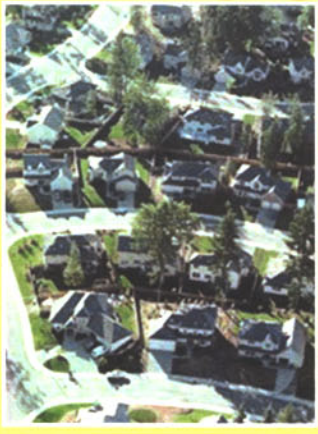
North Harris County
REGIONAL WATER
Authority

Groundwater Reduction Plan



May 2003

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ARCADIS

Groundwater Reduction Plan

Prepared for

North Harris County Regional Water Authority

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EXECUTIVE SUMMARY

The North Harris County Regional Water Authority (NHCRWA) is a governmental agency created by House Bill 2965 of the 76th Texas Legislature. One of the primary missions of the NHCRWA is to deliver an alternate water supply that reduces groundwater withdrawal by the NHCRWA's fee-paying customers and gain compliance with the mandates of the Harris-Galveston Coastal Subsidence District (HGCSD). The NHCRWA has 160 political subdivisions that include cities, Municipal Utility District's (MUD), Public Utility District's (PUD), Water Control and Improvement District (WCID), Utility District's (UD), etc., (collectively referred to as MUDs) as well as independent well owners that combined have a total of 1,612 groundwater wells within the NHCRWA. The total year 2000 well pumpage within the NHCRWA as reported to HGCSD was over 25 billion gallons.

The HGCSD is an underground water conservation district that was created for the purpose of regulating the withdrawal of groundwater in Harris and Galveston Counties to minimize land subsidence. Their 1999 District Regulatory Plan divides the district into three regulatory areas. Areas 1 and 2 have gained substantial compliance with the requirements of the plan. The NHCRWA is located in Area 3 and must meet the following regulatory schedule:

- Complete certification of Groundwater Reduction Plan (GRP).
- Begin construction of infrastructure by January 2005.
- Meet 30 percent conversion to alternate water source by January 2010.
- Meet 70 percent conversion to alternate water source by January 2020.
- Meet 80 percent conversion to alternate water source by January 2030.

The area that is under the jurisdiction of the NHCRWA is expected to experience significant growth. The actual population and water demand for the year 2000 and projected populations and water demands for the years 2010, 2020, and 2030 are shown in the following table.

NHCRWA Population and Water Demand Data[1]

Year	Population	Water Demand (mgd)
2000	397,000	69.2 [2]
2010	488,000	79.4
2020	608,000	98.0
2030	688,000	110.7

[1] See *Table 3*
[2] See *Table 4*, HGCSD's year 2000 pumpage

The NHCRWA has entered into a contract with the City of Houston (COH) to buy capacity in the raw water, treatment, and transmission system facilities owned or contracted by the COH. The treated surface water source will be the Northeast Water Purification Plant (NEWPP). The contract

is a long-term agreement that will satisfy the NHCRWA's requirements for an alternative source of water through at least 2030. Initially, the NEWPP will be a 40-mgd facility, with a phased expansion of approximately 40 million gallons per day (mgd). The plant is designed as a comparatively constant flow facility, with a 6-hour storage capacity and very little capacity to accommodate peak flows. The COH requires that water be metered at the point(s) at which it is taken by the NHCRWA. The NHCRWA intends to deliver water from the COH meter point to the NHCRWA's ground storage tanks. The NHCRWA will re-pressurize the water for distribution to its customers.

The NHCRWA will build its primary water transmission lines from the COH delivery points to its boundary in two construction phases. One transmission line will be constructed initially to satisfy the 2010 through 2019 conversion requirements. A second transmission line will be constructed to meet the requirements for 2020 through 2030. Other entities may pay a pro-rata share for capacity in the NHCRWA's transmission pipe. The Central Harris County Water Users Consortium and the West Harris County Regional Water Authority have been identified as possible participants at this time. The NHCRWA requested its primary water distribution system be sized and designed to provide all wholesale customers water at system pressure (55 to 65 pounds per square inch). Rates of water consumption vary widely throughout the year. Since the NEWPP will supply water at a comparatively constant rate, peaking requirements of wholesale customers will be provided from water sources within the NHCRWA Service Area.

A periphery connection will be made to each MUD from the NHCRWA primary distribution system. This is based on assumption that all MUD distribution systems have a large diameter line where the NHCRWA could connect to it. Refilling the wholesale customer's ground storage tank with water will require construction of a short supply line at its water plant, from its distribution system to its ground storage tank. Although this line will be closed any time the MUD booster pumps are operating, the NHCRWA's primary distribution system will be designed to still deliver average daily flow under normal conditions. The distinct advantage of system pressure delivery, as viewed by the NHCRWA, is the opportunity for some customers to phase out the operation of their groundwater wells, or its entire water plant(s), i.e., wells, storage tanks, and pumps. The latter is beneficial because of deteriorating water plants and the ability to take advantage of a regional source of supply. However, peak day operations of the system will be complex and rely heavily on instrumentation, controls, and predictive real time modeling to determine use of groundwater wells. It will also require that the operators be able to activate and deactivate individual wells to maximize the use of surface water.

The NHCRWA proposes to construct regional water plants and regional wells with collection lines to its regional water plants. This additional infrastructure is necessary to offset the wholesale customer's option to phase out its wells or entire water plants. The proposed additional wells will be submitted for permits through the various regulatory agencies for approval.

The area that will be served in 2010 is the central portion of the NHCRWA. The area is roughly bounded by SH 249 on the west, Spring Cypress Road on the north, IH 45 on the east, and FM 1960 and Bammel North Houston Road on the south. This area was chosen because of the high population density, economics of serving the area of greatest water demand and because several MUDs need an

alternate source of water to alleviate existing groundwater quality or quantity issues. The estimate of probable project cost for the 2010 system including engineering, land acquisition, permits, transmission lines, storage tanks, pumping stations, and distribution piping is $181.6 million, excluding interest, financing costs, and water capacity purchase.

The 2020 and 2030 conversion areas will spread outward from the initial area. The estimates of probable costs for 2020 and 2030 are $402.1 million and $29.1 million, respectively, and $612.7 million total for all three decades, excluding interest, financing costs and water capacity purchase. The above estimates of probable costs were developed using Region H Water Planning Group 1999 unit values.

The NHCRWA anticipates that water reuse and early/over conversion may generate credits against the total amount of surface water that must be used to achieve compliance. The NHCRWA reserves the right to submit for consideration an amended GRP in the future discussing these concepts along with a methodology of applying credits.

SECTION 1 – INTRODUCTION

The North Harris County Regional Water Authority (NHCRWA) has developed this Groundwater Reduction Plan (GRP) to demonstrate its commitment to meeting the groundwater conversion requirements of the Harris-Galveston Coastal Subsidence District (HGCSD).

A. HGCSD'S 1999 DISTRICT REGULATORY PLAN – AMENDED 9-12-01

The HGCSD was created in 1975 as an underground water conservation district under Article XVI, Section 59 of the Texas Constitution. The charge of the HGCSD is to regulate withdrawal of groundwater in Harris and Galveston Counties for the purpose of reducing the rate of land subsidence. Regulatory procedures for the minimization of subsidence have been implemented in a series of District Regulatory Plans. The most recent plan is the 1999 District Regulatory Plan as amended on September 12, 2001.

The 1999 District Regulatory Plan divides the HGCSD into three Regulatory Areas (see *Exhibit 1*). The Regulatory Areas have been reconfigured from the previous plan to generally reflect converted versus unconverted areas. The 1999 District Regulatory Plan requires that non-exempt municipal utility districts and individual well owners within Area 3 prepare a GRP to identify how they will replace groundwater demand with alternate sources of water according to the following schedule:

1. Beginning in January 2003, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) will be required to submit a GRP to the District for certification.

2. Beginning in January 2005, a permittee will be required to provide the District with evidence that construction of the infrastructure defined within the permittee's certified GRP has started.

3. Beginning in January 2010, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 70 percent of the permittee's total water demand.

4. Beginning in January 2020, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 30 percent of the permittee's total water demand.

5. Beginning in January 2030, and continuing thereafter, a permittee (or a group of permittees operating under a single permit, within the same regulatory area) shall be required to reduce and maintain their groundwater withdrawals to comprise no more than 20 percent of the permittee's total water demand.

A disincentive fee shall be applied to any groundwater withdrawals that constitute greater than 20 percent of a permittee's (or a group of permittees operating under a single permit within the same

regulatory area) total water demand if a permittee has not developed and received certification of a GRP by the permit renewal date or if a permittee is not able to provide evidence of construction of the infrastructure defined within the permittee's certified GRP by January 2005 (Item 2 of this section).

Similarly, a disincentive fee shall be applied to any groundwater withdrawals that constitute greater than 20 percent of a permittee's (or a group of permittees operating under a single permit within the same regulatory area) total water demand if a permittee is not in compliance with the reduction schedule found in Items 3, 4, and 5 of this section.

B. HISTORY OF NHCRWA

House Bill 2965 of the 76th Texas Legislature created the NHCRWA. A map of the NHCRWA boundary is shown in *Exhibit 2*. The NHCRWA is located within the HGCSD Regulatory Area 3. One of the NHCRWA's missions is to identify an alternate long-term supply of water for its customers to comply with the 1999 District Regulatory Plan. House Bill 1110 of the 77th Texas Legislature updated the initial legislation including changes to the inclusion of certain territories and eminent domain sections. Copies of both these house bills are provided in *Appendix A*.

The NHCRWA's GRP identifies the alternate water supply source. The areas within its boundaries that will be converted to the alternate supply to meet the HGCSD conversion schedule, plans for distributing water to meet the 2010 conversion requirement and for phasing construction of the distribution system to meet 2020 and 2030 goals, estimated costs of constructing the new facilities, and a method of financing the construction are all included in the GRP.

C. DESCRIPTION OF NHCRWA AND ITS CUSTOMERS

As shown in *Exhibit 2*, the boundaries of NHCRWA are essentially US 290 on the west, the Harris County line on the north (Spring Creek), FM 1960 and Bammel-North Houston on the South, and western shores of Lake Houston of the east. The NHCRWA has 158 political subdivisions within its boundaries that include municipal utility districts (MUDs) and public utility districts (PUDs), water control and improvement districts, fresh water supply districts, water supply corporations, municipalities, etc. (collectively referred to as MUDs), as well as independent well owners that have a combined total of 1,612 groundwater wells within the NHCRWA. The total year 2000 well pumpage within the NHCRWA as reported to HGCSD, was over 25 billion gallons. See *Table 1* for a further breakdown of the well production. There are currently approximately 250 entities, MUDs and independent well owners, with one or more groundwater wells that produce a cumulative total of 5 million gallons per year or more. The NHCRWA's fee-paying customers for this GRP include those entities whose cumulative annual groundwater well production is equal to or greater than 5 million gallons. However, this minimum flow rate is one of several factors that may include or exempt MUDs or independent well owners from being a customer to the NHCRWA.

The NHCRWA mailed Geographical Information System (GIS) Questionnaires to MUDs and independent well owners in November 2000. The returned GIS Questionnaires were completed to

various degrees. This limited data assisted in establishing unit demand factors calculated by review of well pumpage rates with existing and future connections, water plant facility sizes, and more. Results of these questionnaires show there were over 100 water plants and 150 system interconnects for either normal or emergency water system operations. In the future, additional questionnaires may be mailed requesting an update of earlier information and gathering other data, such as typical water use patterns, peaking factors, and disinfection and treatment systems.

SECTION 2 – POPULATION AND WATER DEMAND PROJECTIONS

This section discusses the sources of data for population projections and the methodology that was used to develop water demands based on the population projections. The water demands were used to determine the quantity of water that will be converted to an alternate source in 2010, 2020, and 2030. The demands were also used to size the piping for the transmission and distribution systems.

Sources of population and water demand data that are readily available include the Region H plan and the 1996 HGCSD report entitled *Update of Population and Water Demand Forecasts for the Harris-Galveston Coastal Subsidence District* (HGCSD 1996 Report). The Region H projections are not considered to be detailed enough to assess growth in small areas within the NHCRWA. This study used year 2000 census data and projections specific to the NHCRWA to more accurately reflect the conditions within the NHCRWA boundary. The NHCRWA received a letter from Reliant Energy to exclude the Wharton Power Plant in the NHCRWA GRP. Since the City of Jersey Village contracted 750,000 gallons per day (gpd) of water from the City of Houston, this amount is excluded from the NHCRWA's GRP. Only water demand projections over the contract amount are included in the NHCRWA GRP for the City of Jersey Village in the design of the proposed distribution system.

A. POPULATION PROJECTIONS

The population projections used in the GRP were taken from the Small Area Model-Houston (SAM-Houston) developed by the University of Houston Center for Public Policy (UH CPP). This is the same methodology upon which the *HGCSD 1996 Report* estimates of population projections were made. SAM-Houston combines modeling strategy with statistical processing of a wide variety of data sources about the Houston area. The SAM-Houston model allocates metropolitan-wide population and employment forecasts to each census tract in the five-county metropolitan area (Fort Bend, Harris, Liberty, Montgomery, and Waller Counties); the census tracts are shown in *Exhibit 3*. The projections are provided in 10-year increments through the year 2030. The UH CPP updated the SAM-Houston model with year 2000 census data combined with 1990 census land-use and employment data. The U.S. Census Bureau had not released its 2000 land-use and employment data.

Some SAM-Houston model projections appeared to have some anomalies in the projections that may not accurately reflect the growth that is occurring within the NHCRWA. The anomalies consisted of census tracts that showed either population decreases from 2000 to 2010 or tracts that showed population decreases over the entire period through 2030. In the case where 2010 population is lower than 2000, 2020, or 2030 populations, growth for 2010 and 2020 were interpolated using a straight-lined projection to 2030. Approximately 21 percent of the census tracts were affected by this correction. In the second case, no growth was assumed for the 30-year period rather than a declining population. Approximately 12 percent of the census tracts were affected by this correction. Professor Steven Craig, UH CPP, reviewed and approved these corrections (Craig March 2002). The existing and projected population projections, as shown in *Table 2*, are 397,074 for 2000; 487,499 for 2010; 607,576 for 2020; and 688,111 for 2030.

B. WATER DEMAND PROJECTIONS

Water demand projections were calculated using the UH CPP census tract population and employment forecasts, unit demand factors, and other pumpages. Based on the *HGCSD 1996 Report* on population and water demand projections for the HGCSD's service area, it is assumed unit demand factors would be similar to future unit demand factors for population at 150 gallons per capita per day and employment at 27 gallons per employee per day. Comparatively, the GIS survey respondents, which represented approximately 75 percent of the MUDs and independent well owners, indicate an annual average water usage of 471 gpd per connection and approximately 3.91 connections per acre. It is assumed that the pumpages for HGCSD coded "industrial" and "other" non-public uses will remain constant for future years. Year 2000 well pumpage data within the NHCRWA was collected by the HGCSD and is presented in *Appendix B.* The water demand calculated using the demand factors stated compared very favorably with the actual water use recorded in year 2000.

To plan the 2010, 2020, and 2030 service areas of the NHCRWA's primary distribution system, the NHCRWA was divided into seven planning regions as shown in *Exhibit 4.* The planning region boundaries were defined using the major roads and usage density, i.e., the number of MUDs within a planning region. Planning Regions 1 through 5 were divided up so that the majority of surface water conversion would occur here to meet HGCSD's reduction goals. The remaining conversion amounts came from Planning Regions 6 and 7.

The existing and projected water demands for 2000, 2010, 2020, and 2030, shown in *Table 3*, are 65.3 million gallon per day (mgd), 79.4 mgd, 98.0 mgd, and 110.7 mgd, respectively. The required surface water conversion volume is 30 percent of total demand from 2010 through 2019, 70 percent of total demand from 2020 through 2029, and 80 percent of total demand for 2030 and thereafter. The projected surface water demands the NHCRWA must meet or exceed for 2010, 2020, and 2030 are 23.8 mgd, 68.6 mgd, and 88.6 mgd, respectively. The years 2019 and 2029 are critical years because the percent surface water conversion over the decade in which they occur must be at or above 30 and 70 percent, respectively. The surface water conversion goals for 2019 and 2029 are 28.8 mgd and 76.6 mgd, respectively. These annual average daily flow rates are the minimum flows necessary to meet the HGCSD's requirements.

To meet the projected surface water conversion goals for each construction phase, it was necessary to first determine the overall water demands for each fee-paying customer within the NHCRWA, i.e., MUDs and independent well owners with 5.0 million gallons per year (gpy) or greater. Known entities within NHCRWA were projected with water demands if their cumulative Year 2000 pumpages were 5.0 million gpy or greater. In addition, undeveloped Areas A to E, as shown in *Exhibit 7*, were projected with water demands to meet anticipated growth. The 2010 Service Area, shown in *Exhibit 6*, contains 47 wholesale customers, i.e., MUDs and independent well owners receiving surface water. The 2020 Service Area includes the 2010 Service Area, shown in *Exhibit 7*, and contains 74 additional wholesale customers for a cumulative total of 121. The 2030 Service Area includes the 2010 and 2020 Service Areas, shown in *Exhibit 7*, and contains 16 more wholesale customers for a cumulative total of 137.

Table 4 is a list of all the MUDs and independent well owners within NHCRWA as of year 2000 having cumulative well pumpages 5.0 million gallons per year or greater. This table is divided into four parts: existing and projected water demands per 2010, 2020, and 2030 Service Areas and a list of the entities and their projected water demands that are not within the 2030 Service Area. The water demand projections in *Table 4* are based on several factors including growth rate projections from the UH CPP average per Planning Region, HGCSD's year 2000 pumpage, MUD ultimate build-out connections, unit demand factors of 471 gpd per connection, and 3.91 connections per acre. Connections include residential, commercial, irrigation, and industrial connections. The flows generated were used to design the primary transmission and distribution systems for ultimate development conditions of the 2030 Service Area. The proposed design of the distribution system is sized large enough to accommodate future demands so the need for additional parallel piping can be averted.

There are three water projection terms used in this GRP. A projection by the UH CPP is based on census tract population projections and unit water demand factors established in the TC&B 1996 Report. This projection developed the surface water annual average daily flow (ADF) conversion goals for each decade through 2030, which will be referred to as a *CPP conversion goal*. The ADF projections for MUDs and independent well owners will be referred to as *Owner projection* used in development of the primary water distribution network model. The wholesale treated water supply contract with the City of Houston (COH) necessary to meet the CPP conversion goal will be referred to as the *Contract amount*. This last term will be discussed later in *Section 4 – Water System Alignment, Construction Schedule, and Costs*. The CPP conversion goals shown in *Table 3* are less than Owner projections in *Table 4*. For example, for year 2019 in the 2010 Service Area, the CPP conversion goal in *Table 3* is 28.8 mgd, versus the Owner projection in *Table 4* of 38.4 mgd. The proposed 2010, 2020, and 2030 service areas were developed through consensus of the NHCRWA's General Manager and a Technical Advisory Group composed of engineers who work with the MUDs. Further discussions about system operations are found in Section 4.

SECTION 3 – WATER SOURCE, CONTRACT, AND REFUSE

The purposes of this section are to identify the NHCRWA's alternative water supplier, discuss the source of water, and review the provisions of the proposed water supply contract.

A. INTRODUCTION

A May 2001 report entitled *Evaluation of Recommended Water Supply Alternatives for North Harris County Regional Water Authority* by Turner Collie & Braden Inc. evaluated six alternative sources of surface water supply for NHCRWA. This report provided the following:

1. A preliminary relative evaluation of numerous alternative water supply sources.

2. A comparative cost analysis of the alternatives.

3. Identification of potential sources of supply and calculation of the relative magnitude of costs associated with those sources as a means to compare and evaluate each option as a future source of water for the Authority.

4. Identification of the potential issues that would have to be resolved for each alternative.

5. Refined number of alternatives to be analyzed in greater depth, and refined cost information for those selected alternatives to serve the NHCRWA's short-term (Year 2010 Service Area) and long-term (Year 2050 Service Area) water demands.

Three of these sources were eliminated because they were not feasible. The remaining alternative sources included the COH, the Brazos River Authority, and the Chambers-Liberty Counties Navigation District. The report concluded that the NHCRWA participate with the COH in the phased construction of the Northeast Water Treatment Plant to treat raw water currently owned by the COH, and associated phased construction for transmission and distribution. This option provided the least responsibility for the NHCRWA because it will not have to operate the treatment plant or meet the increasingly stringent federal and state mandates for drinking water quality. In addition, the NHCRWA would benefit from the greater economies of scale by obtaining its water from a larger treatment facility, which would reduce the cost per 1,000 gallons treated. The analyses were based on assumptions of costs, since no firm COH charges were available for treated water.

B. COH SURFACE WATER SYSTEM

The supplier of wholesale treated surface water to the NHCRWA will be the COH. The COH was identified as the regional provider of surface water for Region H in the Senate Bill 1 planning study that was completed in 2001. The COH offered to supply treated surface water to the NHCRWA to meet HGCSD requirements. The COH and the NHCRWA have entered into a long-term contract in which the COH will provide water to the Authority.

The COH began implementing a long-term surface water supply in the 1950s. It comprises raw water facilities, surface water purification plants, and a distribution system that supplies surface water to Harris County and portions of Galveston County. The implementation of the COH surface

water system has been instrumental in making the conversion from groundwater to surface water possible.

Raw Water Facilities

The COH has an available surface water supply of 1,258,829 acre-feet per year (ac-ft/yr) as indicated in the Region H Planning Group *Task 3 Report* by Brown & Root/Turner Collie & Braden Inc. Most of this supply consists of water rights in Lake Conroe, Lake Houston, and Lake Livingston. Year 2000 surface water withdrawals for all users in Harris County totaled 598,561 ac-ft/yr. The 2030 surface water demand for the NHCRWA and other users in the unincorporated portion of Area 3 is estimated to be approximately 179,000 ac-ft/yr. Therefore, the COH has adequate reserve supply to serve the NHCRWA and other users in Area 3.

Lake Houston was the first part of the raw water system to be built. The lake, which is solely owned by the COH, was put into operation in 1954. It impounds the East and West Forks of the San Jacinto River. It was constructed to supply the East Water Purification Plant (EWPP) and industrial raw water customers. It has a yield of 168,000 ac-ft/yr, and the water rights to the yield are 100-percent owned by the COH.

Lake Livingston was completed in 1969. The project was implemented through a partnership with the Trinity River Authority. The lake has a yield of 1,255,500 ac-ft/yr, and the COH has rights to withdraw 902,800 ac-ft/yr.

The Coastal Water Authority (CWA) delivers raw water from the Trinity and San Jacinto Rivers to the COH. The CWA uses pump stations, canals, and transmission lines to deliver raw water to the COH water purification plants and to industrial raw water customers.

Lake Conroe was put into operation in 1972. It was constructed in partnership with the San Jacinto River Authority (SJRA). The lake impounds the West Fork of the San Jacinto River upstream of Lake Houston. Its 99,950 ac-ft/yr of yield is shared by the COH and the SJRA. The COH has rights to 67,029 ac-ft/yr that serves to supplement the yield of Lake Houston. SJRA owns the remaining 32,921 ac-ft/yr of the Lake Conroe yield.

The Wallisville Saltwater Barrier (WSB) was put into operation in 1999. Before the barrier was built, a portion of the water released from Lake Livingston could not be withdrawn to prevent the intrusion of saltwater into the lower Trinity River. The barrier prevents saltwater intrusion and allows the COH and other users to use the water that was previously allowed to flow into the Gulf of Mexico. The COH is now permitted to divert 38,000 acre-feet per year from the WSB.

The COH also has authority to divert an additional 83,000 acre-feet per year of Trinity River water from two other rights.

Two future projects will have an impact on the raw water system. The Luce Bayou project will allow water from the Trinity River to be transferred to Lake Houston for subsequent use in the San

Jacinto Basin. Allens Creek Reservoir will develop the COH's first surface water supply project in the Brazos River Basin.

Surface Water Purification Plants

The EWPP is the largest surface water treatment facility in the COH system. Plant I at the EWPP was put in service in the late 1950s. Two additional plants have been built at the site to bring the total treatment capacity to 300 mgd. The plant uses conventional treatment processes to treat water from the San Jacinto River and the Trinity River. Improvements are planned to re-rate the plant to a capacity of 350 mgd.

The Southeast Water Purification Plant (SEWPP) was put into operation in 1990 at a rated capacity of 80 mgd. The ownership of this plant is divided between several entities that include the COH. The SEWPP also uses conventional water treatment processes. It treats water provided by the CWA from the Trinity River. The plant is in the process of being re-rated to a capacity of 120 mgd. Plant design is currently underway to establish a rated capacity of 200 mgd.

