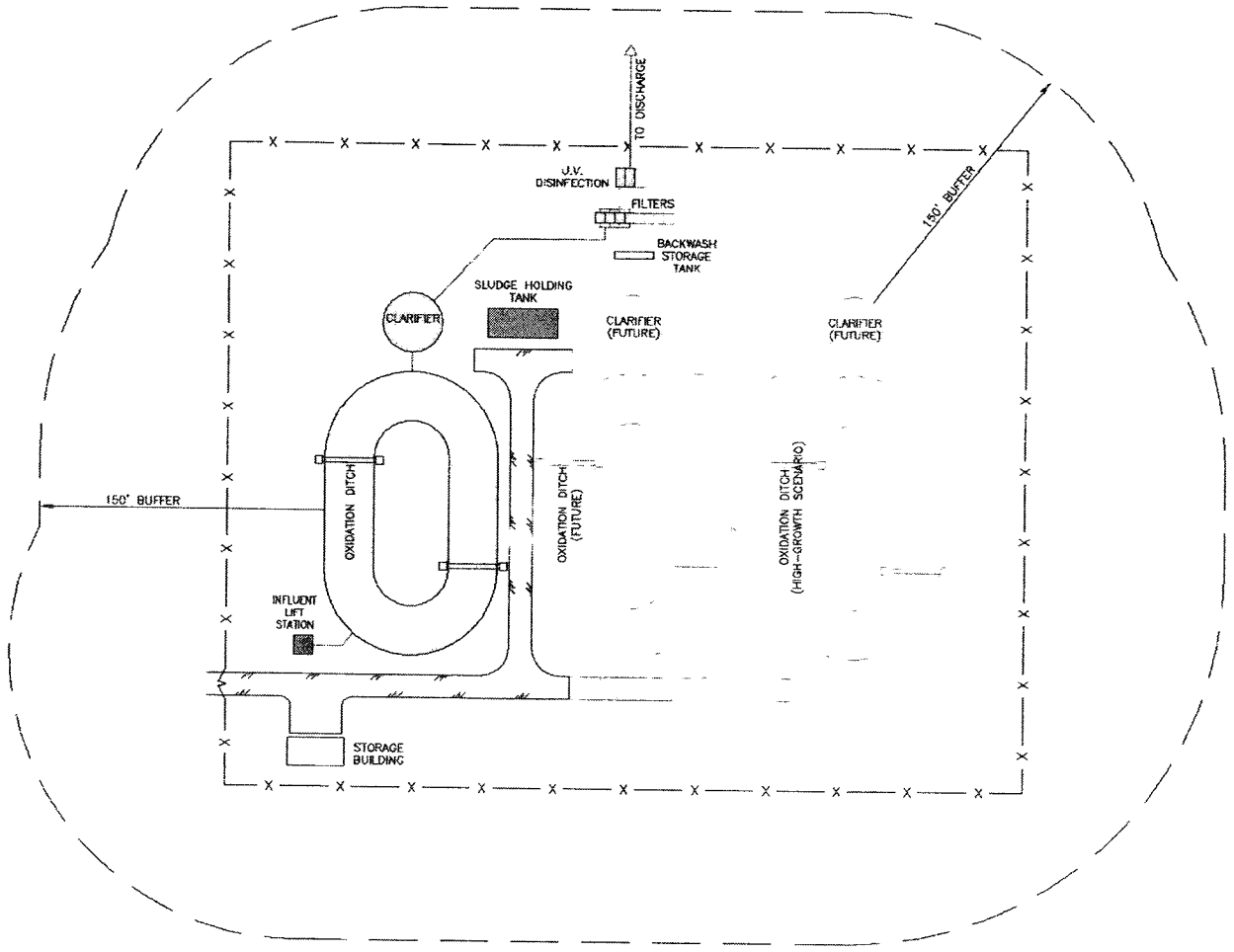


Figure 15 – Conceptual Site Plan
Oxidation Ditch

The extended aeration facility utilizing diffused aeration provides good mixing, maintains liquid temperatures during colder periods of the year, and the ability to vary the air flow provides good operator flexibility. Although the diffused extended aeration system has higher energy costs, it is a very reliable system and the aeration efficiency will not vary with variation in flows.