The Northeast Water Purification Plant (NEWPP) is currently under construction with an initial capacity of 40 mgd. The second construction phase will expand the plant to a capacity of 80 mgd and will be used predominantly by the NHCRWA, to a lesser extent by the COH, and possibly by the Central Harris County Water Users Consortium. This second construction phase will be operational before 2010. The NEWPP will use conventional treatment processes to treat water that is withdrawn from Lake Houston.

Distribution System

The COH water distribution system includes over 200 miles of large diameter water transmission lines. Generally speaking, the EWPP serves the east and central portions of the COH service area, and the SEWPP serves the southern part of the COH system and portions of Galveston County.

Several transmission projects are underway to enable the transmission of surface water to the northwestern part of the COH service area. These projects will also enable the COH to supply surface water to west Harris County.

Water from the NEWPP will be used to supplement the EWPP service area and to supply water to north and west Harris County.

C. LOCATION OF WATER SOURCES AND TREATMENT

Treated surface water for the NHCRWA will be supplied from the NEWPP. The location of the plant is shown in *Exhibit 5*. The first 40-mgd module of the plant is now under construction, and it is estimated to be operational in 2004. The NEWPP will treat raw water from Lake Houston using conventional treatment processes to produce water that meets or exceeds U.S. Environmental

Protection Agency and Texas Commission on Environmental Quality (TCEQ) standards for drinking water.

The NEWPP will be expanded in the future to supply potable water to its non-COH customers. An additional 40-mgd module, for a total of 80 mgd, is necessary to supply the COH and the NHCRWA in the year 2010. Because the COH will also be supplying the West Harris County Regional Water Authority and a group of MUDs in Area 3, it is necessary that the total commitments not exceed the capacity available at the NEWPP. The COH already has plans for this expansion and will authorize the work after executing an agreement with the NHCRWA. Future expansions at the NEWPP may be required to meet the NHCRWA's needs in 2020 and 2030.

D. COH AND NHCRWA WATER CONTRACT PROVISIONS

The Water Supply Contract (the "Contract") with the COH includes the following principles:

1. The NHCRWA will purchase a pro-rata share of capacity of the COH untreated water facilities in sufficient quantity to ensure compliance with the Subsidence District's 1999 Regulatory Plan. The COH untreated water facilities include water rights, reservoirs, canals, storage, and pumping. Capacities will be designated and reserved at least five (5) years in advance of the milestone dates of 2010, 2020 and 2030 or whenever the NHCRWA requires an increase in its then-current demand allocation. The NHCRWA must purchase all of its initial 2010 untreated water supply capacity by December 31, 2009. The purchase price for the initial existing untreated water facilities allocation will be at the actual cost of the outstanding debt of the untreated water facilities in existence at the time of the Contract execution in accordance with the formula set forth in the Contract. For the 2010 capacity, the NHCRWA has the option to tender a lump sum payment to the COH prior to the date water is delivered or make annual payments for a period of time not to exceed 15 years by requesting negotiation of a separate agreement with the COH. It is the NHCRWA's intention to make a lump sum payment to the COH. In the event the COH constructs or acquires new untreated water facilities subsequent to the Contract execution or if the NHCRWA increases its demand allocation in existing untreated water facilities, the NHCRWA shall owe the COH an additional annual amount for its pro-rata share of the costs of such existing facilities or for such new untreated water facilities. The COH will provide 180 days' written notice to the NHCRWA regarding construction of any new untreated water facilities in order to provide the NHCRWA with the opportunity to increase its demand allocation.

   Future untreated water capacity will be reserved five (5) years in advance of the next milestone (2020 or 2030) or at any time additional capacity is needed by the NHCRWA. All payments for untreated water facilities capacity shall be calculated and paid in accordance with the formulas set forth in the Contract.

2. The NHCRWA will purchase a pro-rata share of capacity of the COH treatment plant facilities designated to serve the NHCRWA's service area in sufficient quantity to ensure compliance with the Subsidence District's 1999 Regulatory Plan. The treatment plant designated to serve the NHCRWA Service Area is the NEWPP, located just west of Lake Houston. Capacities will be designated and reserved a minimum of five (5) years in advance of the milestone dates of 2010, 2020, and 2030. The purchase price for capacity will be calculated and paid in accordance with the formulas set forth in the Contract. For the 2010 capacity of 31 mgd, the NHCRWA has the option to tender a lump sum capital payment by no later than July 1, 2003 or make annual interest payments and make the lump sum capital payment prior to receiving treated water. It is the intention of the NHCRWA to tender the lump sum capital payment to the COH of $51.5 million on or before July 1, 2003, pursuant to the Contract provisions.

   Future treated water capacity will be purchased at the time of the reservation by providing a capital payment for the additional capacity to the COH within 60 days after either receiving COH consent to the increased capacity or within 60 days of receiving an estimate from the COH of the capital payment for additional capacity in newly constructed treated water facilities, as specifically set forth in the Contract.

3. The NHCRWA will purchase a pro-rata share of capacity of the transmission line facilities designated to serve the NHCRWA's Service Area in sufficient quantity to ensure compliance with the Subsidence District's 1999 Regulatory Plan. The transmission line designated to initially serve the NHCRWA is an 84-inch-diameter line that is being constructed along Beltway 8 between the NEWPP and US 59. Capacities will be designated and reserved a minimum of five (5) years in advance of the milestone dates of 2010, 2020, and 2030. The purchase price will be the NHCRWA's pro-rata share of actual cost of the transmission line at the time of reservation. The NHCRWA's initial pro-rata share of the transmission line cost is included in the treatment water facilities cost of $51.5 million, as described in paragraph 2 above.

   Future transmission line capacity will be calculated and purchased in the same manner as the treated water facilities, as described in paragraph 2 above.

4. The NHCRWA will pay a pro-rata share of the COH's annual operation and maintenance costs of each of the above components (i.e., the untreated water facilities and treated water facilities) based on the percent of capacity purchased and in accordance with the formula reflected in the Contract. The annual operation and maintenance costs will be identified by the COH in an annual budget. The NHCRWA will make monthly payments to the COH based on the average annual operation and maintenance budget, along with providing an operation and maintenance reserve.

5. The NHCRWA will purchase a specific capacity in the COH water facilities designated to serve the NHCRWA's Service Area. If for some reason the COH cannot meet its customers' demands due to drought conditions or operational issues, the available supply will be allocated among its customers. Should the drought or the restricted delivery be over an extended period, the NHCRWA has the ability to engage certain groundwater facilities to meet its customer demands.

The above-described supply system and wholesale contract will provide a reliable source of water to meet the HGCSD regulatory requirements. A copy of the NHCRWA Contract with the COH can be found in *Appendix C.*

E. RECLAIMED WATER REUSE

The NHCRWA was established to meet the mandates for reduction of groundwater pumpage established by the HGCSD. The legislation creating the NHCRWA provides authority for conservation, protection, recharge, prevention of waste of groundwater, and reduction of groundwater withdrawals. The appropriate use of reclaimed water for irrigation is a viable method of reducing groundwater pumpage. The NHCRWA commissioned a separate feasibility study to analyze the potential benefits of using reclaimed water as an alternative water source.

The use of reclaimed water within the State of Texas is governed by regulations established by the TCEQ (30 TAC 210). These regulations provide guidance and standards for all aspects of reclaimed water-use projects including, but not limited to, authorizations, storage requirements, irrigation practices, distribution systems, quality criteria, and allowable applications. Existing owners of wastewater treatment plants within the NHCRWA were contacted to determine interest in providing reclaimed water for irrigation projects. In addition, potential reclaimed water irrigation users were contacted as part of the feasibility study. The preliminary contacts with both potential providers and potential users were positive and warrant a continuation of discussions.

Although the use of reclaimed water in lieu of potable water appears to be possible, the details concerning delivery infrastructure and pricing methodology have not been completed. The feasibility and extent of reclaimed water use will be determined as these details are addressed in the future. For the purposes of the GRP, no credit has been taken for reclaimed water use as a portion of the reduction of groundwater pumpage in the GRP. The NHCRWA reserves the right to submit an amended GRP for consideration and approval incorporating reclaimed water use and a concept for calculating credits towards groundwater withdrawal reduction.

F. WATER CONSERVATION

Water conservation is a means of reducing long-term demand. The NHCRWA has prepared a Water Conservation Plan to address strategies that can be used by it and the MUDs to reduce demand. A copy of the plan can be found in *Appendix D*.

G. EARLY/OVER CONVERSION

The NHCRWA may choose to accelerate its groundwater conversion. Several customers within the NHCRWA have indicated an interest in obtaining alternate water to reduce their dependency on existing wells prior to 2010. The NHCRWA will seek credit from the HGCSD for such early conversion. If approved, these groundwater credits would be banked for future use and applied during future HGCSD conversion requirements. The application of the groundwater credits could provide the NHCRWA the opportunity to postpone capital investment for water system infrastructure.

In addition, after 2010, the NHCRWA may choose to supply more water from its alternate supply than is required to meet the minimum requirement for groundwater reduction. Again, if it is approved by HGCSD, this could result in over conversion and the accumulation of groundwater credits. These groundwater credits could also be banked for future use and applied as required to postpone capital investment for water system infrastructure. The groundwater credits would also serve to balance surface water availability with total annual water demand during years of high water demand. The GRP may be amended in the future to address the subject of groundwater credits.

SECTION 4 – WATER SYSTEM ALIGNMENT, CONSTRUCTION SCHEDULE, AND COSTS

A. DEVELOPMENT OF WATER DISTRIBUTION NETWORK MODEL PARAMETERS AND ASSUMPTIONS

All of the NHCRWA pipes for the primary transmission system were sized for 1.3 times ADF to provide additional flow for the 2030 Service Area's ultimate development or during emergency conditions. The NHCRWA's primary distribution system was modeled using ultimate development water demands of the 2030 Service Area. The model parameters described below are based on the extensive experience of the engineering consultants on the NHCRWA's Consultant Advisory Committee in the planning and design of an individual MUD and large water systems.

The proposed system pressure option was modeled to maintain a minimum system pressure from the NHCRWA at the delivery point of 55 to 65 pounds per square inch (psi), with NHCRWA pump station pressures between 80 and 100 psi. As more of the Districts phase out their plants and rely on the NHCRWA for their entire water source, the NHCRWA will install additional wells, well collection lines, and storage and pumping facilities at locations within the system that are established to maximize the capacities of the existing lines by providing flows from multiple directions. The proposed additional wells will be submitted for permits through the various regulatory agencies for approval. The sizing of the primary distribution system was a combination of both maximum daily rates, depending on the percent of wholesale customers choosing to phase out their well or their wells and water plants. The peaking factor of 2.0 or 4.2 times ADF provides necessary flows for peaking or emergency conditions. The NHCRWA Consultant Advisory Committee projected the phasing out of MUDs' groundwater wells only or wells and water plants at varying percentages for each decade. The table percentages below were used in model analyses through ultimate development of the 2030 Service Area.

Time Period	Wholesale Customers with Water Plants	Wholesale Customers without Wells and Water Plants
2010 to 2019	80%	20%
2020 to 2030	70%	30%

Computer analyses were conducted to develop the primary transmission system and distribution system. The modeling software used was the University of Kentucky "KYPipe2000 Graphical User Interface" (PIPE2000). Computer model input includes pipe sizes, pipe length, node data, Hazen-Williams coefficients, minor losses, and various GIS shape files of roads and wholesale customers within the NHCRWA. A node is a point of water demand or, in this case, water input into one or more MUDs. Pumps are modeled as fixed-grade nodes. Node data consists of water demands, elevations, and pipe interconnections. The maximum allowable velocity used for sizing pipe in the PIPE2000 models was 5 feet per second (fps) for peak hour flow for all model analyses. A velocity of 5 fps or less will reduce the cost impacts of water hammer, surge suppression devices, leakage repair, thrust blocking, and other maintenance costs.

Five fps is the generally accepted maximum velocity for good, cost-effective design because of these factors (Cesario 1995)

Projected water demand values for each MUD are entered at each node in gallons per minute (gpm). Node elevations were taken from USGS quadrant maps. Node elevations are not intended to match the exact natural ground elevations in the service area. Rather, the elevations are used only to give a basis for preparing a reasonable computer model. Natural ground elevations over the study area range from approximately 100 feet at the east end of the NHCRWA to approximately 220 feet at the west end of the NHCRWA. The difference in elevation greatly affects the pumping system required to deliver water to the service area. Pipe sizes were chosen to overcome pressure losses due to elevation changes, friction head losses from the motion of water over the interior surface of the pipe, and minor losses from sudden changes in flow direction or changes in pipe size. During peaking demands, two pressure planes are needed.

B. PROPOSED NHCRWA SURFACE WATER SYSTEM

Proposed Primary Transmission System

The NHCRWA will build its primary water transmission lines from the COH delivery points to its boundary in two construction phases. One transmission line will be constructed initially to satisfy the 2010 through 2019 conversion requirements. A second transmission line will be constructed to meet the requirements for 2020 through 2030. In general, the proposed primary transmission system will be a low-pressure system that will deliver water through an air gap into the NHCRWA's ground storage tanks.

To meet 2010 to 2019 water demands, the COH will provide water through an 84-inch-diameter transmission line from the NEWPP to near the intersection of Sam Houston Toll Road (Beltway 8) and US 59 (Eastex Freeway). The NHCRWA has entered into a contract with the COH to purchase a pro-rata share of capacity of this transmission pipeline. The NHCRWA will connect at this point and construct its own transmission pipe to the west. Other entities may pay a pro-rata share for capacity in the NHCRWA's transmission pipe. The Central Harris County Water Users Consortium and the West Harris County Regional Water Authority have been identified as possible participants. The proposed location of these pipes is shown in *Exhibit 5*.

Beginning at the end of the 84-inch-diameter pipe at Beltway 8 and Eastex Freeway, the NHCRWA proposes to construct a 60-inch pipe to convey the 2010 through 2019 volumes of water to the 2010 Service Area, as shown in *Exhibit 5.* This will be done without any intermediate booster pumping. The line size may increase if additional entities wish to have capacity in the line. The pipe alignment proposed would extend west along the right-of-way of Beltway 8 until it reaches TC Jester Road, where it will turn to the north. The pipe alignment proposed would be constructed in the right-of-way of TC Jester Road and terminates south of FM 1960, where the water will discharge into groundwater storage tanks at the proposed pump station.

The 2020 through 2030 proposed transmission system, from the NEWPP to the proposed pump stations, will convey only water for wholesale customers within the NHCRWA. An 84-inch-diameter transmission pipe is proposed to be constructed beginning at the NEWPP, align along the right-of-way of Beltway 8, and extend west parallel to the existing 84-inch-diameter transmission line to Hardy Road. At this intersection, the NHCRWA proposes a portion of the water would be diverted north along the right-of-way of Hardy Road through a 54-inch-diameter pipe to discharge into ground storage tanks at the proposed pump station near the intersection of Hardy Road and Candleridge Street. The remaining water will be diverted through a 72-inch-diameter pipeline extending west from Hardy Road along the right-of-way of Beltway 8. This pipeline ultimately reduces to a 60-inch pipeline that terminates near SH 249. This line would discharge into the ground storage tanks at the proposed pump station near this latter intersection. The locations of these proposed pipes and water plants are shown in *Exhibit 5*. The transmission sizes depicted in *Exhibit 5* may change depending on the pattern of growth within NHCRWA, as well as revised population and flow projections and volumes of water required by potential co-participants in the lines.

Proposed Primary Distribution System

The NHCRWA's proposed primary distribution system is described as a "high pressure" system. The system as planned provides a supply of water to the perimeter of the MUD's boundary but makes no provision for addressing water system operations within the MUD's water system. The NHCRWA system includes construction of a meter at the point of connection to the wholesale customer. The operating pressure in some areas of the NHCRWA system will be higher than 75 psi. At these locations where the MUD is tying to the NHCRWA system, a pressure-reducing valve will be required. This cost is anticipated in the NHCRWA system.

MUD water plants reaching their useful life may choose replacement, while others may choose to phase out their aging water plants if they are within the service area of the 2010, 2020, or 2030 phased construction. Those MUDs choosing to phase out their water plants will rely on the NHCRWA to provide sufficient water quantity, capacity, and storage to meet its needs. It is assumed that the individual MUD would continue to operate its individual pipe network. Initial discussions with TCEQ regarding this concept has led to a preliminary conclusion that the NHCRWA would be able to maintain its status as a wholesale supplier of water, not a retail supplier. Before a MUD can abandon its water plant facilities, the MUD and possibly the NHCRWA must receive approval from TCEQ of meeting applicable requirements of a retail supplier. A previous discussion with TCEQ indicated that the NHCRWA would be able to maintain its wholesale water supplier status as long as the water is metered before entering the MUD and the MUD meters the water consumption of its customers (TCEQ, 2001).

Operation of Primary Distribution System

The NHCRWA primary distribution system will provide for the alternative supply of water that meets the requirements of the Subsidence District Regulatory Plan. As mentioned in Section 2, the CPP conversion goal relates to the UH CPP census tract population projections and unit water demand factors to determine surface water conversion goals. The CPP conversion goal for 2019 is

28.8 mgd, as shown in *Table 3*, while the Owner projection is 38.4 mgd, as shown in *Table 4*. To minimize the infrastructure required, it is proposed that the 2010 Service Area be equal to or greater than the surface water conversion requirement. Although it was requested, no data has been provided that allows for the calculation of a daily pattern of water usage within an individual MUD. Consequently, a comparative evaluation of MUDs in the vicinity of the NHCRWA was used to approximate the hourly pattern of water use within the NHCRWA. Seasonal and daily variations in water usage are important in calculating the volume of supply delivered and the volume of storage necessary to equalize the delivery of water within the system.

Low demand periods include seasonal variations as well as after long tropical storm events during the summer. The NHCRWA Service Areas will not consume the entire contract amount (a constant supply of surface water) during low demand periods. On the other hand, during high demand periods, the Contract amount must be augmented by groundwater production. Typical high demands occur during the summer months or for fire demands. Since the contract amount is anticipated to be constant, this means the CPP projected goals cannot be met by contracting for the minimum volume of water from the COH. This is exemplified by the following illustration:

> The Owner projection of the annual average daily flow for the 2010 Service Area in year 2019 is 38.4 mgd. If 28.8 mgd (CPP conversion goal) is being purchased from the COH and the total surface water demand of the 2010 Service Area in December 2019 is only 23.5 mgd, then only 23.5 mgd could be used. Conversely in August, the surface water demand could be 63.0 mgd, but the COH would supply only 28.8 mgd. In effect, an average of 28.8 mgd could not be met because of the deficit in the winter months. Some incremental amount of surface water will be necessary to ensure the full conversion requirements are met.

During the initial period, 2010 to 2019, the NHCRWA has the option of expanding the service area such that the average demand is more than the 28.8 mgd CPP conversion goal. This would allow the NHCRWA to purchase less water from the COH and yet still use a minimum of 23.5 mgd during winter months. However, it will be more economical to purchase additional surface water supplies, approximately 2.0 mgd above the CPP conversion goal projection of 28.8 mgd, than to construct significant expansions to the primary distribution system.

From analysis of typical MUD use patterns, the average daily flow of water in winter months, December to February, can be as low as 61 percent. Consequently, contract amount must be approximately 31.0 mgd to meet the CPP conversion goal projection of 28.8 mgd. Although this may be the contracted amount, not all of this water would be used during low demand periods. In the summer months, all of the contracted water would be used. From review of the wholesale customer locations, it does not appear that adequate primary distribution system infrastructure can be built for the relatively small dollar amount of capital investment necessary to acquire additional surface water. It is recommended therefore, that the incremental water plant capacity be purchased from the COH.

On a daily delivery basis, water storage is necessary to equalize the delivery of water throughout high and low periods of demand. The NEWPP has only a 6-hour storage capacity. Additional

storage will be required within the NHCRWA. It is anticipated that during the initial phase of construction, sufficient storage exists within the individual wholesale customers to offset any deficit. However, on the assumptions that 20 percent of the wholesale customers will phase out their water plant facilities in the next 20 years, a storage volume to replace this vacated storage is recommended.

Throughout the daily period, water will be provided to the system at a constant flow rate. During periods of low demand, water will flow into the wholesale customer's storage tanks and the storage constructed by the NHCRWA. Since some districts will depend solely on the NHCRWA system for supply, peak demands to these districts must be met. This will require that service pumping capacity be increased, or that flow to the other districts is restricted. Once the peak demands have passed to ADF levels or lower, then the original wholesale customers will be supplied surface water again. This oscillation of selected wholesale customers in the service area that receive surface water is referred to as the "balloon effect," which can be accomplished through use of SCADA-controlled valves.

An alternative is to provide additional supply of water through regional groundwater wells such that the system supply of the NHCRWA primary distribution system is capable of meeting the average flow requirements of 80 percent of the MUDs in the service area and 100 percent of the peak requirements in 20 percent of the districts. It is anticipated that in the latter stages of implementation, groundwater supply owned and operated by the NHCRWA will be a significant part of the NHCRWA system implementation. However, in the initial phases, the amount of groundwater supplied by the NHCRWA will be a minimal amount unless more wholesale customers elect to abandon their own facilities.

For daily demand patterns during ADF conditions, there will be fluctuations in demand so that some hours of the day will experience demand conditions that are above ADF. This increase in demand will cause increased velocities and subsequently increased head losses for that period of time. During moderate increases in hourly water demands (1.5 times ADF or less), either the NHCRWA will increase its pumping rate out of its ground storage tanks to a higher level in order to continue to meet demands for a short period of time, or the individual MUDs' booster pumps will turn on to increase the pressure to meet the minimum state requirements. For the first scenario, the NHCRWA will draw down its storage because ADF is all that is coming into its tanks. However, this storage can be replenished during hours when the demand is less than ADF, and there should be no net effect.

As MUDs elect to abandon their total water plant facilities, their total supply of water will come from the NHCRWA system. As the demand for water from NHCRWA increases, decisions based on cost and reliability will dictate whether or not the NHCRWA supplements its supply by purchasing additional treated surface water or by constructing groundwater wells that supply a regional pumping plant. The latter path is currently anticipated in the GRP. In doing so, the NHCRWA will have to address potential problems associated with mixing of groundwater and surface water in the pipelines, as opposed to the ground storage tanks. In such cases, potential problems of taste, odor, color or even toxicity are possibilities. However, these conditions will be resolved during final design after testing of source water quality is confirmed. The NHCRWA's approach will be to provide a

consistent quality of water to its customers to allow the customers to resolve individual problems based on their operating policies.

A March 2001 study by Jones & Carter, Inc., entitled *MUD Interface Study for Surface Water Conversion* (*J&C 2001 Report*) stated the COH's recent experience in the blending of surface water with indigenous groundwater does not cause any problems regarding water potability. Although the COH has managed to provide relatively consistent and high quality water to its ratepayers, it took several years for the COH to attain this degree of quality and consistency. A wholesaler-retailer relationship between separate entities injects significant complexity in controlling the quality of water in the distribution systems.

Management oversight of all of the supplies to the system will be coordinated by the NHCRWA to properly meet demand. To maximize use of contracted water, and based on limitations of the NEWPP design, the MUDs water contract with NHCRWA should attempt to equalize water volumes on a monthly and daily basis. This will mean that either the number of MUDs being provided water in winter months will be different than the number of MUDs being provided water in summer months or the amount of surface water being supplied in each MUD will differ monthly. In either case, the NHCRWA will closely monitor the operation of the system to ensure that the required percent conversion will be met at the end of the year.

Additionally, the NHCRWA will need to closely coordinate the abandonment of water facilities with the MUDs so that regional facilities can be appropriately sized and located and be brought on-line in a timely manner.

Proposed 2010 Primary Distribution System Alternatives

The primary distribution system recommended is the alternative "Distribution System with Regional Water Plant." To be conservative, the recommended alternative involves more infrastructures at a higher cost. However, the NHCRWA will consider the second alternative after further study during design.

1. Primary Distribution System with the Regional Water Plant Alternative

The recommended primary distribution system will include construction of a regional water plant near Louetta Road between Cutten Road and the railroad track east of SH 249, as shown in *Exhibit 6*. This primary system assumes at least 80 percent of the wholesale customers operate and maintain their wells and water plants through 2019, reducing to possibly 70 percent by 2030. For the wholesale customers who choose to phase out their wells or wells and water plants, the NHCRWA proposes constructing additional infrastructure to meet those needs. This would involve the NHCRWA becoming the owner and/or operator of nearby groundwater wells with high capacity and/or installing regional groundwater wells, collection lines, and a regional water plant located near Louetta Road. The proposed regional wells will be submitted for permits through the various regulatory agencies for approval. This regional infrastructure is necessary to compensate for the

reduction of the wholesale customers' water supply and storage needed for their water demands as well as provide ADF for customers retaining their water plants.

Constructing the regional facilities will allow the NHCRWA to minimize balloon effects and maximize flows to the designated service areas. During emergency conditions, e.g., a line break, the regional water plant's storage and wells would be able to adequately address these conditions for those wholesale customers without wells or water plants. Those with water plants who have a line break would be able to adequately use their own wells and storage.

2. Primary Distribution System without the Regional Water Plant Alternative

This primary distribution system alternative may minimize the balloon effect, maximize the balloon effect, or be somewhere in between. During peak demand days, adequate supplies and capacity would be provided to the wholesale customers without wells or wells and water plants. To compensate for the storage and capacity used by those without this infrastructure, those with water plants would receive less than ADF or some would receive none at all, initiating the balloon effect. Between these two alternatives, this alternative would minimize the capital costs to the NHCRWA while maximizing the use of the infrastructure constructed.

The NHCRWA total flow from the NEWPP will be the total flow consumed by the wholesale customers, with priority given to those customers without wells or wells and water plants. Remaining surface water would be distributed in a way that will negate stagnation of the primary distribution system. This may mean one or more MUDs will not receive any surface water during peaking of the water system.

C. METHODOLOGY FOR LOCATING PHASED CONSTRUCTION

The *J&C 2001 Report* described several factors that should be considered for locating the 2010 Service Area within the NHCRWA. The main factor was to provide service to certain MUDs that are currently experiencing water quality or quantity problems. These areas are located predominantly between FM 1960 and Louetta Road and between IH 45 and SH 249. The proposed distribution system for the 2010 conversion requirements encompasses these areas. Another factor was to consolidate the selected service area that will be converted to surface water. In the distribution system, MUDs closest to or adjacent to the NHCRWA's distribution facilities were converted so that areas further out in the NHCRWA's boundaries will not be required to convert to surface water.

Phased construction, described below, is for report purposes only. Actual construction will be spread out over each decade prior to meeting the HGCSD's conversion mandates. The draft Project Schedule for the NHCRWA 2010 Conversion Program previously submitted by NHCRWA is presented in *Appendix E*. The estimates of probable costs that follow were developed using Region H Water Planning Group 1999 unit values.

D. YEAR 2010 PHASED CONSTRUCTION

The central portion of the NHCRWA was chosen to be the 2010 Service Area under all scenarios because of the higher population density and because the majority of water quality and quantity problems exist in this area. The 2010 to 2019 construction phased (2010 Service Area) proposes to include 47 MUDs with owner-projected water demands in year 2019 of 38.4 mgd (see *Table 4*). NHCRWA proposes constructing its first primary transmission line to supply the water volumes to meet the surface water conversion requirements for the 2010 through 2019 water demands. The COH surface water contract amount needed for the 2010 Service Area is 31.0 mgd to meet the CPP conversion goal projection of 28.8 mgd for year 2019.

The NHCRWA pump station near T.C. Jester and FM 1960 will only be supplied with water from NEWPP. One regional water plant is proposed for the year 2010 phased construction, owned and operated by the NHCRWA. A regional water plant location is proposed near Louetta Road between Cutten Road and the railroad track east of SH 249, as shown in *Exhibit 6*. In addition, NHCRWA proposes constructing eight regional groundwater wells to facilitate meeting peak water demands for those MUDs who phased out their water plants. The regional water plant will provide the additional storage and booster pump capacity for this groundwater. The total storage capacity needed for year 2010 construction phase is in two parts. The total storage at the delivery point near T.C. Jester and FM 1960 (delivery storage) is 5 million gallons (mg). The total storage at the regional water plants (regional storage) is 8 mg.

The estimate of probable total project cost for the proposed primary transmission system, discussed previously, is about $62,648,000, as shown in *Table 5*. The estimate of probable total project cost for the proposed pump station, regional water plant, regional groundwater wells and collection lines, distribution system, and MUD interconnection is about $118,905,000, as shown in *Table 7*. The total estimate of probable costs is about $181,553,000 for the 2010 construction phase, excluding interest and financing costs as well as the costs for acquiring surface water.

E. YEAR 2020 PHASED CONSTRUCTION

The 2020 to 2029 construction phase (2020 Service Area) proposes to include 74 additional MUDs, bringing the total number of wholesale customers to 121. The Owner projected water demand in year 2029 for the 2020 Service Area is approximately 96.2 mgd. NHCRWA proposes constructing its second transmission line to supply the water volumes to meet the surface water conversion requirements of not only the 2020 through 2029 water demands, but the 2030 water demands as well. Therefore, the COH surface water contract amount needed for the 2030 Service Area is 102.0 mgd to meet the HGCSD conversion goal of 88.6 mgd for year 2030.

Three new regional water plants are proposed at the following preliminary locations and are shown in *Exhibit 7*. The proposed locations for these regional water plants are for general locating purposes only. Future siting investigations will be necessary to determine the final locations.

- Near Spring Cypress Road and the northeast corner of Bilma Public Utility District.
- Near Boudreaux Road and approximately one mile east of Huffsmith Kohrville Road.

- Near the intersection of Telge Road and Jarvis Road.

These regional water plants and pump stations are sized through year 2029 phased construction. The regional water plants will be supplied with surface water from the NHCRWA's three primary pump stations as well as groundwater from 21 proposed regional groundwater wells owned and operated by the NHCRWA. A few MUDs may provide their excess groundwater capacity and storage to the NHCRWA (NHCRWA 2002). This may reduce the number of regional groundwater wells that the NHCRWA will need to construct. For year 2029 construction phase, the proposed additional delivery storage is 10 mg for total delivery storage of 15 mg. The proposed additional regional storage is 21 mg for total regional storage of 29 mg.

The estimate of probable total project cost for the proposed primary transmission system is about $133,974,000, as shown in *Table 6*. The estimate of probable total project cost for the proposed pump stations, regional water plants, regional groundwater wells and collection lines, distribution system, and MUD interconnection is about $268,084,000, as shown in *Table 8*. The total estimate of probable costs is about $402,058,000 for the 2020 construction phase, excluding interest and financing costs as well as the costs for acquiring surface water.

F. YEAR 2030 PHASED CONSTRUCTION

The distribution system expands to its 2030 Service Area limits on both the east and west sides. The 2030 construction phase expands with 16 additional MUDs bringing the total number of wholesale customers to 137. The Owner projected water demand in the year 2030 Service Area is 7.5 mgd, but for the 2030 Service Area, the Owner projected water demand is 104.8 mgd. As previously mentioned, the COH surface water contract amount needed for the 2030 Service Area is 102.0 mgd to meet the HGCSD conversion goal of 88.6 mgd for year 2030.

This phase construction does not include a new transmission pipe or any new pump stations or regional water plants. However, the pump stations and water plants infrastructure increases to meet the higher water demands including three groundwater wells. For year 2030 construction phase, the proposed additional delivery storage is 6 mg for total delivery storage of 21 mg. The proposed additional regional storage is 3 mg for total regional storage of 32 mg. The estimate of probable total project cost for the proposed distribution system, groundwater wells, storage tank expansion, water plant, and pump station expansion, as shown in *Table 9*, is about $29,068,000, excluding interest and financing costs as well as the costs for acquiring surface water.

The NHCRWA may choose to combine the 2030 Phased Construction with the 2020 Phased Construction.

SECTION 5 – GRP FINANCING

Pursuant to the provisions of House Bill 2965, the NHCRWA's creation legislation, as amended by House Bill 1110 (collectively referred to as "H.B. 2965" or the "Legislation"), the NHCRWA may fund its projects through three sources, including revenue notes, revenue bonds, and capital contributions received from utility districts located within the NHCRWA. Each of these funding sources is outlined below.

The first source of funding for the NHCRWA projects is through the issuance of revenue notes. Section 5.01 of H.B. 2965 authorizes the NHCRWA to borrow money on negotiable notes issued by the NHCRWA secured solely by revenue sources of the NHCRWA. The revenue sources specified in H.B. 2965 include tolls, charges, and fees imposed by the NHCRWA; revenue from the sale of water, water/sewer services, or any other service or product of the NHCRWA; grants and gifts; revenue from the ownership and operation of the NHCRWA's works, improvements, facilities, plants, or equipment; and revenue from contracts between the NHCRWA and any person, including a local government.

The second source of funding available to the NHCRWA is through the issuance of bonds secured by all or part of the revenue derived from any source, including the sources outlined above, to carry out the powers and authority of the NHCRWA pursuant to Section 5.02 of the Legislation. Bonds of the NHCRWA may be issued through a public, private, or negotiated sale. Bonds issued by the NHCRWA must be approved by the Attorney General of the State of Texas and registered by the State Comptroller's office. However, bonds or notes of the NHCRWA are not subject to review and approval by the TCEQ.

The third source of funding for projects of the NHCRWA is from receipt of capital contributions from utility districts located within the NHCRWA in accordance with the provisions of H.B. 2965. Section 5.05 of H.B. 2965 requires the NHCRWA to develop procedures for cooperatively funding projects of the NHCRWA that fulfill a governmental purpose of both the NHCRWA and the participating district with funds from utility districts located within the NHCRWA. Specific procedures for utility districts to participate in funding their allocation of the costs of an NHCRWA project are set forth in Section 5.05(b) and (c) of H.B. 2965.

The NHCRWA plans to finance its pro-rata share of the costs of purchasing a surface water supply capacity from the COH (as outlined in Section 3 of this GRP) by issuing bond anticipation notes and/or bonds of the NHCRWA and through the receipt of capital contributions from utility districts located within the NHCRWA. The bonds issued by the NHCRWA will be secured by revenue generated by fees and charges imposed by the NHCRWA for the pumpage of groundwater and the sale of treated surface water to persons, corporations, and political subdivisions of the State of Texas located inside and outside the boundaries of the NHCRWA. In addition, the NHCRWA will also finance the engineering, design, and construction of the surface water transmission and distribution system described in Section 4 of this GRP through the issuance of NHCRWA bonds and receipt of capital contributions from utility districts located within the NHCRWA.

SECTION 6 – GROUNDWATER REDUCTION PLAN MANAGEMENT

The NHCRWA is a governmental agency and a body politic and corporate of the State of Texas created under Section 59, Article XVI of the Texas Constitution and Chapter 49 of Texas Water Code, as amended. House Bill 2965, the creation legislation for the NHCRWA, along with House Bill 1110 amending such legislation (collectively referred to as "H.B. 2965" or the "Legislation"), provides full and complete power and authority for the NHCRWA to prepare, adopt, implement, and manage a GRP that meets the requirements and mandates of the Subsidence District's 1999 Regulatory Plan as summarized below. Copies of the Legislation can be found in *Appendix A.*

Under the provisions of such Legislation, the NHCRWA may provide for the conservation, preservation, protection, recharge, and prevention of the waste of groundwater. The NHCRWA may, for the purpose of reducing groundwater withdrawals and subsidence, acquire or develop surface water and groundwater supplies from both inside and outside its boundaries and may conserve, store, transport, treat, purify, distribute, sell, and deliver water to persons, corporations, political subdivisions, and other entities located both inside and outside the boundaries of the NHCRWA. In addition, the NHCRWA may also enter into contracts with persons, as well as political subdivisions of the State of Texas, for the performance of the rights, powers, and authority given to the NHCRWA under the Legislation.

Specifically, Section 4.01(b)(5) (as amended by H.B. 1110) provides the authority for the NHCRWA to provide for the reduction of groundwater withdrawals by the development, implementation, or enforcement of the provisions contained in the NHCRWA's GRP. In Subsection (e) of Section 4.01, a GRP that is developed, implemented, participated in, or enforced by the NHCRWA is binding on all persons, districts, entities, and wells located within the NHCRWA's boundaries. Any additional persons or districts that may want to be included in the NHCRWA's GRP may enter into a contract with the NHCRWA for such purpose.

The NHCRWA also has eminent domain authority within its boundaries to acquire property of any kind to further the authorized purposes of the NHCRWA. Eminent domain powers may also be exercised outside the boundaries of the NHCRWA to acquire land, easements, or other property for the purposes of pumping, treating, storing, and transporting water. As specified in the Legislation, the NHCRWA may <u>not</u> use eminent domain powers for the purpose of acquiring rights to underground water, water, or water rights. There are other limitations on the NHCRWA's power of eminent domain, which are specifically outlined in Section 4.08 of the Legislation, as amended by H.B. 1110.

The NHCRWA, pursuant to Section 4.02 of the Legislation, may adopt and enforce rules required to implement the provisions of the Legislation. Section 4.03 provides the NHCRWA with full power to establish fees and charges, with certain limitations, that are necessary to enable the NHCRWA to fulfill its regulatory obligations.

The NHCRWA has the power and authority to acquire by purchase, gift, or lease a water treatment or supply system and to design, finance, and construct a water treatment or supply system, both inside and outside of the NHCRWA boundaries, under Section 4.06 of the Legislation. In addition, the

NHCRWA also has the authority to operate, lease, or sell a water treatment or supply system that the NHCRWA has constructed or acquired and may contract with any person to operate and maintain a water treatment or supply system.

The NHCRWA may sell, store, or reuse water or any by-product of the NHCRWA's operations under Section 4.07, thereby enabling the NHCRWA to purchase water from a wholesale source to sell to the MUDs and other entities located inside and outside of its boundaries.

Section 4.09 of the Legislation provides the NHCRWA with authority to enter into a contract with any person or legal entity regarding the performance of any purpose of the NHCRWA, including a contract to jointly construct, finance, own, or operate works, improvements, facilities, plants, equipment or appliances necessary to accomplish the purposes or functions of the NHCRWA. This contractual authority includes the power to purchase or sell water or water rights.

In summary, through the specific provisions of the Legislation, along with the powers, rights, authority, privileges, and functions provided under Chapter 49, Texas Water Code, as amended, the NHCRWA has full, complete and comprehensive powers and authority to prepare, implement, enforce, and manage the GRP required by the HGCSD. The NHCRWA intends to adopt rules and regulations to appropriately implement and manage the NHCRWA GRP. In addition to the proposed rules and regulations, the NHCRWA, as the GRP Manager, will oversee the conversion from groundwater to surface water via the following activities: identify the service areas for the 2010, 2020, and 2030 conversion phases; identify and notify the utility districts that will be using surface water or groundwater; monitor the utility district volumes of groundwater and surface water by way of reading meters, communicating with the utility districts, and adjusting the usage to ensure compliance with the regulatory requirement; and record and document usage throughout the NHCRWA Service Area and report annually to the HGCSD.

The power and authority of the NHCRWA to finance the implementation and management of the GRP are specifically outlined in Section 5.

SECTION 7 – SUMMARY AND CONCLUSIONS

This GRP demonstrates that the NHCRWA is committed to meeting the HGCSD regulatory requirements. The NHCRWA has entered into a long-term agreement with the COH that will provide sufficient surface water to sustain the groundwater conversion process through at least 2030. Construction of the first elements of the NHCRWA's surface water system is expected to begin by January 2005, as required.

The NHCRWA will serve an area that is expected to continue its trend of rapid growth throughout the conversion period. Continued growth is reflected in both the population and water demand projections. Infrastructure planning to distribute surface water to serve NHCRWA's customers is an ongoing process and will need to be flexible to accommodate changes in growth patterns.

The NHCRWA will deliver water to its customers at system pressure. The 2030 NHCRWA system will be capable of supplying peak day and peak hour flows to as many as 30 percent of the MUDs. This will enable MUDs with poor quality groundwater, wells that produce insufficient flow, or obsolete facilities to rely completely on the NHCRWA system to meet all of their water demands. Groundwater will be used to supplement surface water in order to meet peak demands. Regional facilities and some existing MUD and/or independent well owners will supply the supplemental groundwater.

Detailed planning has been prepared for the 2010 system. The source of surface water will be the NEWPP. Treated water will be delivered to the NHCRWA near the intersection of US 59 and Beltway 8. Transmission facilities will be constructed to deliver the water to NHCRWA storage tanks that will be located in the vicinity of TC Jester Road south of FM 1960. The 2010 service area will be the central portion of the NHCRWA, which has the highest population density has the greatest water demand and is where several MUDs need an alternate source of water to alleviate water quality or quantity problems. This area is roughly bounded by SH 249 on the west, Spring Cypress Road on the north, IH 45 on the east, and FM 1960 and Bammel North Houston on the south. The estimate of probable project cost for the 2010 system for engineering, land acquisition, transmission lines from the COH delivery point, storage tanks, pumping stations, water wells, distribution piping, and appurtenances is about $181.6 million, excluding interest and financing costs. This cost also does not include the NHCRWA purchase of capacity in the COH's raw water facilities, NEWPP, and the transmission line to the delivery point.

A preliminary delineation of the 2020 and 2030 service areas has been made. The system will expand west, north, and east to supply additional customers with surface water to meet the conversion requirements. Additional transmission facilities will be constructed so that ultimately there will be three points from which COH surface water is delivered into the NHCRWA distribution system. Additions to the system to meet 2020 and 2030 requirements have estimates of probable project costs of about $402.1 million and about $29.1 million, respectively, and about $612.7 million total for all three conversion phases. These summary costs are shown in *Table 10* and exclude interest and financing costs as well as the costs for acquiring surface water.

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TABLE 1 THE NHCRWA PUMPAGE DISTRIBUTION OF WATER WELL PERMITTEES

Pumpage Range	Number of Wells	Total Pumpage (mgy)
zero volume	395	0
< 2 mgy	784	186
2 - 5 mgy	73	207
5 - 7.5 mgy	40	189
7.5 - 10 mgy	25	168
10 - 15 mgy	27	207
15 - 30 mgy	26	231
30 - 60 mgy	38	1,187
60 - 90 mgy	27	1,401
90 - 120 mgy	27	1,735
> 120 mgy	150	20,311
TOTAL	**1,612**	**25,822**

Notes:

The groundwater well pumpages shown are for MUDs and independent well owners within the NHCRWA.

mgy: million gallons per year

Source: HGCSD 2000 Pumpage Report

TABLE 2 THE NHCRWA ACTUAL AND PROJECTED POPULATIONS

		ACTUAL (1)	PROJECTED (2)		
CENSUS TRACT (3)	PLAN. REG.	2000 POPULATION	2010 POPULATION	2020 POPULATION	2030 POPULATION
240400	2	848	1,215	1,861	2,046
240800	1	7,403	10,851	13,910	16,293
240900	1	6,725	9,811	12,533	14,135
241000	1	7,088	14,302	20,625	26,866
241100	1	14,726	17,002	24,518	31,937
241200	1	5,927	6,261	9,065	12,419
241300	1	3,396	4,642	6,721	9,200
241400	1	5,248	6,584	9,495	12,370
250700	1	6,129	7,511	10,780	13,690
532400	4	2,931	4,353	5,693	6,017
532500	4	4,858	10,426	17,876	19,232
532900	3	2,491	2,937	3,419	3,589
533900	3	1,737	3,369	5,919	6,462
534000	3	278	679	1,188	1,299
534000	4	2,500	6,111	10,688	11,691
534100	3	2,825	5,706	9,138	10,632
534200	4	3,024	3,641	4,979	6,043
550300	2	2,896	4,139	6,754	8,020
550400	2	658	801	1,205	1,654
550700	3	636	1,167	1,743	1,820
551000	3	1,931	2,099	2,625	2,944
551100	2	5,489	6,035	6,602	7,014
551200	3	5,204	6,680	8,832	9,638
551300	3	3,251	4,810	5,883	6,420
551400	3	2,370	3,992	5,744	6,268
551500	4	2,423	2,917	4,448	6,179
551600	4	7,191	8,305	9,419	10,533
551700	4	18,550	21,581	24,613	27,644
551800	4	4,823	6,222	8,298	10,070
551900	4	4,278	4,278	4,278	4,278
552000	4	7,190	7,190	7,190	7,190
552100	5	11,373	13,011	16,404	16,786
552200	5	3,512	4,709	6,802	9,271
552200	7	878	1,177	1,700	2,318
552300	5	8,129	11,128	14,155	14,484
552400	5	4,266	4,377	5,518	5,646
552500	4	2,171	2,504	3,253	3,796
552500	5	5,065	5,842	7,590	8,858
552600	5	4,437	4,503	5,851	6,829
552700	3	1,861	2,330	3,200	3,753
552800	3	7,839	8,178	10,385	11,847
552900	3	6,895	10,389	10,894	11,148

TABLE 2 THE NHCRWA ACTUAL AND PROJECTED POPULATIONS *(CONTINUED)*

		ACTUAL (1)	PROJECTED (2)		
CENSUS TRACT (3)	PLAN. REG.	2000 POPULATION	2010 POPULATION	2020 POPULATION	2030 POPULATION
553000	2	8,226	11,111	14,206	16,295
553000	3	914	1,235	1,578	1,811
553100	2	6,314	7,376	7,552	7,727
553200	2	7,246	9,535	9,762	9,989
553300	2	2,892	4,120	4,218	4,316
553400	2	10,711	14,008	17,306	20,603
553500	2	6,701	9,140	9,358	9,576
553600	2	5,182	8,670	10,859	11,111
553700	2	3,654	3,969	4,284	4,599
553800	2	6,403	7,631	10,878	11,131
553800	3	2,744	3,271	4,662	4,770
553900	3	7,432	7,794	8,156	8,517
554000	3	7,254	8,484	11,758	14,723
554100	3	9,761	10,576	12,271	12,557
554200	3	4,401	4,557	6,591	8,984
554300	5	11,086	12,030	12,317	12,603
554400	5	2,730	2,730	2,730	2,730
554400	7	8,189	8,189	8,189	8,189
554500	5	6,248	6,286	6,324	6,362
554500	7	694	698	703	707
554600	5	4,732	4,875	5,018	5,161
554700	5	4,406	4,406	4,406	4,406
554800	3	2,837	3,456	4,075	4,694
554800	6	2,322	2,828	3,334	3,840
554900	2	1,998	2,333	2,668	3,004
554900	6	7,990	9,332	10,673	12,014
555000	2	5,535	5,986	8,172	10,613
555100	2	3,657	4,251	5,803	7,537
555200	2	1,403	1,465	2,000	2,597
555200	6	3,275	3,418	4,666	6,059
555300	6	5,816	5,816	5,816	5,816
555400	6	9,168	9,326	9,485	9,643
555500	5	1,829	2,055	2,281	2,508
555500	7	7,314	8,220	9,125	10,030
555600	7	3,848	3,848	3,848	3,848
555700	7	5,979	5,979	5,979	5,979
555800	7	3,708	3,708	3,708	3,708
555900	7	1,026	1,026	1,026	1,026
Total		**397,074**	**487,499**	**607,576**	**688,111**

TABLE 2 THE NHCRWA ACTUAL AND PROJECTED POPULATIONS *(CONTINUED)*

		ACTUAL (1)	PROJECTED (2)		
CENSUS TRACT (3)	PLAN. REG.	2000 POPULATION	2010 POPULATION	2020 POPULATION	2030 POPULATION

Notes:

(1) Year 2000 data is from the U.S. Bureau of Census.

(2) The 2010, 2020, and 2030 population projections are from Prof. Steven Craig, Un. of Houston - Center for Public Policy (CPP), http://www.uh.edu/cpp/. Prof. Craig said the projections from CPP use both the new census and employment data. Since the US Census Bureau will not release the 2000 employment data until late 2002, the projections shown are based on 2000 census and 1990 employment data.

(3) Census tracts are repeated when the census tracts appear in two different planning regions. *Exhibits 3* and *4* provide a general view of these occurrences.

TABLE 3 THE NHCRWA SURFACE WATER CONVERSION GOALS

Population	**2000**	**2010**	**2019**	**2020**	**2029**	**2030**
Residential (1)	397,074	487,499	595,568	607,576	680,057	688,111
Employment (2)	95,432	117,730	135,946	137,970	160,510	163,015
Water Demands (mgd)						
Residential (3)	58.81	72.37	88.59	90.39	101.26	102.47
Employment (4)	2.58	3.18	3.67	3.73	4.33	4.40
Agricultural - Wells are Exempt (5)	0.00	0.00	0.00	0.00	0.00	0.00
Other - Includes Golf Courses (6)	3.54	3.54	3.54	3.54	3.54	3.54
Industrial (6)	0.32	0.32	0.32	0.32	0.32	0.32
Total (mgd)	**65.25**	**79.41**	**96.12**	**97.97**	**109.45**	**110.73**
Required HGCSD Surface Water Conversion Percentages		30%	30%	70%	70%	80%
Surface Water Conversion Goals (mgd)		**23.82**	**28.83**	**68.58**	**76.62**	**88.58**

Notes:
1. Year 2000 population is from the U.S. Bureau of Census. The University of Houston - Center for Public Policy, provided the population projections.
2. Year 2000 employment data and projections are from *HGCSD 1996 Report.*
3. Residential water demand based on 150 gpcd from *HGCSD 1996 Report.*
4. Employment water demand based on 27 gpcd per report from *HGCSD 1996 Report.*
5. Wells designated as Agricultural by the HGCSD are exempt from inclusion in the GRP.
6. Year 2000 "Other" and "Industrial" water demands based on HGCSD Year 2000 pumpage reports. Assumed pumpages are constant throughout the planning period.