The ultimate decision on whether to implement an extended aeration facility will depend upon the owner/operator preference and issues such as the site geology, which could increase the oxidation ditch cost.

Other Capital Cost Associated with Treatment / Disposal

Two other items that have not been mentioned to this point but that will impact the overall project cost are the effluent line that will transport treated wastewater to the point of discharge and costs associated with the permitting process. An opinion of probable costs and preliminary plan and profile drawings for this line are presented in Appendix 6. The overall alignment was illustrated in Figure 13 at the beginning of this section. This line extends approximately 8,000

linear feet from the proposed plant site to the South Fork of the San Gabriel. Depending upon whether the effluent line is designed as a low-pressure line flowing under gravity or whether a conventional gravity line with manholes is installed, the opinion of probable construction cost ranges from approximately $465,000 to $616,000. This issue deserves further discussion since it involves significant reduction in capital cost.

The costs associated with permitting will consist of engineering and attorney fees for permit preparation, cost of attending public meetings, and the cost of providing assistance for a contested permit. As previously indicated, the permitting process can take upwards of 1-½ years and involve lengthy negotiations. We recommend allowing $150,000 to cover all associated costs in anticipation that the permit would be contested.

SECTION 7

Environmental and Cultural Resource Assessment

This section presents the results of a preliminary cultural resources study by Patricia McCoy of the Lower Colorado River Authority. The purpose of the assessment was "to provide a general natural resources baseline for the project area based upon in-house data." A site visit was not performed for this phase of overall feasibility study. The overall intent of the environmental assessment was to raise any red flags that would impact or preclude the proposed location of the treatment plant and other improvements. It should be noted, that at the time this assessment was performed, the upper treatment plant site that was the recommended alternative was not under consideration. In any event, the plant site ultimately selected will require a more thorough investigation. The report by Ms McCoy is presented in its entirety below.

"Methods

An in-house review was made of the following: USGS 7.5-minute topographic Liberty Hill and Leander NE, Texas quadrangles; NRCS Williamson County Soil Survey (NRCS, 1983); and data for species and habitat of concern on file at Texas Parks and Wildlife Department's (TPWD) Wildlife Diversity Center.

Seven possible and approximate locations for a WWTP have been identified on an area map. The approximate Study Area was defined to encompass these seven sites and the infrastructure that would be necessary to service Liberty Hill and nearby development. No site visit was conducted for this planning phase of the project.

Findings

Land Use

The majority of land within the study area is in agriculture or used for livestock grazing. There are a few sand and gravel mining operations along the waterways. The town of Liberty Hill and scattered residences constitute the primary development in the area. There are two large residential developments planned within the ETJ of Liberty Hill. These developments would be served by the proposed WWTP.

Hydrology/Topography

Within the Study Area, drainage is from just north of Highway 29 south into the South Fork of the San Gabriel River. The South Fork of the San Gabriel River flows roughly from west to east and forms the southern boundary of the Study Area for this report. There are seven unnamed tributaries to the river within the Study Area. Most of these tributaries have unnamed secondary tributaries.

The topography of the Study Area grades from approximately 1,050-ft elevation to the north to approximately 900-ft elevation at the South Fork San Gabriel River, a distance of approximately two miles.

Soils

The Williamson County General Soil Map indicates two major soil associations for the Study Area. The Denton-Ekcrant-Doss Association consists of moderately deep, shallow and very shallow, calcareous, clayey, cobbly and stony soils formed in indurated fractured limestone or limy earths; on uplands. The Oakalla-Sunev Association consists of deep, calcareous, loamy soils formed in alluvium; on bottom lands and stream terraces and are found along the river.

There are no hydric soils listed for Williamson County. The presence or absence of Prime Farmland was not investigated for this phase of the project.

Vegetation

The Study Area is primarily in agriculture or pasture. Some areas adjacent to the river are planted in orchards. There may be wooded riparian areas along some of the waterways in the South Fork San Gabriel River system.

Species or Habitat of Concern

Species of concern that are identified as potentially occurring in Williamson County include the Mountain Plover, a winter migratory resident to the area. The Mountain Plover is classified as "potentially threatened" on a national level. There are no occurrence records of this species or other species and/or habitats of concern within, or adjacent to, the Study Area.

Summary & Recommendations

When preparing the Environmental Assessment and planning the project, special attention should be paid to waters of the United States. Waters of the U.S. include streams, creeks, ponds, rivers, and wetlands. An area may be considered a water of the U.S. and not be inundated or saturated during portions of the year, including during the growing season. Impacts to these features may

require coordination with the U.S. Army Corps of Engineers and/or compliance with regulatory conditions.

Riparian areas, wooded or vegetated banks of waterways, are special areas of concern and should be avoided if at all possible."

SECTION 8

Phased Implementation Schedule

Phasing of proposed improvements ensures cash flows are optimized and improvements are in place when needed. The timing of required improvements and capital outlays are summarized in this section. Costs for required wastewater improvements for future developments are estimated based upon extrapolating the opinion of probable cost determined for Liberty Hill as previously discussed.

Overall Phasing

The projected wastewater flow over the twenty-year design period is illustrated in Figure 16. Key milestones are superimposed on the estimated flows to indicate critical dates with regard to planning, design, or implementation. The recommended treatment plant phasing is to construct two 300,000 gallon per day plants, one initially, to come on line in the summer of 2004; the second by the third quarter 2009. Planning for a third expansion would be required when the flow exceeded 75 % of the design capacity, or 450,000 gallons per day, projected to be around the fourth quarter 2015. It should be noted that mid-course corrections can be made prior to the first expansion should growth exceed the estimates.

Phase 1 Implementation Schedule

A preliminary project schedule for the proposed wastewater treatment plant Phase 1 and City of Liberty Hill wastewater improvements is presented in Figure 17. Milestones, critical dates to maintain in order to keep the project on schedule, are presented in red text. The schedule assumes that the wastewater permitting process will take approximately one year to complete. Based upon a "fast track" construction schedule, we believe the earliest date that a wastewater treatment plant could be placed in operation is June, 2004. It should be noted that we have scheduled submittal of the 90 % plans to the TNRCC. The 90 % plans will essentially be complete with only minor revisions required on the plans or in the contract documents that should not impact the review process.

Since the method of funding has not been selected, the preliminary schedule for the City of Liberty Hill Improvements is not as clear. Depending upon the funding method selected and the project's priority with the funding program, the scheduled improvements could be delayed. The proposed schedule is based upon installation of a gravity sewer system. In our opinion, installation of a pressure sewer system could reduce the overall project schedule by two to three months.

In any event, the earliest completion date would coincide with the completion of the treatment plant, or Summer 2004.

With the information available at the time of issue for this report, it was not possible to determine a schedule of improvements for proposed developments. However, based upon conversations with the developer, it was assumed that buildout for the initial development would take approximately 7 to10 years.

Capital Expenditures

The total projected costs for the first two phases of the treatment plant and for the City of Liberty Hill wastewater improvements are presented in Table 5. Costs are not included for proposed development internal utilities. City of Liberty Hill costs are based upon the installation of a pressure sewer system. Design engineering and surveying costs were assumed at 15 % of the capital costs; engineering and surveying construction phase services are estimated to be 2.5 % of capital costs.