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
	47 WHOLESALE CUSTOMERS FOR 2010 SERVICE AREA						
2	Bammel Forest Utility Company	158	201	240	244	270	273
2	BAMMEL U.D.	289	368	410	415	415	415
2	BILMA P.U.D.	473	603	689	698	698	698
2	BRIDGESTONE M.U.D.	610	779	928	945	1,043	1,054
2	Candlelight Service Co. Inc. aka Candlelight Hills and AquaSource Utility, Inc.	228	291	345	350	350	350
2	CNP UTILITY DISTRICT	780	912	912	912	912	912
3	CY-CHAMP P.U.D.	654	826	1,039	1,063	1,175	1,188
3	CYPRESS FOREST P.U.D.	1,067	1,347	1,695	1,734	1,802	1,809
2	CYPRESS KLEIN U.D. (WP to SI HCMUD 316)	550	702	837	852	941	951
2	CYPRESSWOOD UD (SI HCWCID No. 132)	NA	NA	NA	NA	NA	NA
3	FOUNTAINHEAD M.U.D. (WP and SI NWHCMUD 21)	479	587	587	587	587	587
3	HARRIS CO. F.W.S.D. 52	641	809	1,018	1,041	1,096	1,103
2	HARRIS CO. M.U.D. 016	339	432	515	525	579	586
3	HARRIS CO. M.U.D. 024	817	983	983	983	983	983
2	HARRIS CO. M.U.D. 044	286	365	381	383	383	383
3	HARRIS CO. M.U.D. 048	0	135	257	271	392	406
2	HARRIS CO. M.U.D. 104	206	263	314	319	353	357
3	HARRIS CO. M.U.D. 191	155	195	245	251	278	280
3	HARRIS CO. M.U.D. 202	188	237	299	306	338	341
2	HARRIS CO. M.U.D. 211 (SI MUD 233)	NA	NA	NA	NA	NA	NA
2	HARRIS CO. M.U.D. 233 (WP to SI MUD 211)	108	137	164	167	184	186
2	HARRIS CO. M.U.D. 275	112	143	170	173	191	193
5	HARRIS CO. M.U.D. 286	418	469	533	540	540	540
2	HARRIS CO. M.U.D. 316 (SI Cypress Klein UD)	NA	NA	NA	NA	NA	NA
2	HARRIS CO. W.C.I.D. 091	345	440	524	534	542	543
3	HARRIS CO. W.C.I.D. 109	1,120	1,414	1,482	1,490	1,490	1,490
2	HARRIS CO. W.C.I.D. 110	591	753	898	914	1,009	1,020
3	HARRIS CO. W.C.I.D. 114	798	901	901	901	901	901
3	HARRIS CO. W.C.I.D. 116	553	639	639	639	639	639
3	HARRIS CO. W.C.I.D. 119	476	601	748	764	764	764
2	HARRIS CO. W.C.I.D. 132 (WP to SI Cypresswood UD)	870	1,084	1,084	1,084	1,084	1,084
3	HEATHERLOCH M.U.D.	415	462	462	462	462	462
2	KLEIN P.U.D. (WP to SI NWHCMUD 36)	501	639	762	775	785	786
3	KLEINWOOD M.U.D.	416	525	660	676	747	755

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
3	LOUETTA NORTH P.U.D.	347	438	551	564	623	630
2	LOUETTA ROAD U.D. (WP to SI Terranova West MUD)	146	186	222	226	250	252
5	MALCOMSON ROAD U.D.	659	739	856	869	924	930
3	NW HARRIS CO. M.U.D. 06	192	243	305	312	345	349
2	NW HARRIS CO. M.U.D. 20	275	351	357	358	358	358
3	NW HARRIS CO. M.U.D. 21 (SI w/ MUD 22 and Fountainhead MUD)	459	580	626	631	631	631
3	NW HARRIS CO. M.U.D. 22 (SI w/ MUD 21)	NA	NA	NA	NA	NA	NA
2	NW HARRIS CO. M.U.D. 36 (SI from Klein PUD)	NA	NA	NA	NA	NA	NA
2	PONDEROSA FOREST U.D.	815	940	940	940	940	940
3	PRESTONWOOD FOREST U.D.	438	532	532	532	532	532
2	SPRING CREEK FOREST P.U.D.	312	398	462	469	469	469
2	TERRANOVA WEST M.U.D. (WP and SI Louetta Road PUD)	289	369	407	412	412	412
2	WESTADOR M.U.D.	715	717	717	717	717	717
	Water Demand at ADF (gpm)	19,292	23,734	26,697	27,026	28,134	28,257
	Water Demand at ADF (mgd)	**27.78**	**34.18**	**38.44**	**38.92**	**40.51**	**40.69**
	73 WHOLESALE CUSTOMERS ADDED FOR 2020 SERVICE AREA						
1	Bayer Water System	53	72	98	100	125	128
3	CHARTERWOOD M.U.D.	347	438	551	564	623	630
4	CITY OF JERSEY VILLAGE (3)	193	403	652	679	807	822
2	Consumers Water Corporation	76	97	115	117	130	131
5	CYPRESS CREEK U.D.	443	496	575	584	621	625
5	EMERALD FOREST U.D. (Very small flow from SI FWSD 61)	491	550	637	647	688	692
5	Enchanted Valley Estates Water Supply	48	48	48	48	48	48
5	FAULKEY GULLY M.U.D.	913	1,022	1,185	1,203	1,279	1,287
1	FOREST POINT MUD	NA	152	289	304	440	456
5	GRANT ROAD P.U.D.	170	191	221	225	239	240
5	HARRIS CO. F.W.S.D. 61 (WP to HCMUD 248 and a little to SI Emerald Forest UD)	1,052	1,179	1,367	1,387	1,475	1,484
5	HARRIS CO. M.U.D. 018	538	602	643	648	648	648
1	HARRIS CO. M.U.D. 043	308	418	568	585	591	592
5	HARRIS CO. M.U.D. 052	NA	45	85	90	130	134
5	HARRIS CO. M.U.D. 069	350	392	454	461	462	462
1	HARRIS CO. M.U.D. 077	0	117	223	234	340	352
1	HARRIS CO. M.U.D. 082	441	599	814	838	1,043	1,066
2	HARRIS CO. M.U.D. 086	105	134	159	162	179	181
1	HARRIS CO. M.U.D. 115	0	38	73	76	111	115

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
4	HARRIS CO. M.U.D. 168	840	929	929	929	929	929
4	HARRIS CO. M.U.D. 170	165	214	214	214	214	214
5	HARRIS CO. M.U.D. 222	345	386	448	454	483	486
5	HARRIS CO. M.U.D. 230	135	152	176	178	190	191
1	HARRIS CO. M.U.D. 231	0	76	145	153	221	229
5	HARRIS CO. M.U.D. 248 (SI HCFWSD 61)	NA	NA	NA	NA	NA	NA
1	HARRIS CO. M.U.D. 249	0	85	116	119	148	151
5	HARRIS CO. M.U.D. 280, now named NORTH POINTE WCID (SI NWHCMUD 15)	93	105	121	123	131	132
5	HARRIS CO. M.U.D. 360/PILGRIM	526	589	683	694	737	742
3	HARRIS CO. M.U.D. 367	214	270	340	348	384	388
3	HARRIS CO. M.U.D. 368	138	174	219	224	248	250
3	HARRIS CO. M.U.D. 383, Commercial Dev.	0	264	502	529	766	793
1	HARRIS CO. W.C.I.D. 092	538	730	835	847	847	847
1	HARRIS CO. W.C.I.D. 099	204	277	376	387	467	476
1	HARRIS CO. W.C.I.D. 136	204	277	376	387	408	410
1	HUNTERS GLEN M.U.D.	212	288	392	403	502	513
1	INVERNESS FOREST U.D. (partially w/in NHCRWA	230	312	424	436	543	555
4	Jersey Lake Homeowners Assoc aka Lakeside Club	65	65	65	65	65	65
5	LAKE FOREST U.D.	802	898	1,041	1,057	1,124	1,131
2	MEADOWHILL REGIONAL MUD aka DOVE MEADOWS M.U.D. (WP to SI NWM28)	276	352	419	427	471	476
1	MEMORIAL HILLS U.D.	228	310	421	433	540	551
5	MILLS ROAD M.U.D.	378	424	491	499	520	522
1	NORTH PARK P.U.D.	383	383	383	383	383	383
1	NORTHGATE CROSSING M.U.D. 1 (SI Northgate Crossing 2)	NA	NA	NA	NA	NA	NA
1	NORTHGATE CROSSING M.U.D. 2 (WP to SI Northgate Crossing 1)	95	129	175	180	224	229
5	NW HARRIS CO. M.U.D. 09	522	584	678	688	731	736
5	NW HARRIS CO. M.U.D. 15 (SI MUD 280)	210	235	273	277	294	296
3	NW HARRIS CO. M.U.D. 24	103	130	164	168	185	187
5	NW HARRIS CO. M.U.D. 27	0	34	64	67	97	101
2	NW HARRIS CO. M.U.D. 28 (SI to Meadowhill MUD)	0	117	221	233	338	350
4	NW HARRIS CO. M.U.D. 29	290	375	476	487	539	545
2	NW HARRIS CO. M.U.D. 30	0	312	592	623	904	935
2	NW HARRIS CO. M.U.D. 32	156	199	237	242	267	270

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
1	Pilchers Oxford Group aka Splashtown	23		23	23	23	23	23
1	POST WOOD M.U.D.	210		285	388	399	407	408
4	REID ROAD M.U.D. 1	501		648	822	841	931	941
4	REID ROAD M.U.D. 2	267		345	438	449	497	502
1	RICHEY ROAD MUD	109		148	201	207	257	263
2	SHASLA P.U.D.	182		232	263	267	267	267
1	Six Flags Splashtown L.P.	102		102	102	102	102	102
2	SPRING WEST M.U.D.	66		84	100	102	112	114
1	TATTOR ROAD M.U.D.	364		495	616	630	630	630
1	TIMBER LANE U.D.	841		1,143	1,444	1,478	1,478	1,478
5	TIMBERLAKE I.D.	349		391	410	412	412	412
3	Undeveloped Area A	0		601	1,143	1,203	1,744	1,804
7	Undeveloped Area B	0		527	1,001	1,053	1,528	1,580
6	Undeveloped Area C	0		323	613	645	936	968
6	Undeveloped Area D	0		413	784	825	1,196	1,238
6	Undeveloped Area E	0		495	940	989	1,435	1,484
4	W. HARRIS CO. M.U.D. 09	469		540	540	540	540	540
4	W. HARRIS CO. M.U.D. 10	676		874	885	886	886	886
4	W. HARRIS CO. M.U.D. 11	519		671	852	872	965	975
4	W. HARRIS CO. M.U.D. 21	67		86	110	112	124	126
4	WHITE OAK BEND M.U.D.	163		211	267	274	303	306
	Water Demand at ADF (gpm)	17,785		25,302	32,695	33,516	38,650	39,221
	Water Demand at ADF (mgd)	**25.61**		**36.44**	**47.08**	**48.26**	**55.66**	**56.48**
	120 WHOLESALE CUSTOMERS CUMULATIVE TOTALS FOR 2010 THROUGH 2029							
	Water Demand at ADF (gpm)	37,078		49,036	59,391	60,542	66,784	67,477
	Water Demand at ADF (mgd)	**53.39**		**70.61**	**85.52**	**87.18**	**96.17**	**97.17**
	16 WHOLESALE CUSTOMERS ADDED FOR 2030 SERVICE AREA							
1	Amberwood Utility Co.	12		16	21	22	27	28
7	CYPRESS HILL M.U.D. 1	240		249	259	260	270	271
7	CYPRESS HILL M.U.D. 2	0		212	402	424	614	635
1	HARRIS CO. M.U.D. 026	422		573	779	802	998	1,020
1	HARRIS CO. M.U.D. 085	0		56	107	113	163	169
7	HARRIS CO. M.U.D. 289	0		130	247	260	378	391
7	HARRIS CO. M.U.D. 322 (SI MUD 354 and 358)	NA		NA	NA	NA	NA	NA
7	HARRIS CO. M.U.D. 354 (SI MUDs 322 and 358)	NA		NA	NA	NA	NA	NA
7	HARRIS CO. M.U.D. 358 (WP to SI MUDs 322 and 354)	770		800	831	835	868	872
7	HARRIS CO. M.U.D. 364 (SI MUD 365)	NA		NA	NA	NA	NA	NA

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
7	HARRIS CO. M.U.D. 365 (WP to SI MUD 364)	232		241	251	252	262	263
5	HARRIS CO. W.C.I.D. 113	147		164	190	193	206	207
5	NW HARRIS CO. M.U.D. 05	447		501	581	590	627	631
7	NW HARRIS CO. M.U.D. 10	223		231	240	241	251	252
1	Oak Hill Estates Water Co.	0		42	79	84	121	125
7	Suburban Utility Co.	0		140	266	280	406	420
	Water Demand at ADF (gpm)	2,492		3,355	4,254	4,354	5,191	5,284
	Water Demand at ADF (mgd)	**3.59**		**4.83**	**6.13**	**6.27**	**7.47**	**7.61**
	136 WHOLESALE CUSTOMERS CUMULATIVE TOTALS FOR 2010 THROUGH 2030							
	Water Demand at ADF (gpm)	39,570		52,391	63,646	64,896	71,975	72,761
	Water Demand at ADF (mgd)	**56.98**		**75.44**	**91.65**	**93.45**	**103.64**	**104.78**
	120 OWNERS NOT INCLUDED IN THE NHCRWA 2030 OVERALL SERVICE AREA							
6	Albury Manor Utility Co.	22		23	26	26	28	28
7	Allied Concrete Materials	12		13	13	13	14	14
5	Aquasource Development Co. aka Stable Gate Homeowners Assoc.	15		15	15	15	15	15
7	AquaSource Inc. aka Cypress Fields	28		29	30	30	32	32
5	AquaSource Inc. aka Marks Glen	23		26	30	31	33	33
6	AquaSource Inc. aka Rolling Oaks	27		29	32	32	35	35
4	AquaSource Utility, Inc. aka Creekside Estates	93		121	153	157	173	175
7	AquaSource Utility, Inc. aka Lakes of Rosehill	105		109	114	114	119	119
5	AquaSource Utility, Inc. aka Park Forest	45		50	58	59	62	63
3	Aquasource, Inc. aka Bammel Oaks 2	13		16	20	21	23	23
6	Aquasource, Inc. aka Oakwood Village	12		13	15	15	16	16
7	Ashton Houston Residence	20		52	54	54	56	57
6	Atascocita Management Corp.	75		81	89	90	98	99
6	Augusta Pines Golf Course aka Tour 18	15						
5	Beazer Homes	18		20	23	23	25	25
6	Bussell, Craig	15		16	17	17	19	19
4	C&P Utilities, Inc.	56		73	93	95	105	106
2	C&P Utilities, Inc.	60		76	91	92	102	103
7	C&P Utilities, Inc.	11		11	12	12	12	12
4	C&P Utilities, Inc.	11		14	18	19	21	21
7	C&P Utilities, Inc.	11		12	12	12	13	13
1	Castle Country Homes, Inc.	16		21	29	30	37	38
1	Cemex USA	10		10	10	10	10	10
3	Cemex USA	22		22	22	22	22	22

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
7	Champions Glen, L.P.	12	12	13	13	13	13
3	Champions Golf Club	124	124	124	124	124	124
5	Chasewood Land Venture	28	31	36	37	39	39
4	City of Jersey Village for Jersey Meadows Golf Course	16	53	53	53	53	53
6	CITY OF TOMBALL	1,315	1,414	1,549	1,564	1,705	1,720
7	Compaq Computer Corp.	89	89	89	89	89	89
3	Compaq Computer Corp.	17	17	17	17	17	17
3	Compaq Computer Corporation	12	12	12	12	12	12
5	Cypress Forest Service Assoc.	41	46	54	55	58	58
7	Cypress Lakes Golf Course aka Middleton Properties	277	277	277	277	277	277
1	Cypresswood Golf Club aka Cypresswood LTD - US golf Corp	268	268	268	268	268	268
6	DOWDELL P.U.D.	144	155	169	171	186	188
6	Dubrook, Inc./Frontier Materials	10	11	12	12	13	13
7	EJDS Inc.	19	20	20	21	21	21
6	ENCANTO REAL U.D.	91	98	107	108	118	119
2	Enviro-Grow Nursery	11	14	17	17	19	19
4	Furlong LTD	42	54	69	70	78	79
1	Fussel Farm, Riley	22	30	41	43	53	54
2	Gilbert, Robert C.	11	14	17	17	19	19
3	Gleannloch Farms Comm. Assoc. Inc. (aka Champions Glen LP)	110	110	110	110	110	110
3	Gleannloch Golf Club L.P.	291	291	291	291	291	291
7	Grand Northwest MUD	0	224	425	447	648	671
5	Grantwood Civic Club aka Grantwood Water Supply Corp.	34	34	34	34	34	34
6	HARRIS CO. M.U.D. 001	256	275	301	304	331	334
6	HARRIS CO. M.U.D. 009	0	129	245	258	374	387
6	HARRIS CO. M.U.D. 022	0	184	349	368	533	552
4	HARRIS CO. M.U.D. 025 (WP to SI WHCMUD 1)	251	325	412	422	467	472
6	HARRIS CO. M.U.D. 109	727	782	856	865	942	951
6	HARRIS CO. M.U.D. 383 Golf Club (Proposed)	0	169	169	169	169	169
7	HARRIS CO. W.C.I.D. 155	0	192	365	384	556	576
3	Harris County	16	16	16	16	16	16
4	Harris County	17	17	17	17	17	17
2	Harris County	18	18	18	18	18	18
6	HMW Special Utility District	13	14	16	16	17	17
7	HMW Special Utility District aka 2920 West	35	36	37	38	39	39
7	HMW Special Utility District aka Alice Acres	18	19	20	20	21	21

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
2	HMW Special Utility District aka Brandywine Pines	18	23	28	28	31	31
5	HMW Special Utility District aka Cypress Pass	17	19	22	22	23	23
7	HMW Special Utility District aka Holly Lakes	17	17	18	18	19	19
7	HMW Special Utility District aka New Kentucky	84	87	90	91	94	95
4	HMW Special Utility District aka Red Oak Terrace	16	21	26	27	30	30
7	HMW Special Utility District aka Rosewood Hill	98	102	106	107	111	111
6	HMW Special Utility District aka Timberwilde	35	38	42	42	46	46
7	HMW Special Utility District aka Treichel Woods	12	13	13	13	14	14
6	HMW Special Utility District aka Willow Oaks	31	34	37	37	41	41
6	HOE Water Supply Corp.	25	27	29	30	32	33
6	Hometown Timbercrest, L.P.	116	125	137	138	150	152
4	Houston Race Park, Sam	72	72	72	72	72	72
3	I.Q. Products Company	10	13	16	16	18	18
6	Inline Development Corp. aka Sugarberry Place	51	55	61	61	67	67
1	Jaeger, Kenneth V.	18	24	33	34	42	43
7	Johnston Utilities Inc. aka Powder Mill Estates	72	75	78	78	81	81
2	Klein I.S.D.	12	16	19	19	21	21
6	Klein Memorial Park and Mausoleum	10	10	11	11	12	13
	KWIK KOPY CORP NORTHWEST FOREST	14					
7	Lake Owners Association	16	16	16	16	16	16
7	Lakes of Cypress Hill Homeowners	41	41	41	41	41	41
7	Lakes of Fairfield H.O.A.	106	106	106	106	106	106
5	Lakewood Grove Assoc. Ltd.	9	9	9	9	9	9
3	Lodge at Cypresswood L.P.	15	15	15	15	15	15
5	National Golf Properties, Inc. aka Longwood Golf Club	169	169	169	169	169	169
3	Newman, Thomas C.	19	24	30	31	34	35
6	NORTHAMPTON M.U.D. (WP to SI Oakmont PUD)	838	901	986	996	1,086	1,096
2	Northgate Country Club	205	207	207	207	207	207
2	Northwest Airport MGMT., L.P.	20	20	20	20	20	20
7	NORTHWEST FREEWAY M.U.D.	168	175	182	182	190	190
7	Northwest Water Systems Inc.	36	37	38	39	40	40

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
6	NW HARRIS CO. M.U.D. 19	60	65	71	72	78	79
6	OAKMONT PUD (SI to NORTHAMPTON M.U.D.)	0	174	332	349	506	523
2	Pinelakes LP now named Windrose Golf Club	190	190	190	190	190	190
6	Pinewood Place, Inc.	55	59	65	66	71	72
7	Pitcairn W.S.C.	17	18	18	18	19	19
7	Raub, Val	12	12	13	13	13	13
3	Raveneaux Country Club	106	106	106	106	106	106
4	Reliant Energy - T.H. Wharton Pwr Plant (Is not in NHCRWA's GRP)	NA	NA	NA	NA	NA	NA
5	Rock Creek LP	45	51	59	60	64	64
3	S C Utilities	24	24	24	24	24	24
1	Sasson, Eli aka Greens Rd Mobile Home Community	48	66	71	72	72	72
1	Southwest Utilities, Inc.	11	15	20	21	26	26
3	Sterling Gates Estates	10	13	16	16	18	18
5	Tall Pines Utility Inc.	21	23	27	27	29	29
4	Texas Arai, Inc.	11	14	17	18	20	20
6	Tom, John W. Sr.	10	10	11	11	12	12
6	Tomball Country Club	23	23	23	23	23	23
5	Tower Oak Bend Water Supply	42	47	55	56	59	60
5	Treeline Golf Club, INC	70	70	70	70	70	70
3	Trees & Plants Inc	10	12	16	16	18	18
6	Trunkline Gas Company	19	20	22	22	24	24
6	Undeveloped Area F (new Woodlds Area)	0	2,057	2,057	2,057	2,057	2,057
4	W. HARRIS CO. M.U.D. 01 (SI MUD 25)	0					
7	Waller I.S.D.	19	20	21	21	22	22
7	Waynewood Place Civic Club, INC	29	30	31	31	33	33
6	Willow Creek Golf Club	73	73	73	73	73	73

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
4	Windermere Interests LTD	107		139	176	180	199	202
3	Woodwind Lakes Homeowners Assoc. aka Creekside U.C.	32		32	32	32	32	32
	Water Demand (gpy)	8,486		12,280	13,873	14,050	15,512	15,675
	Water Demand at ADF (mgd)	**12.22**		**17.68**	**19.98**	**20.23**	**22.34**	**22.57**
	TOTAL FLOWS WITHIN NHCRWA'S BOUNDARY >= 5.0 MGY							
	ADF (gpm)	**48,056**		**64,671**	**77,519**	**78,946**	**87,487**	**88,436**
	ADF (mgd)	**69.20**		**93.13**	**111.63**	**113.68**	**125.98**	**127.35**

Notes:

PLN REG: Planning Region Nos. 1 through 7 as shown in *Exhibit 4*; NA: Not applicable

(1) Some owners supply or receive their water from other owners through system interconnects (SI). Projected water demands for owners receiving water were combined into the projected water demands for the owner supplying their water.
(2) ADF: Annual average daily flow was calculated from HGCSD's Year 2000 pumpage.
(3) These water demands exclude the 750,000 gpd the City of Jersey Village receives from the City of Houston through its system interconnect.