Table 5 – Capital & Engineering & Surveying Cost Summary

Description	Capital Cost**	Engineering & Surveying	Total
City of Liberty Hill Wastewater Improvements	$1,096,000	$192,000	$1,288,000
Wastewater Treatment Plant and Effluent Line	$2,226,000	$389,000	$2,615,000
Subtotal Phase 1			**$3,903,000**
Wastewater Treatment Plant Expansion (2008)	$1,410,000	$247,000	$1,657,000
Total Capital Phase 1 & 2			**$5,560,000**

** - 2002 Dollars

Additionally, permitting costs of $150,000 should be allocated as previously indicated.

A projected cash flow for the Phase 1 wastewater treatment plant and effluent line only is superimposed on the projected number of services in Figure 18. It is assumed project funding would be required to initiate permitting and design beginning in October 2002. Permitting costs were added to the engineering and surveying costs and appropriated over a 12-month period. All costs are in 2002 dollars.

SECTION 9

Funding Options

There are several mechanisms available to the participants for funding. Firstly, the City of Liberty Hill can pursue the following options:

- Community Development Block Grants
- Rural Utility Service Loans
- Texas Water Development Board Loans
- Lower Colorado River Authority Funds

A brief description of each of these options follows.

Community Development Block Grants (CDBG) are administered by the Texas Department of Housing and Community Affairs (TDHCA). Block grants require a minimum of 51 % of the beneficiaries of the block grant be of low to moderate income. The grants require 10 % matching funds or in-kind services from the grantee. Grants are limited to a $250,000 maximum. In the past, there has been a two-year funding cycle, that is, funds are appropriated for 2 years. Once those funds are expended, an applicant will have to wait for the next funding cycle to be funded. A project must have the support of the local Council of Government (COG) to ensure it is funded.

The Rural Utility Service (RUS), a division of the Rural Development Administration offers grants and low interest loans. Eligibility for a grant is dependent upon the median household income. Prior to the last census, the cut-off for grants was a median household income in excess of $27,043. Between $21,634 and $27,043, grants are available to cover 50 to 75 % of the total project costs, with a RUS loan for the remainder. The median income for Liberty Hill determined from the income survey of a couple of years ago did not fall into this range, however, the response was not very good. Higher participation in the survey could result in portions of a project being eligible. The RUS loans carry a 40-year term, and a current interest rate of approximately 4.5 %. Application for a RUS loan/grant can be made any time during the year.

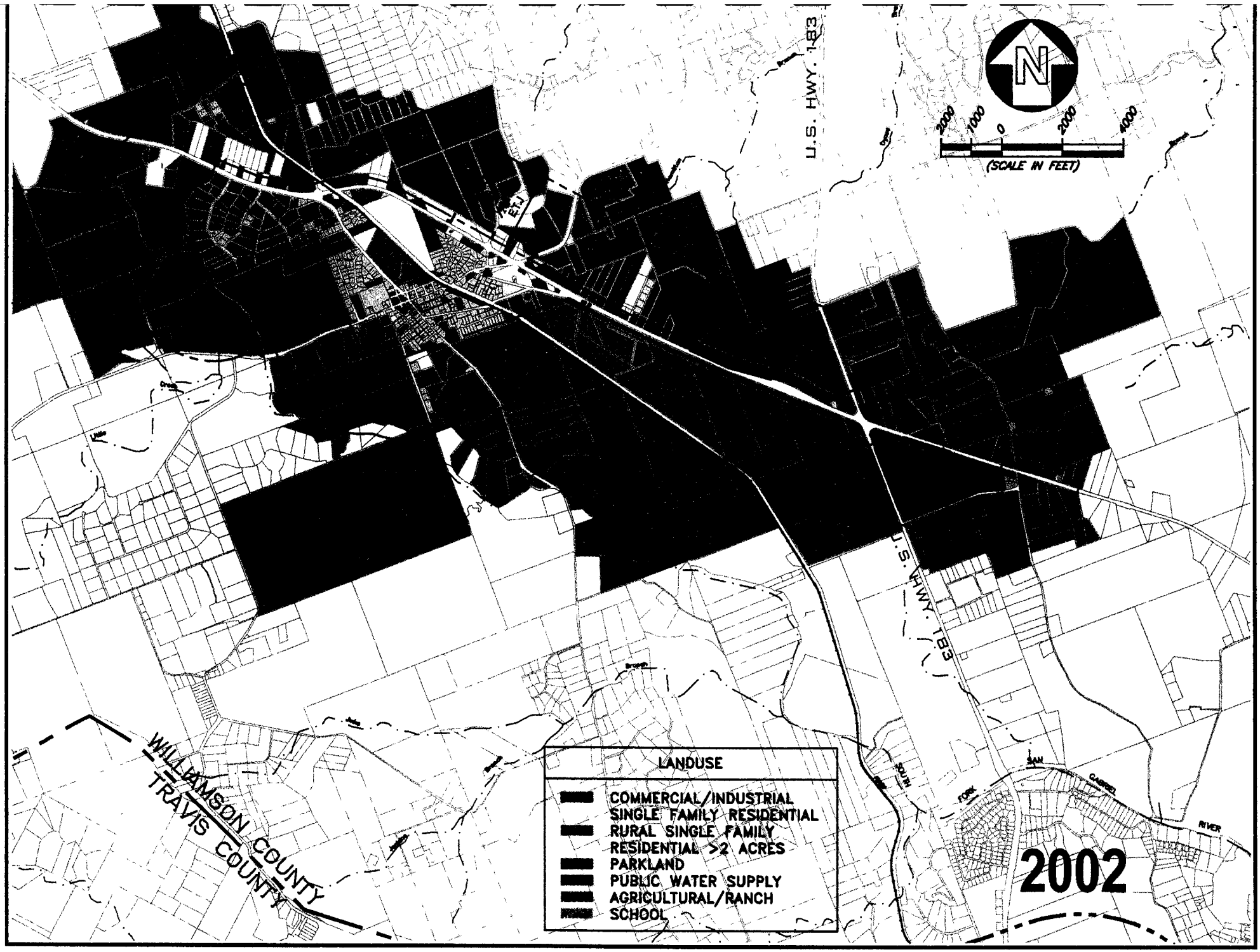
The Texas Water Development Board has a low interest loan program for water and wastewater improvements called the Clean Water State Revolving Fund. This fund provides low interest loans, approximately 1 % below the market rate, currently approximately 4.5 % for system improvements. Applications are solicited yearly, with funds approved on a first come/first served basis. For this type of funding, the City issues bonds, and the State buys the City's bonds.

The Lower Colorado River Authority can and does provide funding for these types of projects. The LCRA can issue Contract Revenue Bonds solely supported by project revenues, or LCRA Revenue Bonds issued on the open market or through the Texas Water Development Board's

Clean Water State Revolving Fund. The LCRA typically will incorporate the capital requirements of a project such as this with a much larger overall bond offering. Because of this, the LCRA obtains interest rates that are very advantageous and lower than what the City could obtain outside of the avenues discussed above. The LCRA offers the advantage, that provided the project is economically viable, there is not an application process that would entail an evaluation against other competing political subdivisions.