TABLE 5 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2010 PRIMARY WATER TRANSMISSION

Item	Unit Cost	Quantity	Units	Costs ($)
Piping				
Open Cut Trench Construction	($/LF)			
Pipe @ 8"	$60	0	LF	$0
Pipe @ 12"	$90	0	LF	$0
Pipe @ 16"	$120	0	LF	$0
Pipe @ 24"	$210	0	LF	$0
Pipe @ 30"	$275	0	LF	$0
Pipe @ 36"	$340	0	LF	$0
Pipe @ 42"	$408	0	LF	$0
Pipe @ 48"	$475	0	LF	$0
Pipe @ 54"	$555	0	LF	$0
Pipe @ 60"	$635	71,450	LF	$45,370,750
Pipe @ 66"	$720	0	LF	$0
Pipe @ 84"	$955	0	LF	$0
Subtotal		**71,450**		**$45,370,750**
Trenchless Construction				
Pipe @ 12"	$600	0	LF	$0
Pipe @ 16"	$650	0	LF	$0
Pipe @ 24"	$845	0	LF	$0
Pipe @ 30"	$945	0	LF	$0
Pipe @ 36"	$1,045	0	LF	$0
Pipe @ 42"	$1,170	0	LF	$0
Pipe @ 48"	$1,295	0	LF	$0
Pipe @ 54"	$1,430	0	LF	$0
Pipe @ 60"	$1,565	1,768	LF	$2,766,920
Pipe @ 66"	$1,648	0	LF	$0
Pipe @ 84"	$1,850	0	LF	$0
Subtotal		**1,768**		**$2,766,920**
Total LF		**73,218**		
Total Capital Cost				**$48,137,670**
Engineering, Legal Costs and Contingencies				
Pipeline	30%	$48,137,670	$	$14,441,301
Other Facilities	35%	$0	$	$0
Environmental & Archaeology Studies and Mitigation				
Pipeline	$5,000	13.87	mile	$69,335
Other	$600	0	acres	$0
ESTIMATE OF PROBABLE TOTAL PROJECT COST				**$62,648,306**

TABLE 6 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2020 PRIMARY WATER TRANSMISSION

Item	Unit Cost	Quantity	Units	Costs ($)
Piping				
Open Cut Trench Construction	($/LF)			
Pipe @ 8"	$60	0	LF	$0
Pipe @ 12"	$90	0	LF	$0
Pipe @ 16"	$120	0	LF	$0
Pipe @ 24"	$210	0	LF	$0
Pipe @ 30"	$275	0	LF	$0
Pipe @ 36"	$340	0	LF	$0
Pipe @ 42"	$408	0	LF	$0
Pipe @ 48"	$475	0	LF	$0
Pipe @ 54"	$555	25,788	LF	$14,312,340
Pipe @ 60"	$635	19,470	LF	$12,363,450
Pipe @ 66"	$720	0	LF	$0
Pipe @ 72'	$805	22,038	LF	$17,740,590
Pipe @ 84"	$955	53,544	LF	$51,134,520
Subtotal		**120,840**		**$95,550,900**
Trenchless Construction				
Pipe @ 12"	$600	0	LF	$0
Pipe @ 16"	$650	0	LF	$0
Pipe @ 24"	$845	0	LF	$0
Pipe @ 30"	$945	0	LF	$0
Pipe @ 36"	$1,045	0	LF	$0
Pipe @ 42"	$1,170	0	LF	$0
Pipe @ 48"	$1,295	0	LF	$0
Pipe @ 54"	$1,430	332	LF	$474,760
Pipe @ 60"	$1,565	496	LF	$776,240
Pipe @ 66"	$1,648	0	LF	$0
Pipe @ 72'	$1,730	1,268	LF	$2,193,640
Pipe @ 84"	$1,850	2,146	LF	$3,970,100
Subtotal		**4,242**		**$7,414,740**
Total LF		**125,082**		
Total Capital Cost				**$102,965,640**
Engineering, Legal Costs and Contingencies				
Pipeline	30%	$102,965,640	$	$30,889,692
Other Facilities	35%	$0	$	$0
Environmental & Archaeology Studies and Mitigation				
Pipeline	$5,000	23.69	mile	$118,449
Other	$600	0	acres	$0
ESTIMATE OF PROBABLE TOTAL PROJECT COST				**$133,973,781**

TABLE 7 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2010 WATER DISTRIBUTION SYSTEM

Item	Unit Cost	Quantity	Units	Costs ($)
Regional Water Facilities				
Pump Station No. 1 (T.C. Jester @ FM 1960)	$5,668,000	1	LS	$5,668,000
Regional Water Plant No. 1 (Louetta Rd)	$7,888,000	1	LS	$7,888,000
Regional Water Wells and Collection Lines	$1,000,000	8	EA	$8,000,000
Subtotal				**$21,556,000**
Piping				
Open Cut Trench Construction	($/LF)			
Pipe @ 8"	$60	0	LF	$0
Pipe @ 12"	$90	0	LF	$0
Pipe @ 16"	$120	0	LF	$0
Pipe @ 18"	$150	13,747	LF	$2,062,050
Pipe @ 20"	$175	7,064	LF	$1,236,200
Pipe @ 24"	$210	32,802	LF	$6,888,420
Pipe @ 30"	$275	30,748	LF	$8,455,700
Pipe @ 36"	$340	22,811	LF	$7,755,740
Pipe @ 42"	$408	26,590	LF	$10,848,720
Pipe @ 48"	$475	38,001	LF	$18,050,475
Pipe @ 54"	$555	9,518	LF	$5,282,490
Pipe @ 60"	$635	331	LF	$210,185
Pipe @ 66"	$720	0	LF	$0
Pipe @ 84"	$955	0	LF	$0
Subtotal		**181,612**		**$60,789,980**
Trenchless Construction				
Pipe @ 12"	$600	0	LF	$0
Pipe @ 16"	$650	0	LF	$0
Pipe @ 24"	$845	0	LF	$0
Pipe @ 30"	$945	340	LF	$321,300
Pipe @ 36"	$1,045	0	LF	$0
Pipe @ 42"	$1,170	318	LF	$372,060
Pipe @ 48"	$1,295	382	LF	$494,690
Pipe @ 54"	$1,430	161	LF	$230,230
Pipe @ 60"	$1,565	0	LF	$0
Pipe @ 66"	$1,648	0	LF	$0
Pipe @ 84"	$1,850	0	LF	$0
Subtotal		**1,201**		**$1,418,280**
Total LF		**182,813**		
District Interconnection	$100,000	47	EA	**$4,700,000**
Total Capital Cost				**$88,464,260**

TABLE 7 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2010 WATER DISTRIBUTION SYSTEM *(CONTINUED)*

Item	Unit Cost	Quantity	Units	Costs ($)
Engineering, Legal Costs and Contingencies				
Pipeline	30%	$66,908,260	$	$20,072,478
Other Facilities	35%	$21,556,000	$	$7,544,600
Land Acquisition				
Right of Way Pipeline (20% & 80% : 30 ft & 40 ft wide roads)	$109,000	0	acres	$0
Facilities Site Acquisition	$109,000	22	acres	$2,398,000
Property Surveying	10%	$2,398,000	$	$239,800
Environmental & Archaeology Studies and Mitigation				
Pipeline	$5,000	34.62	mile	$173,118
Other	$600	22	acres	$13,200
ESTIMATE OF PROBABLE TOTAL PROJECT COST				**$118,905,456**

TABLE 8 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2020 WATER DISTRIBUTION SYSTEM

Item	Unit Cost	Quantity	Units	Costs ($)
Regional Water Facilities				
Pump Station No. 2 (Hardy Rd @ FM 1960)	$5,004,000	1	LS	$5,004,000
Pump Station No. 3 (Beltway 8 @ SH 249)	$6,122,000	1	LS	$6,122,000
Regional Water Plant No. 2 (Telge Rd)	$5,405,000	1	LS	$5,405,000
Regional Water Plant No. 3 (Boudreaux Rd)	$6,558,000	1	LS	$6,558,000
Regional Water Plant No. 4 (Spring Cypress)	$8,607,000	1	LS	$8,607,000
Regional Water Wells and Collection Lines	$1,000,000	21	EA	$21,000,000
Subtotal				**$52,696,000**
Piping				
Open Cut Trench Construction	($/LF)			
Pipe @ 8"	$60	4,861	LF	$291,660
Pipe @ 12"	$90	18,506	LF	$1,665,540
Pipe @ 16"	$120	3,018	LF	$362,160
Pipe @ 18"	$150	22,112	LF	$3,316,800
Pipe @ 20"	$175	20,426	LF	$3,574,550
Pipe @ 24"	$210	96,696	LF	$20,306,160
Pipe @ 30"	$275	72,193	LF	$19,853,075
Pipe @ 36"	$340	22,119	LF	$7,520,460
Pipe @ 42"	$408	45,152	LF	$18,422,016
Pipe @ 48"	$475	44,765	LF	$21,263,375
Pipe @ 54"	$555	47,484	LF	$26,353,620
Pipe @ 60"	$635	5,473	LF	$3,475,355
Pipe @ 72'	$805	6,768	LF	$5,448,240
Subtotal		**409,573**		**$131,853,011**
Trenchless Construction				
Pipe @ 12"	$600	0	LF	$0
Pipe @ 16"	$650	182	LF	$118,300
Pipe @ 18"	$725	363	LF	$263,175
Pipe @ 24"	$845	1,296	LF	$1,095,120
Pipe @ 30"	$945	360	LF	$340,200
Pipe @ 36"	$1,045	1,172	LF	$1,224,740
Pipe @ 42"	$1,170	361	LF	$422,370
Pipe @ 48"	$1,295	2,052	LF	$2,657,340
Pipe @ 54"	$1,430	574	LF	$820,820
Pipe @ 60"	$1,565	0	LF	$0
Pipe @ 72'	$1,730	455	LF	$787,150
Subtotal		**6,815**		**$7,729,215**
Total LF		**416,388**		
District Interconnection	$100,000	73	EA	**$7,300,000**
Total Capital Cost				**$199,578,226**

TABLE 8 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2020 WATER DISTRIBUTION SYSTEM *(CONTINUED)*

Item	Unit Cost	Quantity	Units	Costs ($)
Engineering, Legal Costs and Contingencies				
Pipeline	30%	$146,882,226	$	$44,064,668
Other Facilities	35%	$52,696,000	$	$18,443,600
Land Acquisition				
Right of Way Pipeline (20% & 80% : 30 ft & 40 ft wide roads)	$109,000	0	acres	$0
Facilities Site Acquisition	$109,000	46.5	acres	$5,068,500
Property Surveying	10%	$5,068,500	$	$506,850
Environmental & Archaeology Studies and Mitigation				
Pipeline	$5,000	78.86	mile	$394,307
Other	$600	46.5	acres	$27,900
ESTIMATE OF PROBABLE TOTAL PROJECT COST				**$268,084,051**

TABLE 9 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2030 WATER DISTRIBUTION SYSTEM

Item	Unit Cost	Quantity	Units	Costs ($)
Regional Water Facilities				
Pump Station No. 2 (Hardy Rd @ FM 1960)	$1,445,000	1	LS	$1,445,000
Pump Station No. 3 (Beltway 8 @ SH 249)	$1,378,000	1	LS	$1,378,000
Regional Water Plant No. 1 (Louetta Rd)	$1,371,000	1	LS	$1,371,000
Regional Water Plant No. 2 (Telge Rd)	$2,335,000	1	LS	$2,335,000
Regional Water Plant No. 3 (Boudreaux Rd)	$161,000	1	LS	$161,000
Regional Water Wells	$1,000,000	3	EA	$3,000,000
Subtotal				**$4,194,000**
Piping				
Open Cut Trench Construction	($/LF)			
Pipe @ 8"	$60	0	LF	$0
Pipe @ 12"	$90	10,768	LF	$969,120
Pipe @ 16"	$120	12,727	LF	$1,527,240
Pipe @ 18"	$150	0	LF	$0
Pipe @ 20"	$175	2,253	LF	$394,275
Pipe @ 24"	$210	10,917	LF	$2,292,570
Pipe @ 30"	$275	0	LF	$0
Pipe @ 36"	$340	23,632	LF	$8,034,880
Pipe @ 42"	$408	7,575	LF	$3,090,600
Pipe @ 48"	$475	0	LF	$0
Pipe @ 54"	$555	0	LF	$0
Pipe @ 60"	$635	0	LF	$0
Pipe @ 66"	$720	0	LF	$0
Pipe @ 72'	$805	0	LF	$0
Subtotal		**67,872**		**$16,308,685**
Trenchless Construction				
Pipe @ 12"	$600	0	LF	$0
Pipe @ 16"	$650	0	LF	$0
Pipe @ 24"	$845	0	LF	$0
Pipe @ 30"	$945	0	LF	$0
Pipe @ 36"	$1,045	0	LF	$0
Pipe @ 42"	$1,170	0	LF	$0
Pipe @ 48"	$1,295	0	LF	$0
Pipe @ 54"	$1,430	0	LF	$0
Pipe @ 60"	$1,565	0	LF	$0
Pipe @ 66"	$1,648	0	LF	$0
Pipe @ 72'	$1,730	0	LF	$0
Subtotal		**0**		**$0**
Total LF		**67,872**		
District Interconnection	$100,000	16	EA	**$1,600,000**
Total Capital Cost				**$22,102,685**

TABLE 9 ESTIMATE OF PROBABLE COST FOR THE NHCRWA'S PROPOSED 2030 WATER DISTRIBUTION SYSTEM *(CONTINUED)*

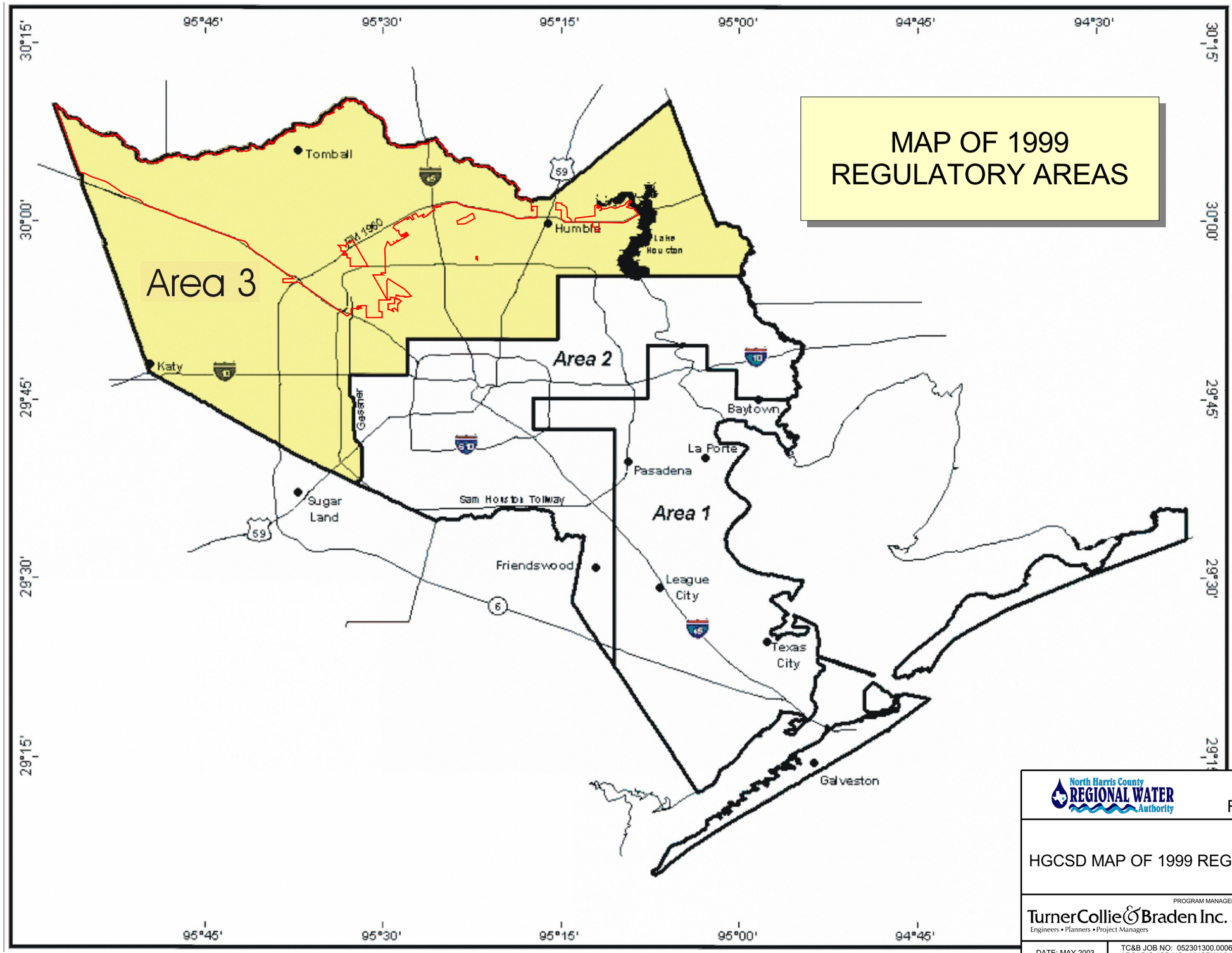
Item	Unit Cost	Quantity	Units	Costs ($)
Engineering, Legal Costs and Contingencies				
Pipeline	30%	$17,908,685	$	$5,372,606
Other Facilities	35%	$4,194,000	$	$1,467,900
Land Acquisition				
Right of Way Pipeline (20% & 80% : 30 ft & 40 ft wide roads)	$109,000	0	acres	$0
Facilities Site Acquisition	$109,000	0.5	acres	$54,500
Property Surveying	10%	$54,500	$	$5,450
Environmental & Archaeology Studies and Mitigation				
Pipeline	$5,000	12.85	mile	$64,273
Other	$600	0.5	acres	$300
TOTAL PROJECT COST				**$29,067,713**

TABLE 10 ESTIMATE OF PROBABLE COST SUMMARY FOR THE NHCRWA

Item	Cost by Phase		
	2010	**2020**	**2030**
Primary Water Transmission System	$62,648,000	$133,974,000	$0
Primary Water Distribution System	$118,905,000	$268,084,000	$29,068,000
Total Project Costs Each Phase	**$181,553,000**	**$402,058,000**	**$29,068,000**
ESTIMATE OF PROBABLE TOTAL PROJECT COST			**$612,679,000**

Note:
These estimates exclude interest and financing costs as well as the costs for acquiring surface water.

MAP OF 1999 REGULATORY AREAS



North Harris County Regional Water Authority

GROUNDWATER REDUCTION PLAN

HGCSD MAP OF 1999 REGULATORY AREAS

PROGRAM MANAGEMENT TEAM:

Turner Collie & Braden Inc. Engineers • Planners • Project Managers and ARCADIS

DATE: MAY 2003	TC&B JOB NO: 052301300.0006 ARCADIS JOB NO: NHCRWA04	EXHIBIT: 1

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LEGEND
NHCRWA Boundary
CCN
Utility Districts

GROUNDWATER REDUCTION PLAN

NHCRWA BOUNDARY AND MEMBER ENTITIES

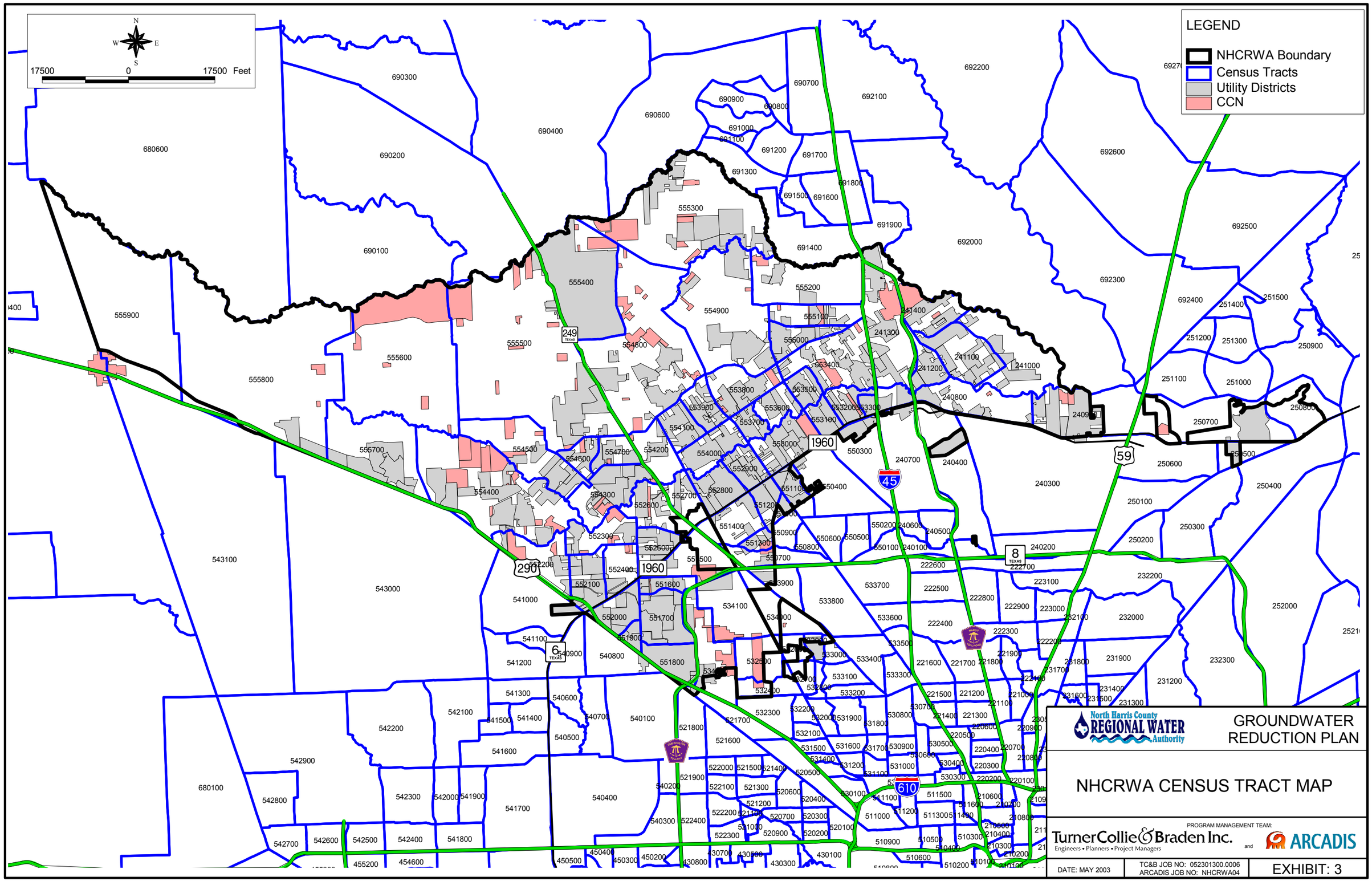
North Harris County Regional Water Authority

PROGRAM MANAGEMENT TEAM:
Turner Collie & Braden Inc. Engineers • Planners • Project Managers and ARCADIS

DATE: MAY 2003

TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04

EXHIBIT: 2



GROUNDWATER REDUCTION PLAN

North Harris County REGIONAL WATER Authority

NHCRWA CENSUS TRACT MAP

PROGRAM MANAGEMENT TEAM:

Turner Collie & Braden Inc.
Engineers • Planners • Project Managers

and

ARCADIS

DATE: MAY 2003

TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04

EXHIBIT: 3

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LEGEND

- NHCRWA Boundary
- Utility Districts
- CCN
- Houston

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249 TEXAS
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1960
8 TEXAS
6 TEXAS
610

North Harris County REGIONAL WATER Authority

GROUNDWATER REDUCTION PLAN

PLANNING REGIONS FOR PROJECTION DEVELOPMENT

PROGRAM MANAGEMENT TEAM:

Turner Collie & Braden Inc.
Engineers • Planners • Project Managers
and
ARCADIS

DATE: MAY 2003

TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04

EXHIBIT: 4

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LEGEND
- NEWPP
- Regional Water Plants
- Pump Stations
- 2010 Primary Transmission System - COH / NHCRWA
- 2010 Primary Transmission System - NHCRWA
- 2020 Primary Transmission System - NHCRWA
- NHCRWA Boundary
- 2010 Service Area
- 2020 Service Area
- 2030 Service Area
- Utility Districts (No Surface Water Provided)
- CCN (No Surface Water Provided)

HARRIS CO. MUD 104
HARRIS CO. MUD 115
HARRIS CO. MUD 43
POST WOOD MUD
HARRIS CO. WCID 136
TATTOR ROAD MUD
HARRIS CO. WCID 99
TIMBER LANE UD
HARRIS CO. MUD 275
CYPRESSWOOD UD
BILMA PUD
GNP UD
MEMORIAL HILLS UD
INVERNESS FOREST
NORTH PARK PUD
HARRIS CO. WCID 132
TERRANOVA WEST MUD
LOUETTA ROAD UD
HARRIS CO. WCID 91
PINE OAK WATER COMPANY
WESTADOR MUD
HARRIS CO. MUD 231
OAK HILL ESTATES WATER COMPANY
AMBERWOOD UTILITY COMPANY
FOREST POINT MUD
HUNTER'S GLEN MUD
HARRIS CO. MUD 85
BAMMEL FOREST UTILITY COMPANY
PONDEROSA FOREST UD
HARRIS CO. MUD 211
HARRIS CO. MUD 316
NW HARRIS CO. MUD 20
HARRIS CO MUD 86
HARRIS CO. MUD 44
BAMMEL UD
HARRIS CO. MUD 233
RICHEY ROAD MUD
HEATHERLOCH MUD
HARRIS CO. MUD 48
HARRIS CO. WCID 116
HARRIS CO. MUD 16
NW HARRIS CO. MUD 21
NW HARRIS CO. MUD
FOUNTAINHEAD MUD
HARRIS CO. WCID 109
NW HARRIS CO. MUD 2
HARRIS CO. MUD 202
NW HARRIS CO. MUD 6
NW HARRIS CO. MUD 24
HARRIS CO. MUD 118
SUNBELT FWSD
GREENS ROAD MOBILE HOME COMMUNITY