APPENDIX 1

LAND USE PLANS 2002-2022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RURAL SINGLE FAMILY
RESIDENTIAL >2 ACRES
PARKLAND
PUBLIC WATER SUPPLY
AGRICULTURAL/RANCH
SCHOOL
SOUTH
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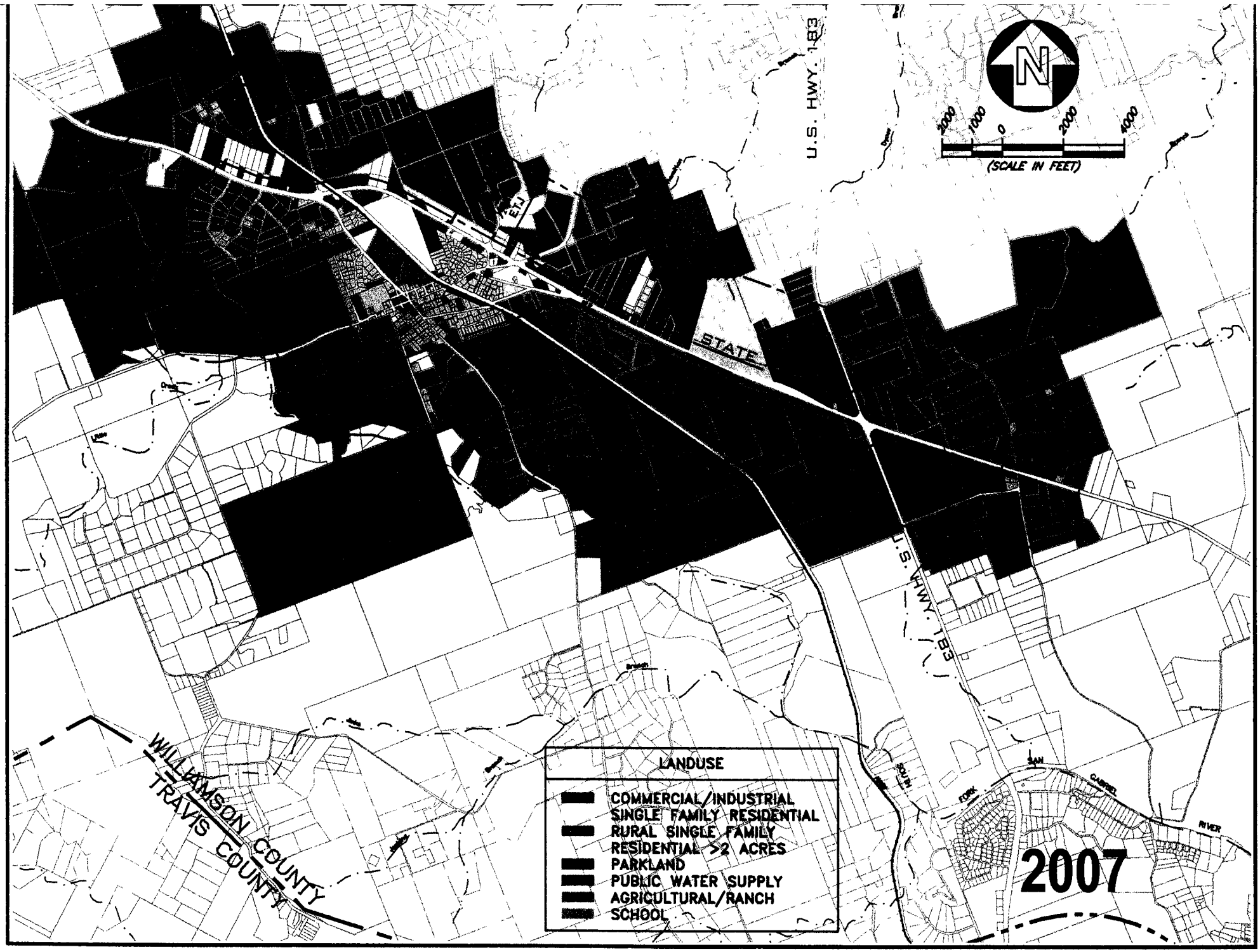
SAN