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North Harris County Regional Water Authority

GROUNDWATER REDUCTION PLAN

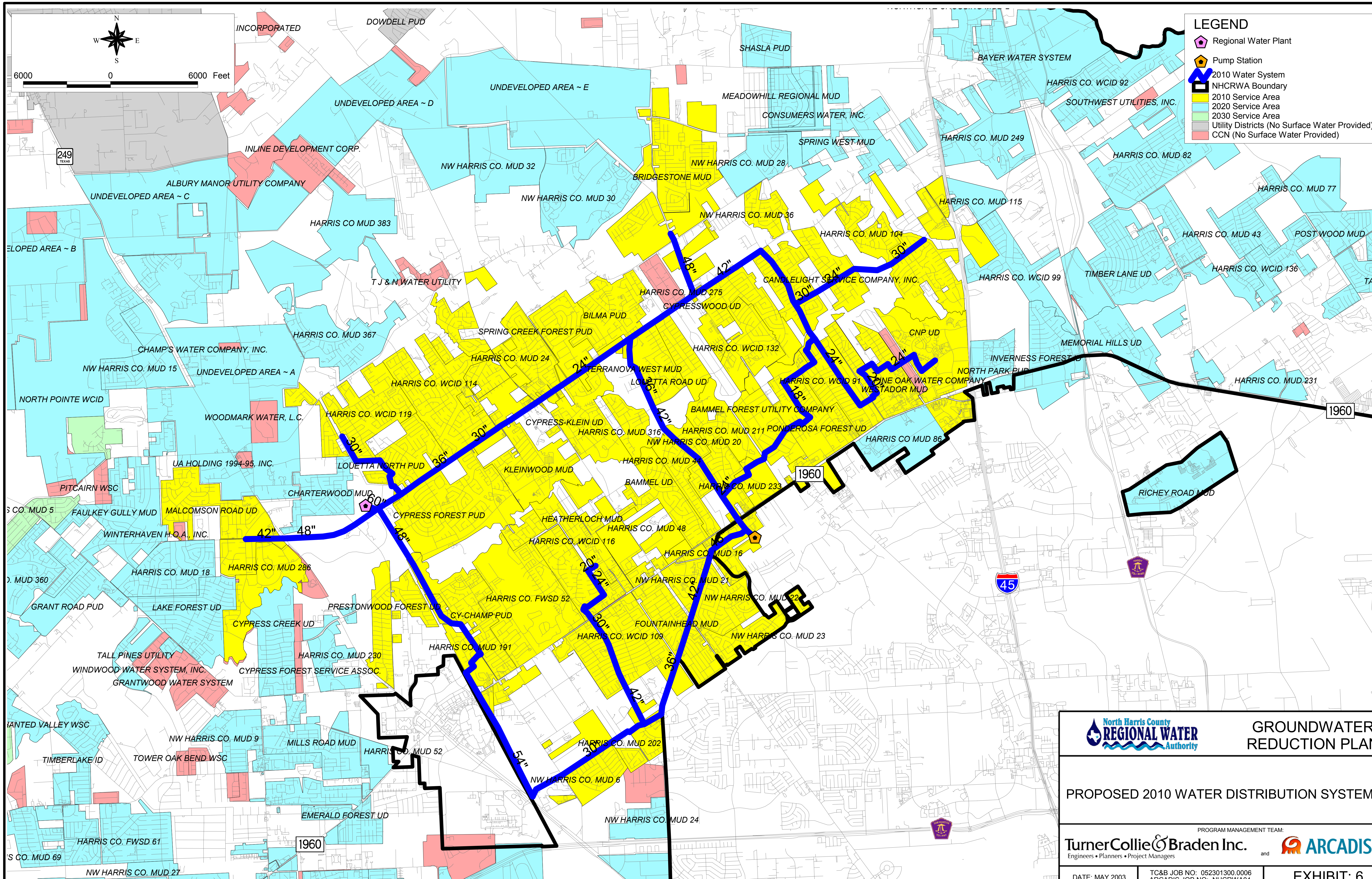
PROPOSED PHASED PRIMARY WATER TRANSMISSION SYSTEM

PROGRAM MANAGEMENT TEAM:
Turner Collie & Braden Inc. Engineers • Planners • Project Managers
and ARCADIS

DATE: MAY 2003

TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04

EXHIBIT: 5


LEGEND
Regional Water Plant
Pump Station
2010 Water System
NHCRWA Boundary
2010 Service Area
2020 Service Area
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SHASLA PUD
BAYER WATER SYSTEM
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SOUTHWEST UTILITIES, INC.
UNDEVELOPED AREA ~ E
UNDEVELOPED AREA ~ D
MEADOWHILL REGIONAL MUD
CONSUMERS WATER, INC.
SPRING WEST MUD
HARRIS CO. MUD 249
HARRIS CO. MUD 82
INLINE DEVELOPMENT CORP.
NW HARRIS CO. MUD 32
NW HARRIS CO. MUD 28
BRIDGESTONE MUD
ALBURY MANOR UTILITY COMPANY
UNDEVELOPED AREA ~ C
NW HARRIS CO. MUD 30
HARRIS CO. MUD 77
HARRIS CO. MUD 115
NW HARRIS CO. MUD 36
HARRIS CO MUD 383
HARRIS CO. MUD 104
HARRIS CO. MUD 43
POST WOOD MUD
UNDEVELOPED AREA ~ B
HARRIS CO. WCID 99
TIMBER LANE UD
HARRIS CO. WCID 136
T J & N WATER UTILITY
CANDLELIGHT SERVICE COMPANY, INC.
HARRIS CO. MUD 275
CYPRESSWOOD UD
BILMA PUD
HARRIS CO. MUD 367
SPRING CREEK FOREST PUD
CNP UD
HARRIS CO. WCID 132
MEMORIAL HILLS UD
CHAMP'S WATER COMPANY, INC.
HARRIS CO. MUD 24
INVERNESS FOREST ID
NW HARRIS CO. MUD 15
UNDEVELOPED AREA ~ A
TERRANOVA WEST MUD
NORTH PARK PUD
LOUETTA ROAD UD
HARRIS CO. WCID 91
PINE OAK WATER COMPANY
HARRIS CO. MUD 231
HARRIS CO. WCID 114
WESTADOR MUD
NORTH POINTE WCID
BAMMEL FOREST UTILITY COMPANY
WOODMARK WATER, L.C.
HARRIS CO. WCID 119
CYPRESS-KLEIN UD
HARRIS CO. MUD 316
HARRIS CO. MUD 211
PONDEROSA FOREST UD
NW HARRIS CO. MUD 20
HARRIS CO MUD 86
UA HOLDING 1994-95, INC.
LOUETTA NORTH PUD
HARRIS CO. MUD 4
KLEINWOOD MUD
BAMMEL UD
HARRIS CO. MUD 233
PITCAIRN WSC
CHARTERWOOD MUD
RICHEY ROAD MUD
FAULKEY GULLY MUD
MALCOMSON ROAD UD
CYPRESS FOREST PUD
HEATHERLOCH MUD
WINTERHAVEN H.O.A., INC.
HARRIS CO. MUD 48
HARRIS CO. WCID 116
HARRIS CO. MUD 16
HARRIS CO. MUD 286
HARRIS CO. MUD 18
NW HARRIS CO. MUD 21
GRANT ROAD PUD
LAKE FOREST UD
PRESTONWOOD FOREST UD
HARRIS CO. FWSD 52
NW HARRIS CO. MUD 22
CY-CHAMP PUD
CYPRESS CREEK UD
FOUNTAINHEAD MUD
NW HARRIS CO. MUD 23
HARRIS CO. WCID 109
TALL PINES UTILITY
HARRIS CO. MUD 230
HARRIS CO MUD 191
WINDWOOD WATER SYSTEM, INC.
CYPRESS FOREST SERVICE ASSOC.
GRANTWOOD WATER SYSTEM
NW HARRIS CO. MUD 9
MILLS ROAD MUD
HARRIS CO. MUD 52
HARRIS CO. MUD 202
TIMBERLAKE ID
TOWER OAK BEND WSC
NW HARRIS CO. MUD 6
EMERALD FOREST UD
NW HARRIS CO. MUD 24
HARRIS CO. FWSD 61
NW HARRIS CO. MUD 27
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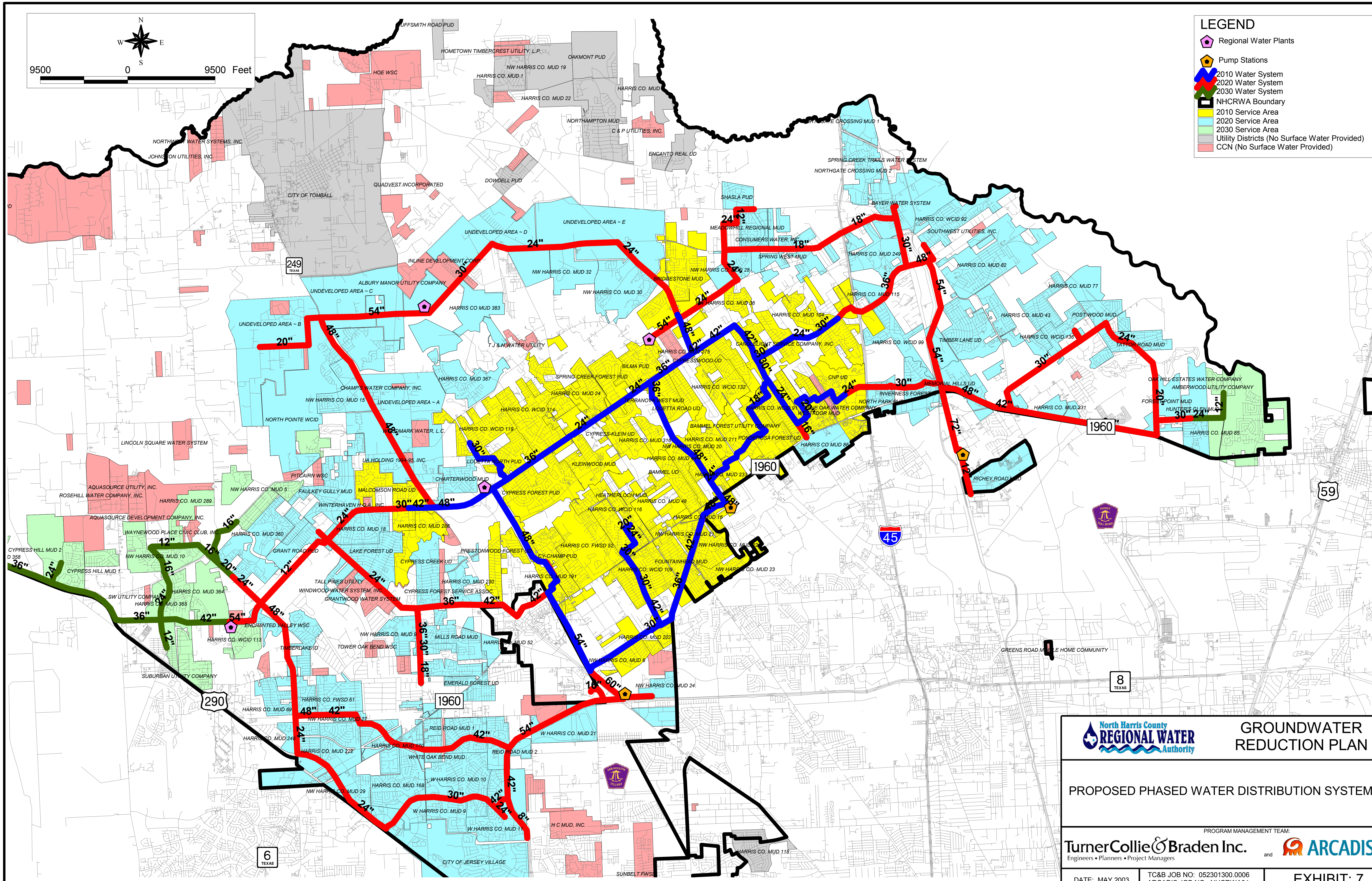
North Harris County REGIONAL WATER Authority
GROUNDWATER REDUCTION PLAN
PROPOSED 2010 WATER DISTRIBUTION SYSTEM
PROGRAM MANAGEMENT TEAM:
TurnerCollie&Braden Inc.
Engineers • Planners • Project Managers
and
ARCADIS
DATE: MAY 2003
TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04
EXHIBIT: 6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LEGEND
Regional Water Plants
Pump Stations
2010 Water System
2020 Water System
2030 Water System
NHCRWA Boundary
2010 Service Area
2020 Service Area
2030 Service Area
Utility Districts (No Surface Water Provided)
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North Harris County REGIONAL WATER Authority
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and
ARCADIS
DATE: MAY 2003
TC&B JOB NO: 052301300.0006
ARCADIS JOB NO: NHCRWA04
EXHIBIT: 7

APPENDIX A HOUSE BILL NOS. 2965 AND 1110

H.B. No. 2965 from the 76th Legislature, Regular Session, 1999

AN ACT

relating to the creation, administration, powers, duties, operation, and financing of the North Harris County Regional Water Authority; granting the power of eminent domain and the authority to issue bonds; providing a civil penalty.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

ARTICLE 1. GENERAL PROVISIONS

SECTION 1.01. CREATION. (a) A regional water authority, to be known as the North Harris County Regional Water Authority, is created in Harris County, subject to a confirmation election held under Section 2.05 of this Act. The authority is a governmental agency and a body politic and corporate.

(b) The authority is created under and is essential to accomplish the purposes provided by Section 59, Article XVI, Texas Constitution.

SECTION 1.02. DEFINITIONS. In this Act:

(1) "Authority" means the North Harris County Regional Water Authority.

(2) "Board" means the board of directors of the authority.

(3) "Commission" means the Texas Natural Resource Conservation Commission.

(4) "Director" means a member of the board.

(5) "Local government" means a municipality, county, special district, or other political subdivision of this state or a combination of two or more of those entities.

(6) "Person" has the meaning assigned by Section 311.005, Government Code.

(7) "Subsidence district" means the Harris-Galveston Coastal Subsidence District.

(8) "System" means a network of pipelines, conduits, canals, pumping stations, force mains, treatment plants, and any other construction, device, or related appurtenance used to treat or transport water.

(9) "Water" includes:

(A) groundwater, percolating or otherwise;

(B) any surface water, natural or artificial, navigable or nonnavigable; and

(C) industrial and municipal wastewater.

(10) "Subsidence" means the lowering in elevation of the surface of land by the withdrawal of groundwater.

(11) "Agricultural crop" means food or fiber commodities grown for resale or commercial purposes that provide food, clothing, or animal feed.

SECTION 1.03. DESCRIPTION OF BOUNDARIES. (a) Except as provided by this section, the authority includes the territory that is contained in the following area, whether the territory contains noncontiguous parcels of land or whether the territory is located within the boundaries of any other governmental entity or political subdivision of the state, but only if also contained in one or more of the house districts described by this section:

BEGINNING at the intersection of the Harris and Waller County line with the north right-of-way line of U.S. Highway 290 (current alignment);

THENCE northwest along the Harris and Waller County line to the intersection with Spring Creek;

THENCE continuing southeasterly along said Harris and Waller County line, with the meanders of Spring Creek to the intersection of the Waller and Montgomery County line;

THENCE southeasterly along the Harris and Montgomery County line continuing with the meanders of said Spring Creek; to the intersection with the City of Houston, corporate limits;

THENCE along said City of Houston corporate limits, the following: south approximately one half mile; east approximately one half mile to the City of Humble corporate limits; north along said City of Humble corporate limits approximately one half mile to aforementioned Spring Creek; east along Spring Creek to its confluence with the San Jacinto River to the intersection of U.S. Highway 59; easterly and southerly along the take line for Lake Houston to the intersection with the southeasterly right-of-way of the Union Pacific Railroad; southwesterly along said Union Pacific Railroad for approximately two miles; south to the north end of Duessen Parkway; southeast along the east side of Duessen Parkway and along the north side of the access road to the intersection with North Lake Houston Parkway;

THENCE departing said City of Houston corporate limits, west along the north side of said North Lake Houston Parkway to the beginning of Mount Houston Road, and continuing west on Mount Houston Road to the 6900 block to the intersection of Suburban;

THENCE south along Suburban to the City of Houston corporate limits;

THENCE along said City of Houston corporate limits, the following: west to Hirsch Road; south along the west side of Hirsch Road to Langely; west along the south side of Langley to the southbound feeder road of US Highway 59; northeast along the west side of the feeder road of US Highway 59 to Little York; west along the south side of Little York to Bentley; north along the east side of Bentley to Sagebrush; west along the north side of Sagebrush to Halls Bayou; south along Halls Bayou to Little York; west along the south side of Little York to Aldine Westfield Road; north along the east sides of Aldine Westfield Road to its intersection with the easterly extension of the City of Houston corporate limits; west to the Hardy Toll Road; north along the Hardy Toll Road approximately 0.25 miles; east approximately 0.35 mile; north approximately 0.15 mile; west approximately 0.35 mile; northwest along the Hardy Toll Road approximately 1 mile; southwesterly along an irregular path generally west to Carby; west along Carby to Airline Drive; south along Airline Drive to Canino; west along Canino to Sweetwater; north along Sweetwater to West Road; west to Interstate 45/US 75; south along Interstate 45/US 75 to south of Bluebell Road; southerly along an irregular path generally south and west to West Mount Houston Road; west along Mount Houston Road to a line east of Ella Boulevard; south along a line generally parallel to Ella Boulevard to south of West Gulf Bank; west along the south side of West Gulf Bank to Tomball Parkway; northwest along Tomball Parkway approximately 1.5 mile; west along an irregular path to North Houston-Rosslyn Road; north along North Houston-Rosslyn Road to Vogel Creek; west along Vogel Creek to the FWD CRIP RR; south along the FWD CRIP RR to Logview; west along Logview to Hollister; south along Hollister to White Oak Bayou; east along White Oak Bayou to Twisting Vine; south along Twisting Vine to West Little York; west along West Little York to Fairbanks North Houston; south along Fairbanks North Houston to Cole Creek; west along Cole Creek to Hempstead Road; northwest along Hempstead Road to Brittmore Road, also being the intersection with U.S. Highway 290, Northwest Freeway;

THENCE departing said City of Houston corporate limits and continuing northwest along U.S. Highway 290, Northwest Freeway, at Spencer Road;

THENCE northwest along U.S. Highway 290, Northwest Freeway (current alignment), to the intersection of the Harris and Waller County line, the POINT OF BEGINNING.

(b) The authority includes only that territory described by Subsection (a) of this section that is also in the following state representative districts as described by Article II, Chapter 2, Acts of the 72nd Legislature, 3rd Called Session, 1992 (Article II, Article 195a-11, Vernon's Texas Civil

Statutes), as the districts existed on the effective date of this Act:

(1) District 127;
(2) District 126;
(3) District 130;
(4) District 135; and
(5) District 150.

(c) Notwithstanding Subsections (a) and (b) of this section, the authority does not include any area that, on the effective date of this Act, is inside the municipal limits of the city of Houston or inside the municipal limits of the city of Humble.

(d) On a municipality's annexation of any of the authority's territory, the annexed territory is excluded from the authority's territory. The authority shall continue to provide services to the annexed territory in accordance with contracts in effect at the time of the annexation unless a written agreement between the board and the governing body of the municipality provides otherwise.

SECTION 1.04. EXCLUSION OF CERTAIN TERRITORY. (a) A district organized under Section 52, Article III, or Section 59, Article XVI, Texas Constitution, that is located in the portion of the territory described by Section 1.03(a) of this Act that is south of Beltway 8 or east of U.S. Highway 59 may petition for exclusion of its territory from the authority's territory. Before the 61st day after the date the authority receives the petition, the board shall:

(1) grant the petition and order the territory excluded if the petition:

(A) includes an accurate legal description of the boundaries of the territory to be excluded; and

(B) the petition is filed with the authority before March 1, 2001; and

(2) if the board grants the petition, file for recording in the office of the county clerk of Harris County a copy of the order and a description of the authority's boundaries as they exist after the exclusion of the territory.

(b) The order excluding the territory is effective immediately after the order and description are recorded.

SECTION 1.05. APPLICABILITY OF OTHER LAW. (a) This Act prevails over any inconsistent provision of general law.

(b) This Act does not prevail over or preempt a provision of Chapter 151, Water Code, or Chapter 36, Water Code, that is being implemented by the subsidence district.

SECTION 1.06. FINDING OF BENEFIT. All the land and other property included within the boundaries of the authority will be benefited by the works and projects that are to be accomplished by the authority under powers conveyed by this Act. The authority is created to serve a public use and benefit.

ARTICLE 2. DIRECTORS

SECTION 2.01. BOARD OF DIRECTORS. (a) The authority is governed by a board of five directors.

(b) The board shall appoint a person to fill a vacancy in the office of director until the next election for directors. If the position is not scheduled to be filled at the election, the person elected to fill the position serves only for the remainder of the unexpired term.

(c) To be eligible to serve as director, a person must be a qualified voter in the voting district from which the person is elected or appointed.

SECTION 2.02. METHOD OF ELECTION OF DIRECTORS. (a) One director shall be

elected from each of five single-member voting districts by the qualified voters of the voting district.

(b) A person shall indicate on the person's application for a place on the ballot the voting district that the person seeks to represent.

(c) In the manner described by Section 49.103(d), Water Code, the board shall redraw the single-member voting districts as soon as practicable after:

(1) each federal decennial census; and

(2) any change in the boundaries of the authority.

(d) At the first election after each time the voting districts are redrawn:

(1) five new directors shall be elected to represent the single-member voting districts; and

(2) the directors elected shall draw lots to determine their terms so that:

(A) two directors serve two-year terms; and

(B) three directors serve four-year terms.

(e) Subchapter C, Chapter 146, Election Code, applies to the consideration of votes for a write-in candidate for the initial permanent director or permanent director as if the authority were a municipality.

SECTION 2.03. SERVICE OF DIRECTORS. (a) Temporary directors serve until the initial permanent directors are elected under Section 2.05 of this Act.

(b) The initial permanent directors serve until permanent directors are elected under Section 2.06 of this Act.

(c) Permanent directors serve staggered four-year terms.

(d) A director serves until the director's successor has qualified.

SECTION 2.04. TEMPORARY DIRECTORS. (a) The temporary board of directors is composed of three individuals appointed by the commission.

(b) If a temporary director fails to qualify for office, the temporary directors who have qualified shall appoint a person to fill the vacancy. If at any time there are fewer than two qualified temporary directors, or if the temporary directors cannot agree on the appointment, the commission shall appoint the necessary number of persons to fill all vacancies on the board.

(c) A temporary director is not eligible to be elected under Section 2.05 of this Act.

SECTION 2.05. CONFIRMATION AND INITIAL PERMANENT DIRECTORS ELECTION. (a) The temporary board of directors shall:

(1) establish five single-member voting districts in the manner described by Section 49.103(d), Water Code; and

(2) on the first uniform election date of the calendar year 2000 hold an election to confirm the establishment of the authority and to elect five initial permanent directors.

(b) A person who desires to be a candidate for the office of initial permanent director may file an application with the temporary board to have the candidate's name printed on the ballot.

(c) At the confirmation and initial permanent directors election, the temporary board of directors shall have placed on the ballot:

(1) the name of each candidate filing for the office of director; and

(2) blank spaces to write in the names of other persons.

(d) If the authority is created at the election, the temporary board of directors, at the time the vote is canvassed, shall:

(1) declare the qualified person who receives the most votes for each position to be

elected as the initial director for that position; and

(2) include the results of the initial directors election in the authority's election report to the commission.

(e) As soon as practicable after the initial permanent directors have qualified, the directors shall draw lots to determine their terms so that:

(1) two directors serve terms that expire when permanent directors are elected at the first election held under Section 2.06 of this Act; and

(2) three directors serve terms that expire when permanent directors are elected at the second election held under Section 2.06 of this Act.