GABRIEL
RIVER
2002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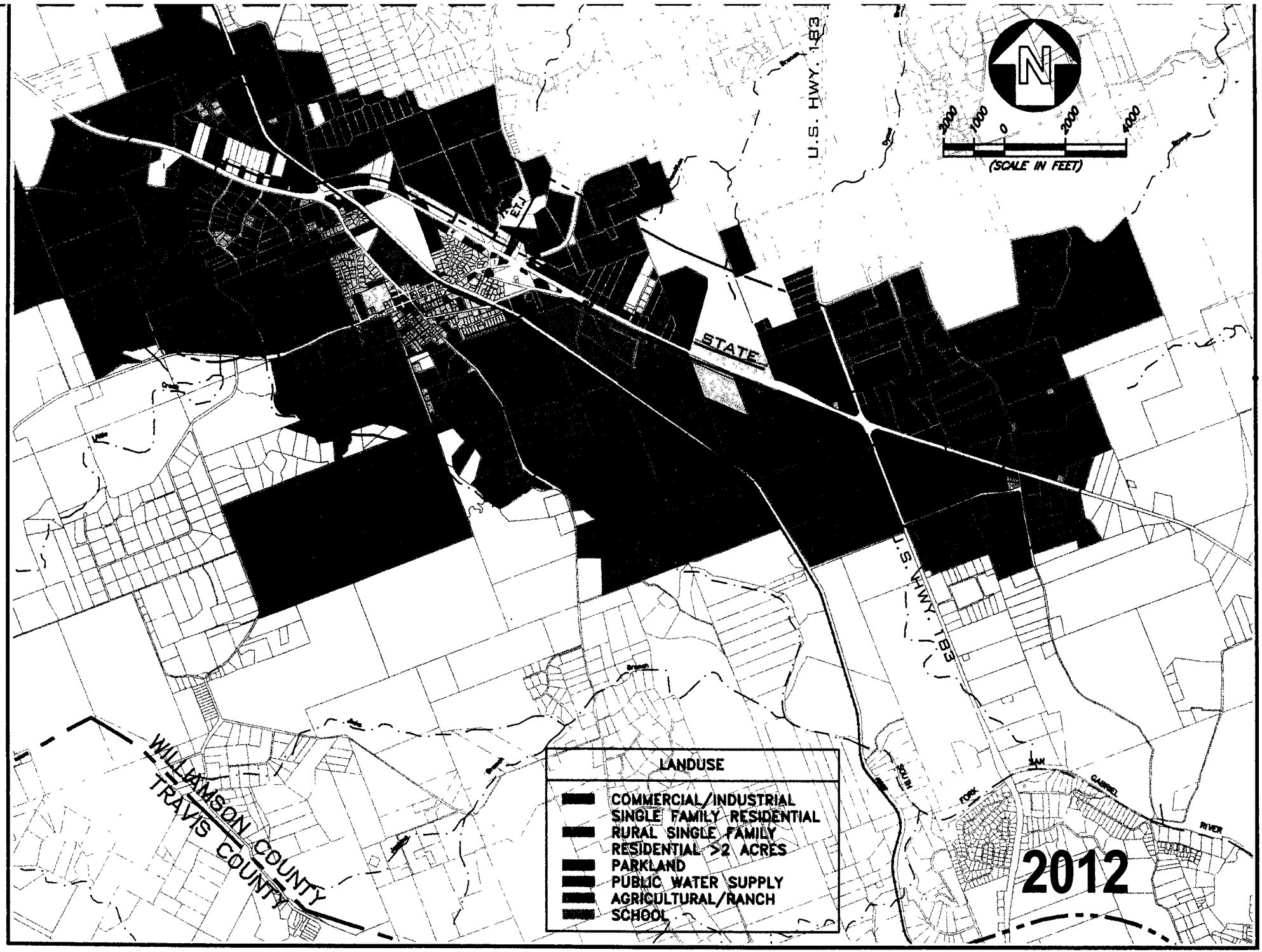
PUBLIC WATER SUPPLY
AGRICULTURAL/RANCH
SCHOOL
2007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RESIDENTIAL >2 ACRES
PARKLAND
PUBLIC WATER SUPPLY
AGRICULTURAL/RANCH
SCHOOL
2012