(f) Section 41.001(a), Election Code, does not apply to the confirmation and initial permanent directors election held under this section.

(g) The temporary board of directors shall draft language for the ballot proposition used for the confirmation election. The ballot proposition must clearly and completely explain:

(1) the powers and duties of the authority;

(2) whether the authority has the power of eminent domain;

(3) whether the authority has the authority to issue bonds;

(4) whether the authority has the authority to impose taxes; and

(5) whether the authority has the authority to impose fees.

(h) The ballot language must explain the nature of any fees or taxes the authority has the authority to impose.

SECTION 2.06. ELECTION DATES. On the first uniform election date of the calendar year in each subsequent even-numbered year, the appropriate number of directors shall be elected to the board.

SECTION 2.07. COST OF ELECTION. (a) The temporary board of the authority shall fund the cost of the confirmation and initial permanent directors election if the temporary board is able to find a reasonable means of funding the election.

(b) If the temporary board is unable to fund the entire cost of the election, the temporary board of the authority and the board of directors of the subsidence district may execute an agreement by which:

(1) the subsidence district shall pay the portion of the costs that could not be funded by the district; and

(2) the authority shall repay the subsidence district for those costs within a reasonable period.

ARTICLE 3. ADMINISTRATIVE PROVISIONS

SECTION 3.01. MEETINGS AND ACTIONS OF BOARD. The board shall meet at least four times each year and may meet at any other time the board considers appropriate.

SECTION 3.02. GENERAL MANAGER. (a) The board shall employ a general manager as the chief administrative officer of the authority. The board may delegate to the general manager full authority to manage and operate the affairs of the authority subject only to the orders of the board.

(b) The duties of the general manager include:

(1) the administration of the orders of the board;

(2) coordination with state, federal, and local agencies;

(3) the oversight of development of authority plans and programs; and

(4) other duties assigned by the board.

(c) The board shall determine the terms of office and employment and the compensation to be paid the general manager. The general manager may be discharged by majority vote of the board.

SECTION 3.03. EMPLOYEES; BONDS. (a) The general manager of the authority shall employ all persons necessary for the proper handling of the business and operations of the authority and may employ attorneys, bookkeepers, engineers, and other expert and specialized personnel the board considers necessary. The general manager shall determine compensation to be paid by the authority.

(b) The general manager may discharge employees of the authority.

(c) The general manager of the authority and each employee or contractor of the authority who is charged with the collection, custody, or payment of any money of the authority shall execute a fidelity bond in an amount determined by the board and in a form and with a surety approved by the board. The authority shall pay for the bond.

ARTICLE 4. POWERS AND DUTIES

SECTION 4.01. GENERAL POWERS AND DUTIES. (a) The authority has all of the rights, powers, privileges, authority, functions, and duties necessary and convenient to accomplish the purposes of this Act, including those provided by Chapter 49, Water Code.

(b) The authority may:

(1) provide for the conservation, preservation, protection, recharge, and prevention of waste of groundwater, and for the reduction of groundwater withdrawals, in a manner consistent with the purposes of Section 59, Article XVI, Texas Constitution;

(2) for the purposes of reducing groundwater withdrawals and subsidence, acquire or develop surface water and groundwater supplies from sources inside of or outside of the boundaries of the authority and may conserve, store, transport, treat, purify, distribute, sell, and deliver water to persons, corporations, municipal corporations, political subdivisions of the state, and others, inside of and outside of the boundaries of the authority;

(3) enter into contracts with persons, including political subdivisions of the state, on terms and conditions the board considers desirable, fair, and advantageous for the performance of its rights, powers, and authority under this Act;

(4) coordinate water services provided inside of, outside of, or into the authority; and

(5) administer and enforce the provisions of the Act.

(c) The authority's rights, powers, privileges, authority, functions, and duties are subject to the continuing right of supervision of the state, to be exercised by and through the commission.

(d) The authority shall exercise its rights, powers, privileges, and authority in a manner that will promote regionalization of water treatment and distribution.

SECTION 4.02. AUTHORITY RULES. (a) The authority shall adopt and enforce rules reasonably required to implement this Act, including rules governing procedures before the board.

(b) The board shall compile its rules in a book and make them available for use and inspection at the authority's principal office.

SECTION 4.03. FEES AND CHARGES. (a) The authority may establish fees and charges as necessary to enable the authority to fulfill the authority's regulatory obligations provided by this Act.

(b) The authority may charge against the owner of a well located in the authority's boundaries

a fee on the amount of water pumped from the well. The board shall establish the rate of a fee under this subsection only after a special meeting on the fee. The board by rule may exempt classes of wells from the fee under this subsection. The board may not apply the fee to a well:

(1) with a casing diameter of less than five inches that serves a single-family dwelling;

(2) regulated under Chapter 27, Water Code;

(3) used for irrigation of agricultural crops;

(4) that produces 10 million gallons or less annually; or

(5) used solely for electric generation.

(c) Fees the board establishes must be sufficient to:

(1) achieve water conservation, prevent waste of water, serve as a disincentive to pumping groundwater, and accomplish the purposes of this Act, including making available alternative water supplies; and

(2) enable the authority to meet operation and maintenance expenses and pay the principal of and interest on debt issued in connection with the exercise of the authority's general powers and duties.

(d) The temporary board may set fees to pay for the initial operation of the authority and the election of the initial permanent board until the permanent board has been elected.

SECTION 4.04. CIVIL PENALTY; INJUNCTION. (a) A person who violates a rule or order of the authority is subject to a civil penalty of not less than $50 and not more than $5,000 for each violation or each day of a continuing violation.

(b) The authority may bring an action to recover the penalty in a district court in the county where the violation occurred. The penalty shall be paid to the authority.

(c) The authority may bring an action for injunctive relief in a district court in the county where a violation of an authority rule or order occurs or is threatened to occur. The court may grant to the authority, without bond or other undertaking, a prohibitory or mandatory injunction that the facts warrant, including a temporary restraining order, temporary injunction, or permanent injunction.

(d) The authority may bring an action for a civil penalty and injunctive relief in the same proceeding.

SECTION 4.05. WATER SUPPLY PLANS. The authority by rule shall, as needed but not less frequently than every five years, develop, prepare, revise, and adopt comprehensive water supply and drought contingency plans for various areas of the authority. The plans:

(1) must be consistent with regional planning; and

(2) must include 10-year, 20-year, and 50-year projections of water needs within the authority.

SECTION 4.06. ACQUISITION, CONSTRUCTION, AND OPERATION OF SYSTEMS. (a) The authority may:

(1) acquire and provide by purchase, gift, or lease a water treatment or supply system inside of or outside of the authority's boundaries;

(2) design, finance, or construct a water treatment or supply system and provide water services inside of or outside of the authority's boundaries;

(3) operate, lease, or sell a water treatment or supply system the authority constructs or acquires; and

(4) contract with any person to operate or maintain a water treatment or supply

system the person owns.

(b) The authority shall give persons outside the authority's boundaries, including the city of Houston, the option to contract for available excess capacity of the authority's water treatment or supply system or, before construction of a water treatment or supply system begins, for additional capacity of the system. The authority must offer a contract that would enable the person to pay for the excess capacity or additional capacity in accordance with the person's pro rata share of the capital investment and operational and maintenance costs for providing the excess capacity or additional capacity.

SECTION 4.07. SALE OR REUSE OF WATER OR BY-PRODUCT. The authority may store, sell, or reuse:

(1) water; or

(2) any by-product from the authority's operations.

SECTION 4.08. EMINENT DOMAIN. The authority may exercise the power of eminent domain in the manner provided in Chapter 21, Property Code, to acquire property of any kind to further authorized purposes of the authority. The authority may not exercise the power of eminent domain outside of the boundaries of the authority.

SECTION 4.09. CONTRACTS. (a) The authority may enter into a contract with any person or legal entity regarding the performance of any purpose or function of the authority, including a contract to jointly construct, finance, own, or operate works, improvements, facilities, plants, equipment, or appliances necessary to accomplish a purpose or function of the authority. A contract may be of unlimited duration.

(b) The authority may purchase an interest in a project used for a purpose or function of the authority.

(c) The authority may contract for:

(1) the purchase or sale of water or water rights;

(2) the performance of activities within the powers of the authority to promote the continuing and orderly development of land and property in the authority through the purchase, construction, or installation of works, improvements, facilities, plants, equipment, or appliances so that, to the greatest extent possible, considering sound engineering practices and economic feasibility, all the land and property in the authority may receive services of the works, improvements, facilities, plants, equipment, or appliances of the authority; or

(3) the construction, ownership, maintenance, or operation of any works, improvements, facilities, plants, equipment, or appliances of the authority or another person or legal entity.

(d) The authority may purchase surplus property from this state, the United States, or another public entity through a negotiated contract without bids.

(e) An officer, agent, or employee of the authority who is financially interested in the contract of the type described by Subsection (d) of this section shall disclose the interest to the board before the board votes on the acceptance of the contract.

SECTION 4.10. COOPERATION WITH AND ASSISTANCE OF OTHER GOVERNMENTAL ENTITIES. (a) In implementing this Act, the board may cooperate with and request the assistance of the Texas Water Development Board, the commission, the United States Geological Survey, the subsidence district, other local governments, and other agencies of the United States and this state.

(b) The subsidence district may enter into an interlocal contract with the authority to carry

out the authority's purposes and may carry out the governmental functions and services specified in the interlocal contract.

(c) The board shall coordinate with the city of Houston to develop an interregional plan for a system to distribute treated surface water in an economical and efficient manner.

SECTION 4.11. GIFTS AND GRANTS. The authority is authorized to accept a gift or grant from money collected by the subsidence district under Chapter 151, Water Code, to fund a water treatment or supply system. The authorization in this section is in addition to the authorization provided in Section 49.229, Water Code.

SECTION 4.12. EXPENDITURES. (a) The authority's money may be disbursed only by check, draft, order, or other instrument.

(b) Disbursements of the authority must be signed by at least two directors, except the board by resolution may allow the general manager, treasurer, bookkeeper, or other employee of the authority to sign disbursements.

(c) The board by resolution may allow disbursements to be transferred by federal reserve wire system to accounts in the name of the authority.

SECTION 4.13. TAXATION. The authority may not impose an ad valorem tax.

ARTICLE 5. NOTES AND BONDS

SECTION 5.01. REVENUE NOTES. (a) The board, without an election, may borrow money on negotiable notes of the authority to be paid solely from the revenue derived from any legal source, including:

(1) tolls, charges, and fees the authority imposes;

(2) the sale of water, water or sewer services, or any other service or product of the authority;

(3) grants or gifts;

(4) the ownership and operation of all or a designated part of the authority's works, improvements, facilities, plants, or equipment; and

(5) contracts between the authority and any person, including a local government.

(b) The notes may be first or subordinate lien notes at the board's discretion. An obligation may not be a charge on the property of the authority. An obligation may only be a charge on revenue pledged for the payment of the obligation.

SECTION 5.02. BONDS. (a) To carry out a power or authority conferred by this Act, the authority may issue bonds secured by all or part of the revenue derived from any source, including any source described by Section 5.01(a) of this Act.

(b) In issuing or securing a bond or note of the authority, the authority may exercise any power of an issuer under Chapter 656, Acts of the 68th Legislature, Regular Session, 1983 (Article 717q, Vernon's Texas Civil Statutes).

(c) The authority may conduct a public, private, or negotiated sale of the bonds.

(d) The authority's bonds must:

(1) be authorized by board resolution;

(2) be issued in the authority's name;

(3) be signed by the president or vice president of the board, which may be accomplished by facsimile signature;

(4) be attested by the secretary of the board, which may be accomplished by facsimile signature; and

(5) bear the authority's seal or facsimile seal.

(e) An authority bond may be secured by an indenture of trust with a corporate trustee.

(f) The authority may issue bonds in more than one series as required for carrying out the purposes of this Act. In issuing bonds secured by revenue of the authority, the authority may reserve the right to issue additional bonds secured by the authority's revenue that are on a parity with or are senior or subordinate to the bonds issued earlier.

(g) The resolution authorizing the bonds or the trust indenture securing the bonds may specify additional provisions that constitute a contract between the authority and its bondholders. The board may provide:

(1) for additional bond provisions; and

(2) for a corporate trustee or receiver to take possession of the authority's facilities if the authority defaults.

(h) Section 49.181, Water Code, does not apply to bonds or notes issued by the authority.

SECTION 5.03. REFUNDING BONDS. The provisions of this Act that apply to the authority's issuance of other bonds, their security, and the remedies of the holders apply to refunding bonds.

SECTION 5.04. APPROVAL AND REGISTRATION OF BONDS. After the authority authorizes bonds, the authority shall submit the bonds and the record relating to their issuance to the attorney general for approval. If the bonds are secured by a pledge of the proceeds of a contract between the authority and a municipality or other governmental agency, authority, or district, the authority shall submit to the attorney general a copy of the contract and the proceedings of the municipality or other governmental agency, authority, or district authorizing the contract. If the attorney general finds that the bonds have been authorized and each contract has been made in accordance with the constitution and laws of this state, the attorney general shall approve the bonds and contracts. On approval, the bonds shall be registered by the comptroller.

SECTION 5.05. FUNDING BY OTHER DISTRICTS. (a) The authority shall develop a procedure for cooperatively funding a project of the authority with money from other districts inside of the authority's boundaries if the authority project fulfills a governmental purpose of both the authority and other districts.

(b) Not later than the 90th day before the date the authority issues bonds, other than refunding bonds, to finance a project, the authority shall provide written notice of the authority's intention to issue the bonds to each district inside of the authority's boundaries that may be benefited or affected by the project. The notice must include the value of the bonds planned to be issued, a description of the project the bonds would finance, and a schedule of the portion of the project costs financed by the bonds that may be allocated to each district benefited or affected. The schedule must be prepared by means of a formula certified by the authority's engineer.

(c) A district may enter into a contract with the authority for the district to finance a portion of the proposed project with the district's resources instead of using proceeds from bonds of the authority for that purpose. The contract must be executed before the authority issues the bonds. As provided in the contract, the authority must:

(1) reduce the value of the bond issuance to the degree that the district provides project funding; and

(2) credit the district for its contribution to the project financing and adjust the allocation of revenue pledged to the payment of the bonds so that the authority avoids using, to a

degree commensurate with the contribution, revenue from the district to service the authority's bond debt or interest.

ARTICLE 6. MISCELLANEOUS PROVISIONS

SECTION 6.01. FINDINGS RELATED TO PROCEDURAL REQUIREMENTS. (a) The proper and legal notice of the intention to introduce this Act, setting out the general substance of this Act, has been published as provided by law, and the notice and a copy of this Act have been furnished to all persons, agencies, officials, or entities to which they are required to be furnished by the constitution and other laws of this state, including the governor, who has submitted the notice and the Act to the commission.

(b) The commission has filed its recommendations relating to this Act with the governor, lieutenant governor, and speaker of the house of representatives within the required time.

(c) All requirements of the constitution and laws of this state and the rules and procedures of the legislature with respect to notice, introduction, and passage of this Act are fulfilled and accomplished.

SECTION 6.02. EMERGENCY. The importance of this legislation and the crowded condition of the calendars in both houses create an emergency and an imperative public necessity that the constitutional rule requiring bills to be read on three several days in each house be suspended, and this rule is hereby suspended, and that this Act take effect and be in force from and after its passage, and it is so enacted.

H.B. No. 2965 from the 76th Legislature, Regular Session, 1999

_____ _____

President of the Senate Speaker of the House

I certify that H.B. No. 2965 was passed by the House on April 22, 1999, by a non-record vote; and that the House concurred in Senate amendments to H.B. No. 2965 on May 19, 1999, by the following vote: Yeas 143, Nays 0, 2 present, not voting.

_____

Chief Clerk of the House

I certify that H.B. No. 2965 was passed by the Senate, with amendments, on May 17, 1999, by the following vote: Yeas 30, Nays 0.

_____

Secretary of the Senate

APPROVED: _____

Date

_____

Governor

H.B. No. 1110 from the 77th Legislature, Regular Session, 2001

AN ACT

relating to the North Harris County Regional Water Authority.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Section 1.02, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended by adding Subdivision (12) to read as follows:

(12) "Groundwater reduction plan" means a plan adopted or implemented to supply water, reduce reliance on groundwater, regulate groundwater pumping and water usage, or require and allocate water usage among persons in order to comply with or exceed the minimum requirements imposed by the subsidence district, including any applicable groundwater reduction requirements.

SECTION 2. Section 1.03, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended by adding Subsection (e) to read as follows:

(e) Notwithstanding Subsections (a) and (b) of this section, the authority does not include the territory of a district organized under Section 52, Article III, or Section 59, Article XVI, Texas Constitution, located within the area described by Subsections (a) and (b) of this section only if the territory meets both of the following criteria:

(1) any portion of the territory of the district was located outside the area described by Subsections (a) and (b) of this section on the effective date of this Act; and

(2) the district does not own, lease, or receive water for nonemergency purposes from a well located within the area described by Subsections (a) and (b) of this section.

SECTION 3. Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended by adding Section 1.045 to read as follows:

Sec. 1.045. INCLUSION OF CERTAIN TERRITORY. (a) The board of directors of a district organized under Section 52, Article III, or Section 59, Article XVI, Texas Constitution, all or part of which is not included within the boundaries of the authority under Section 1.03 of this Act, may request by petition the inclusion of its territory in the authority's territory. The petition must:

(1) be filed with the authority; and

(2) include an accurate legal description of the boundaries of the territory to be included.

(b) If the authority has bonds, notes, or other obligations outstanding, the board shall require the petitioning district to assume its share of the outstanding bonds, notes, or other obligations.

(c) Before the 61st day after the date the authority receives the petition, the board shall hold a hearing to consider the petition. The board may grant the petition and order the territory described in the petition included in the authority's territory if:

(1) it is feasible, practicable, and to the advantage of the authority; and

(2) the authority's system and other improvements of the authority are sufficient or will be sufficient to supply the added territory without injuring the territory already included in the authority.

(d) If the board grants the petition, the board shall file for recording

in the office of the county clerk of Harris County:

(1) a copy of the order; and

(2) a description of the authority's boundaries as they exist after the inclusion of the territory.

(e) The order including the territory is effective immediately after the order and description are recorded.

(f) A district that petitions before January 1, 2002, for inclusion within the territory of the authority shall not be required to pay any fee to the authority for admission or reimbursement for activities the authority has undertaken since its creation in the furtherance of its duties and functions. A district that petitions for inclusion within the territory of the authority on or after January 1, 2002, shall be subject to such fees and reimbursements as are in effect at the time of such petition and are applicable to such petitioners.

SECTION 4. Section 4.01, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended by amending Subsection (b) and adding Subsections (e) through (h) to read as follows:

(b) The authority may:

(1) provide for the conservation, preservation, protection, recharge, and prevention of waste of groundwater[~~, and for the reduction of groundwater withdrawals,~~] in a manner consistent with the purposes of Section 59, Article XVI, Texas Constitution;

(2) for the purposes of reducing groundwater withdrawals and subsidence, acquire or develop surface water and groundwater supplies from sources inside of or outside of the boundaries of the authority and may conserve, store, transport, treat, purify, distribute, sell, and deliver water to persons, corporations, municipal corporations, political subdivisions of the state, and others, inside of and outside of the boundaries of the authority;

(3) enter into contracts with persons, including political subdivisions of the state, on terms and conditions the board considers desirable, fair, and advantageous for the performance of its rights, powers, and authority under this Act;

(4) coordinate water services provided inside of, outside of, or into the authority; [~~and~~]

(5) provide for the reduction of groundwater withdrawals by the development, implementation, or enforcement of a groundwater reduction plan as provided in Subsection (e) of this section;

(6) identify sources of water other than groundwater to be provided by the authority;

(7) specify the rates, terms, and conditions under which sources of water other than groundwater will be provided by the authority, which may be changed from time to time as deemed necessary by the authority;

(8) specify the dates and extent to which each person or district within the authority's boundaries shall accept water from the authority; and

(9) administer and enforce the provisions of the Act.

(e) The authority may develop, implement, participate in, and enforce a groundwater reduction plan. A groundwater reduction plan developed, implemented, participated in, or enforced by the authority shall be binding on persons, districts, entities, and wells within the authority's boundaries.

(f) The authority may contract on such terms as are mutually agreeable with any person or district located outside the authority to allow the person or district to be included in the authority's groundwater reduction plan. Such contracts shall have the same force and effect as if the person or district were located within the authority, except that the person or district shall not have the right to vote in elections for members of the board of the authority.

(g) The plan authorized by Subsection (e) of this section may be amended from time to time at the discretion of the authority subject to the requirements and procedures of the subsidence district applicable to the amendment of groundwater reduction plans.

(h) The groundwater reduction plan developed by the authority may exceed the minimum requirements imposed by the subsidence district, including without limitation any applicable groundwater reduction requirements.

SECTION 5. Section 4.08, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended to read as follows:

Sec. 4.08. EMINENT DOMAIN. (a) The authority may exercise the power of eminent domain inside the boundaries of the authority [~~in the manner provided in Chapter 21, Property Code,~~] to acquire property of any kind to further the authorized purposes of the authority[~~. The authority may not exercise the power of eminent domain outside of the boundaries of the authority~~].

(b)(1) The authority may exercise the power of eminent domain outside the boundaries of the authority to acquire any land, easements, or other property for purposes of pumping, treating, storing, and transporting water.

(2) The authority may not use the power of eminent domain granted by Subsection (b)(1) of this section for the condemnation of land for the purpose of acquiring rights to underground water or water or water rights.

(3) The authority may not use the power of eminent domain granted by Subsection (b)(1) of this section to acquire property of any kind that is:

(A) owned by a municipality with a population of 1.6 million or more or any instrumentality of a municipality with a population of 1.6 million or more, including any local government corporation created by the municipality; or

(B) located within the corporate boundaries of a municipality with a population of 1.6 million or more for limited or general purposes as of February 1, 2001.

(4) Notwithstanding Subsection (b)(3)(B) of this section, the authority may use the power of eminent domain granted by Subsection (b)(1) of this section to acquire property:

(A) within the corporate boundaries of a municipality with a population of 1.6 million or more if:

(i) the condemnation is to be used to provide facilities between two points that are within the authority; and

(ii) the area within the municipality is bounded by a line parallel to and 150 feet north of the north side of Greens Bayou and by a line parallel to and 150 feet south of the south side of Greens Bayou;

(B) that is within the corporate boundaries of a

municipality with a population of 1.6 million and annexation of the territory by the municipality was completed between January 1, 1962, and January 1, 1964; or

(C) that is within an area of the corporate boundaries of a municipality with a population of 1.6 million or more if the municipality grants permission for such condemnation.

(c) The power of eminent domain granted by Subsections (a) and (b) of this section shall be exercised in the manner provided in Chapter 21, Property Code, except that the authority shall not be required to give bond for appeal or bond for costs in any condemnation suit, or other suit to which it is a party, and shall not be required to deposit more than the amount of any award in any suit.

(d) When exercising the power of eminent domain granted by Subsections (a) and (b) of this section, the authority may elect to condemn either the fee simple or a lesser property interest.

(e) The authority may not exercise the power of eminent domain granted by Subsections (a) and (b) of this section to acquire property of any kind in a county that:

(1) has a population of more than 245,000;

(2) borders the Gulf of Mexico; and

(3) is adjacent to a county with a population of more than 1.6 million.

SECTION 6. Section 4.12(b), Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended to read as follows:

(b) Disbursements of the authority must be signed by at least two directors, except, notwithstanding any other law, the board by resolution may allow the general manager, treasurer, bookkeeper, or other employee of the authority to sign disbursements.

SECTION 7. Article 4, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is amended by adding Section 4.14 to read as follows:

Sec. 4.14. INCLUDED DISTRICTS. A district inside of the authority's boundaries retains its separate identity, powers, and duties, except that the district is subject to the powers and duties of the authority, including those powers and duties of the authority necessary to develop, implement, and enforce a groundwater reduction plan.

SECTION 8. Section 1.04, Chapter 1029, Acts of the 76th Legislature, Regular Session, 1999, is repealed.

SECTION 9. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2001.

H.B. No. 1110 from the 77th Legislature, Regular Session, 2001

_____ _____

President of the Senate Speaker of the House

I certify that H.B. No. 1110 was passed by the House on March 21, 2001, by the following vote: Yeas 146, Nays 0, 1 present, not voting.

_____

Chief Clerk of the House

I certify that H.B. No. 1110 was passed by the Senate on May 17, 2001, by the following vote: Yeas 30, Nays 0, 1 present, not voting.

_____

Secretary of the Senate

APPROVED: _____

Date

_____

Governor

APPENDIX B NHCRWA WELL PUMPAGE

Notes:

1. The table format is shown as it is presented by the HGCSD.

2. Column title “AGG2000” is the aggregated number of wells with pumpage by the owner in Year 2000.

3. In “AGG2000.” The number “999” signifies no pumpage in that particular well for the year.

4. Column title “PUMP2000 (GPY)” shows the total production from all wells assigned to the owner for a particular parcel of land. Duplicate entries for well owners are not included in the total pumpage.

WELL	OWNER	AGG2000	PUMP2000 (GPY)
5153	111011 JONES ROAD JOINT VENTURE		
5235	A & M AUTO PARTS, INC.	1	24,000
5978	A. G. GEOPHYSICAL	1	480,000
7699	A.R.C., LTD.	1	30,000
7926	A.R.C., LTD.	1	45,000
7704	A-1 ADVANCED MOVING & STORAGE	1	24,000
7052	A-1 DISCOUNT STORAGE	1	850
5579	AAA BOAT STORAGE	2	398,000
6833	AAA BOAT STORAGE	2	398,000
7403	AAA GRASS	1	21,120
7656	A-ACE STORAGE 1, LTD.	1	69,000
4890	ABERCROMBIE ACADEMY	1	800,000
5528	ABUZAID ENTERPRISES, INC.	999	
5752	ACCENT PACKAGING, INC.	1	59,892
4612	ADAMS RANCHES, INC., BUD	1	468,000
4611	ADAMS RANCHES, INC., BUD	1	828,000
3887	ADAMS, R.E.	999	
3888	ADAMS, R.E.	999	
5727	AERIFORM CORPORATION	1	15,000
5233	AHMED, MOHAMMED	1	49,000
3289	AHMED, MOHAMMED	1	200,000
7132	AKIN III, JESS W.	1	14,000
5283	AKSM INVESTMENTS INC.	1	35,000
7657	ALATTAR, FAROUK & RIMA	1	194,000
7617	ALETHA PROPERTIES INC.	1	600,000
6013	ALFANO, NICHOLAS	1	27,000
5338	ALI, KARIM	1	201,597
7361	ALL ASSETS, INC.	1	66,000
3317	ALLIED CYPRESS BANK	999	
3318	ALLIED CYPRESS BANK	999	
6483	ALLIED EXTERMINATORS	1	6,210
7990	ALLSEITZ, EDWIN	1	140,000
4750	ALPHABET SOUP EARLY LEARNING CTR	1	184,900
7147	ALSAY INCORPORATED	1	712,900
6073	ALSAY, INC.	999	
6127	ALSAY, INC.	999	
6384	ALSAY, INC.	999	
6965	AMB ENTERPRISE	1	500,000
5967	AMERICAN RODSMITH	1	1,082
6953	ANDERGAUGE, USA, INC.	2	12,000
6954	ANDERGAUGE, USA, INC.	2	12,000
2679	ANDERSON, IRA, TRUSTEE	999	
7090	ANDERSON, ROBERT L.	1	9,300
7660	ANGELIKA GOURMET FOODS	1	36,000
4881	ANTIQUE MALL, THE	1	999,997
7818	AQUASOURCE DEVELOPMENT COMPANY	1	570,000
7244	AQUASOURCE DEVELOPMENT INC.	1	-
4986	ASH, BILLY H. - SHIPLEY DONUTS	1	69,600

WELL	OWNER	AGG2000	PUMP2000 (GPY)
6145	ASH, JANICE L.	1	3,100
2503	ATASCOCITA MANAGEMENT CORP.	999	
2505	ATASCOCITA MANAGEMENT CORP.	999	
2960	ATASCOCITA MANAGEMENT CORP.	999	
7661	ATLAS PRIME REALTY CORP.	1	55,000
6710	ATLAS TRANSMISSION	1	10,000
6955	AUSTIN, RICK	1	12
7157	B&B TECHNOLOGY, INC.	1	73,000
4255	B.J.H. HOLDING INC.	1	-
4254	B.J.H. HOLDING INC.	1	52,000
6712	BAHIA FARMS	1	100,000
3120	BAMMEL FOREST UTILITY COMPANY	999	
7056	BAMMEL TRUSTEE, ELIZABETH	1	1,000,000
1527	BAMMEL U.D.	999	
3862	BAMMEL U.D.	999	
7466	BAMSCH ENTERPRISES INC.	1	25,200
7153	BAMWOOD ACT CNTR/AMERICAN RAMALL		
7771	BANCROFT, EDDIE	1	39,000
5324	BANFF SCHOOL	1	44,000
4999	BARCUS, B.J.	1	893,600
6131	BARDWELL, JERRY	1	24,000
7095	BARRETT, GARY	1	290,660
7981	BARTASH CO., II LTD.	1	240,000
4884	BASHAM, CAREY E.	1	695,000
7563	BASIC OFFICE & SCHOOL SUPPLY	1	1,000,000
5440	BATES MOTOR HOMES	1	45,000
5129	BATES, BILL	1	1,610,000
6406	BAUMGARTNER, ALVIN	1	10,000
7890	BAYER, ALICE L.		
6968	BAYNE, ROY L.	1	12,000
6967	BAYNE, ROY L.	1	21,600
7059	BDB PARTNERSHIP	1	4,680
4862	BECK & MASTEN PONTIAC GMC, INC.	1	369,000
7303	BEDNAROWICZ, TOM	999	
5901	BELL, JAMES		
5871	BENFER, DARRIN W.	999	
4797	BENNETT, SAMUEL E., SR.	1	1,960,400
6959	BETHEL EVANGELICAL LUTHERAN	1	4,780
7383	BETHEL EVANGELICAL LUTHERAN CHUR		
6878	BETHESDA LUTHERAN HOMES & SERV.	2	799,000
7077	BEYER CONSTRUCTION, INC.	1	80,000
7553	BHAI, ISMAIL	1	50,000
5125	BHAI, ISMAIL		
6048	BHAI'S INVESTMENTS, INC.		
2494	BHUSHAN, SAMEET	2	585,600
6527	BIJJANI, CHARLIE	1	72,000
7291	BIRDWELL CONSTRUCTION INC., G.R.	1	96,000
7081	BISHOP, E.R.	1	1,200

WELL	OWNER	AGG2000	PUMP2000 (GPY)
5310	BISMIL PROPERTIES, INC.		
6698	BLACKMAN, WILLIAM L.	1	322,900
6699	BLACKMAN, WILLIAM L.	1	403,300
7055	BLB, LTD.	1	348,000
7646	BLTF INC.	1	280,000
7647	BMB INVESTMENTS	1	-
5801	BODY SHOP, THE	1	12,000
7191	BOKEMEYER, BURT	1	7,530
6931	BOLFING BROTHERS MARBLE, INC.	1	151,200
5742	BOND, GUY	1	230,000
7800	BONDS, JOHNNY	1	500,000
7160	BOUDREAUX, PAUL	1	100,000
6957	BOYD, JERRY B. & ELIZABETH M.	1	12,000
6998	BRABAND-STUTTS	1	144,000
7159	BRADLEY, JOHN & STACY D. BOWLIN	1	30,000
4153	BRAEWOOD DEVELOP CO/NORTHGATE	999	
5326	BRAUE, JOHN & JULIE	1	10,000
7071	BRENTWOOD LAKES HOMEOWNERS ASS(	1	400
7247	BRIDGESTONE M.U.D.	1	2,200
3835	BROWN CONSTRUCTION, INC., GRANT	999	
7070	BROWN, ELENE BOUHOUTSOS	1	70,000
6773	BROWN, JOHN W.	1	7,677
7666	BROWN, JR., N.A.	1	100,000
4436	BSL GOLF CORP/JERSEY MEADOW G.C.		
4586	BSL GOLF CORP/JERSEY MEADOW G.C.		
7079	BURNS, JACK		
5311	BUSSEL & SONS, INC.	1	100,000
7365	BUTLER, DAROLYN	1	208,000
6782	C & C RESTAURANT	1	1,000,000
7636	C & L TIRE CO.		
4767	C & P UTILITIES, INC.	1	1,956,000
7292	C.W. OILFIELD SALES, INC.	1	2,400
7882	CALDWELL, VALERIE	1	140,000
6371	CALVARY HILL FUNERAL HOME	1	708,300
5169	CAMBRIDGE COURT MEDICAL CENTER	999	
1360	CAMERON IRON WORKS, INC.	999	
5815	CAMERON, COOPER	1	51,600
7937	CAMPOS, WALTER	1	493,987
3815	CAN-AM ASSOC. INC.	999	
3816	CAN-AM ASSOC. INC.	999	
1725	CANDLELIGHT SERVICE CO., INC.		
7432	CANTERRA CLASSICS		
5991	CAPITAL AIR & HEAT, INC.	1	24,000
7135	CARTER, JAMES	1	24,000
6401	CARTER'S COUNTRY	1	17,000
6400	CARTER'S COUNTRY	1	86,500
6935	CARTHEY, JOHN W.	1	8,304
7804	CASTRO, TIM	1	12,390

WELL	OWNER	AGG2000	PUMP2000 (GPY)
2066	CBI NA-CON, INC.	999	
2859	CEMEX USA	2	-
2860	CEMEX USA	2	-
7606	CEPEDA, CARLOS A.	1	14,600
4799	CERES INVESTMENTS, INC.	1	724,000
7711	CHAMBERS, JUDY	1	490,000
7618	CHAMPION LAKES LIMITED	2	-
7619	CHAMPION LAKES LIMITED	2	-
5377	CHAMPION POINT AUTO CENTER	1	12,000
4853	CHAMPION SPRINGS HOMEOWNERS, INC	999	
6999	CHAMPION WINDOW, INC.	1	500,000
7000	CHAMPION WINDOW, INC.	1	500,000
3470	CHAMPIONS GLEN, L.P.	1	-
5212	CHAMPIONS GLEN, L.P.	1	-
5300	CHAMPIONS GLEN, L.P.	1	-
2414	CHAMPIONS GLEN, L.P.	1	160,000
2417	CHAMPIONS GLEN, L.P.	999	
5522	CHAMPIONS PEST CONTROL	1	3,450
7620	CHAMPIONS STONE COMPANY		
6511	CHAPELA, JOSE	1	10,335
7519	CHARLIE'S AUTO & TRUCK SALVAGE	1	78,000
7712	CHASEWOOD ENVIRONMENTAL	1	30
4034	CHASEWOOD LAND VENTURE	999	
6958	CHATAGNIER, JOHN M.	1	19,200
4630	CHENG'S FLEA MARKET		
3725	CHEVRON U.S.A., INC.	1	214,540
2766	CHEVRON U.S.A., INC.	999	
2770	CHEVRON U.S.A., INC.	999	
2772	CHEVRON U.S.A., INC.	999	
3421	CHEVRON U.S.A., INC.	999	
3536	CHEVRON U.S.A., INC.	999	
4001	CHEVRON U.S.A., INC.	999	
7968	CHIEH, FRANCISCO & SHU JANE	1	3,660
6300	CHRIST UNITED CHURCH	1	7,670
2058	CIRCLE K CORPORATION	999	
5220	CIRCLE S FOOD STORE	999	
5278	CJM TRUCKING & SOILS CO., INC.		
5547	CLA ENTERPRISES, INC.	1	95,000
6775	CLAIRMONTE, JAMES & JOYCELYN	1	500,000
5441	CLASSIC 3 GOLF COURSE	1	6,000
5442	CLASSIC 3 GOLF COURSE	1	1,955,000
7284	CLEM, R. TURNER	1	48,000
7670	CMH HOMES INC. DBA CLAYTON HOMES	1	10,000
7669	CMH HOMES INC. DBA LUV HOMES	1	10,000
7136	COCKAYNE, MIKE	1	75,500
3504	COE UTILITIES, INC.	999	
3506	COE UTILITIES, INC.	999	
3507	COE UTILITIES, INC.	999	

WELL	OWNER	AGG2000	PUMP2000 (GPY)
3511	COE UTILITIES, INC.	999	
3666	COE UTILITIES, INC.	999	
3795	COE UTILITIES, INC.	999	
3961	COE UTILITIES, INC.	999	
4314	COE UTILITIES, INC.	999	
7745	COE, JR., E.W.	1	24,000
7932	COHEN, LARRY	1	379,400
7805	COLEMAN, RICHARD	1	5,400
7701	COLONY ASSOCIATES	1	150,000
7839	COLWELL ELECTRIC	1	10,400
1754	COMMUNITY UTILITY COMPANY	999	
3086	COMMUNITY UTILITY COMPANY	999	
3760	COMMUNITY UTILITY COMPANY	999	
2358	COMPAQ COMPUTER CORP.	999	
4134	COMPAQ COMPUTER CORP.	999	
4135	COMPAQ COMPUTER CORP.	999	
5495	COM-REAL PROPERTIES	999	
6254	CONCRETE SERVICES, INC.	1	3,000
5689	CON-EQUIP	1	880,000
6979	CONEY ISLAND L.P.	1	500,000
6376	CONNELL, JOE C. & SUSAN B.	1	15,600
1832	CONSUMERS WATER CORPORATION	999	
1840	CONSUMERS WATER CORPORATION	999	
6973	CONTINENTAL CASING CORP.	1	6,000
7411	CONTRINO, HERMAN	1	20,000
5403	CON-WAY SOUTHERN EXPRESS, INC.	1	163,800
6974	COPELAND, JIMMY	1	600,000
6975	CORB, ALVIN E.	1	100,000
5397	CORDER, J. MICHAEL	1	120,000
2740	CORNELIUS, INC.	999	
2742	CORNELIUS, INC.	999	
7697	COX, THOMAS P.	1	497,000
4929	CRAIN, HERBERT S.	999	
5910	CRC/MASTERCRAFT, INC.	1	20,250
7773	CRESS, BOBBY J.	1	42,000
4004	CSA LIMITED, INC.	999	
4278	CSA LIMITED, INC.	999	
2654	CULLEN ESTATE TRUST FBO HRM, LC	2	1,220,000
2655	CULLEN ESTATE TRUST FBO HRM, LC	2	1,220,000
6976	CUNNINGHAM, ROY M.	1	9,800
6977	CUNNINGHAM, ROY M.	1	340,000
4897	CURRIER, JR., JOHN D.	1	726,066
6090	CUSTOM PRECISION SHEETMETAL	1	59,000
7412	CY-FAIR AQUATIC CENTER	1	107,400
5128	CY-FAIR ASSEMBLY OF GOD CHURCH	1	450,000
5011	CY-FAIR LAWNMOWER, INC.	1	240,000
6103	CY-FAIR VOLUNTEER FIRE DEPT.	1	30,000
6897	CY-FAIR VOLUNTEER FIRE DEPT.	1	44,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
3357	CY-FAIR, INC.	999	
3358	CY-FAIR, INC.	999	
2909	CY-FOREST SERVICE ASSOCIATION	999	
4940	CYPRESS CHILD CARE CENTER	1	342,390
7387	CYPRESS CREEK EMS	1	49,275
7388	CYPRESS CREEK EMS	1	49,275
7389	CYPRESS CREEK EMS	1	49,275
7386	CYPRESS CREEK EMS STATION 6		
5583	CYPRESS CREEK UTILITY SERVICE CO	1	108,000
5349	CYPRESS N. HOUSTON BUSINESS CTR.	1	396,000
5130	CYPRESS N. HOUSTON BUSINESS CTR.	999	
2677	CYPRESS-FAIRBANKS I.S.D.	999	
2678	CYPRESS-FAIRBANKS I.S.D.	999	
2951	CYPRESS-FAIRBANKS I.S.D.	999	
3598	CYPRESS-FAIRBANKS I.S.D.	999	
6173	CYPRESSWOOD LTD.	1	362,550
4173	CYPRESSWOOD LTD.	1	1,520,300
7009	D & S PROPERTIES LP	1	6,000
7873	D&S SERVICES	1	-
7875	D&S SERVICES	1	-
6084	D.B. TREE SERVICE	1	196,179
5136	DAIRY QUEEN 1960 WEST	1	20,400
7249	DANIEL, RONALD C.	1	16,000
6329	DAN'S HARDWARE COUNTRY, INC.	1	54,900
7074	DAVID'S CYCLES	1	5,475
7718	DAVIDSON, KENT	1	7,800
7752	DAVIDSON, LEA A.	1	150,300
5321	DAVIS BROTHERS CONSTRUCTION	1	133,500
6150	DDS AGGREGATES	1	12,000
5562	DENINA, RUSSELL	1	6,000
3985	DENNIS DEVELOPMENT INC.	999	
4743	DESAI, ARUN	1	38,750
7368	DEVINE, MILES DBA SEASON GROWERS	1	21,531
5954	DIA-DEN LTD.	1	966,600
7992	DIAMOND TRUCK AND EQUIPMENT	1	26,100
5035	DIAMONDS OF HOUSTON, INC.		
4805	DILLER, P.A., INC.	1	478,527
6790	DINCANS, KYLE B.	999	
6873	DIVERSE IRRIGATION GROUP, INC.	1	371,400
7253	DLT	1	44,200
5630	DOAN, TRUNG	1	2,924
1858	DOVE MEADOWS M.U.D.	1	-
5586	DOVER, DANNY L.	1	500,000
5193	DR. PEPPER BOTTLING CO - HOUSTON	1	200,000
5624	DREYER, JEAN S.	1	156,000
7645	DRY CREEK HANGAR CONDOMINIUM	1	198,000
4047	DUBROOK, INC.		
7673	DUNN, WOODY	1	100,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
5700	E & E REALTY CO	1	91,454
1774	EMERALD FOREST U.D.	999	
7061	ENGLAND, SADIE JO	1	600,000
5219	ENGLISH, ELLEN	1	28,800
6074	EOG RESOURCES, INC.	999	
5723	ESTATES AT WILLOW CREEK LLC, THE	1	48,000
6562	ESTES, DAVID	1	3,600
6980	EUBANKS, LARRY W.	1	-
7213	EVENING STAR INVESTMENTS, LLC	1	324,000
6310	EVERETT SQUARE, INC.	1	734,059
6789	EXCALIBUR CONSTRUCTION, INC.	1	16,100
3006	EXXON COMPANY, U.S.A.	999	
5174	EXXON COMPANY, U.S.A.	999	
2403	EXXON CORPORATION	999	
3720	EXXON CORPORATION	999	
3997	EXXON CORPORATION	999	
4053	EXXON CORPORATION	999	
4067	EXXON CORPORATION	999	
4068	EXXON CORPORATION	999	
4387	EXXON LAND DEVELOPMENT INC.	1	500,000
4812	F L & H	1	480,000
7008	FAIRFIELD BAPTIST CHURCH	1	994,810
6010	FAIRFIELD CHRISTIAN CHURCH	1	58,400
6869	FAITH TEMPLE BAPTIST CHURCH	1	180,000
6663	FAMCOR OIL	999	
7214	FAMCOR OIL	999	
3609	FAUST PROPERTIES, INC.	999	
3817	FAUST PROPERTIES, INC.	999	
4026	FAUST PROPERTIES, INC.	999	
5345	FEINBERG, BARBIE	999	
6338	FELTS, MIKE	1	60
7350	FELTS, RON	1	26,000
7927	FERGUSEN GARRETT & ASSOCIATES		
7149	FERGUSON, ROBERT Y.	1	1,000,000
6981	FINCH, CINDY R.	1	100,000
7139	FIRST BAPTIST CHURCH ROSEHILL	1	11,400
2142	FIRST MADISON BANK, FSB	999	
2145	FIRST MADISON BANK, FSB	999	
2153	FIRST MADISON BANK, FSB	999	
7163	FISHER JR., WILLIAM K.	1	100,000
4814	FLINN, NADENE	1	360,000
5791	FLINTLOCK, LTD	999	
7047	FLORES, N.I., A PARTNERSHIP	1	203,390
4905	FONTANA TRUSTEE, FRANK P.	1	200,000
7700	FORD, RICHARD	1	36,000
6982	FORREST, GABRIEL	1	100,000
4066	FORUM PROPERTIES, INC.	999	
4815	FOUNDRY UNITED METHODIST CHURCH	999	

WELL	OWNER	AGG2000	PUMP2000 (GPY)
2938	FOUNTAINHEAD M.U.D.	999	
6009	FOUR D INVESTMENTS	1	300,000
5837	FRANK SUPPLY CO OF HOUSTON	1	500,000
7674	FRANKLIN'S	1	-
2114	FRANZ ENTERPRISES, RALPH D.	999	
2045	FRANZ, C. C.	999	
6216	FRASER, DIANA L.	1	500,000
7317	FRAYSUR, DARREN LEE	1	1,800
4906	FREDERICK, WAYNE H. & DONNA	1	136,400
6375	FREEDOM FELLOWSHIP CHURCH	1	3,840
4907	FRESH AMERICA CORP.	999	
5900	FRESH AMERICA CORP.		
6983	FREY PROPERTIES, INC., JACK	1	50,000
2151	FRIENDSWOOD DEVELOPMENT CO.	1	-
4295	FRIENDSWOOD DEVELOPMENT CO.	1	209,534
2144	FRIENDSWOOD DEVELOPMENT CO.	1	500,000
2143	FRIENDSWOOD DEVELOPMENT CO.	999	
2146	FRIENDSWOOD DEVELOPMENT CO.	999	
2147	FRIENDSWOOD DEVELOPMENT CO.	999	
2148	FRIENDSWOOD DEVELOPMENT CO.	999	
2150	FRIENDSWOOD DEVELOPMENT CO.	999	
4056	FRIENDSWOOD DEVELOPMENT CO.	999	
4057	FRIENDSWOOD DEVELOPMENT CO.	999	
4206	FRIENDSWOOD DEVELOPMENT CO.	999	
7471	FUN IN SWIMMING, INC.	1	38,830
5306	FURLONG LTD.	1	64,824
6915	GAGE, EDDIE W.	1	1,000,000
7156	GAMEZ, NEMECIO P.	1	845,000
7652	GARDEN ACCENTS INC.	1	2,400
4039	GARY CUTSINGER COMPANY	999	
5084	GARZA, CABRITOS	1	682,760
6043	GAS-N-STUFF	1	500,000
4984	GATEWAY FOODS	999	
4738	GBZ, INC. DBA THE WINNERS CIRCLE	999	
6885	GEAREN, JR., DEMPSEY	999	
2259	GENESIS PIPELINE TEXAS, L.P.	1	8,528
7002	GENSHELMER, MARK	1	60,500
7204	GERLAND, JR., A.J.	1	180,000
6604	GIBBS ENTERPRISES	1	-
6605	GIBBS ENTERPRISES	1	250,000
7976	GIBBS, GREGG		
2020	GIFFORD-HILL & COMPANY, INC.	999	
7078	GILBREATH, JAMES R.	1	69,700
7910	GILCHRIST, RONALD G.	1	17,755
3573	GIRL'S COUNTRY OF HOUSTON, INC.	1	1,045,000
5609	GLASSCOCK, ROCKY M.	1	24,000
6422	GLENWOOD FALLS ANIMAL HOSPITAL	1	18,000
5417	GODWIN MECHANICAL	1	2,400

WELL	OWNER	AGG2000	PUMP2000 (GPY)
6363	GOLF ACADEMY LLC, THE	999	
6364	GOLF ACADEMY LLC, THE	999	
7725	GOMEZ, ELVIRA	1	6,000
5879	GONZALES, THOMAS	1	33,600
2453	GOODRICH, HUGH R.	999	
1422	GOODYEAR TIRE & RUBBER CO.	999	
7829	GOWER CONSTRUCTION	1	1,200
4817	GRANT ROAD DAY CARE CENTER, INC.	1	300,000
6723	GRAVES, LLOYD	1	36,000
6809	GRAY, THOMAS R.	1	10,000
4941	GRAYSON, EDWARD H.	999	
6984	GREATER LIFE CHURCH	1	51,400
5264	GREEN, JONATHAN T., DVM	1	227,000
5574	GREENBRIAR REAL ESTATE INVEST.	1	600
6650	GREENWOOD BAPTIST CHURCH	1	8,750
7886	GREIG, ROBERT	1	12,000
5969	GRIEPP, BRAD		
5990	GRIFFS AUTO SERVICE	999	
5331	GROGANS PARK TEXAS	1	196,000
7879	GUETERSLOH, JAMES CRAIG	1	380,000
6669	GULF COAST ALLOY WELDING, INC.	1	492,000
5372	GULF COAST STABILIZED MATERIALS	1	38,828
3420	GULF OIL COMPANY - U.S.	999	
3422	GULF OIL COMPANY - U.S.	999	
5399	GUTHRIE, DON	1	3,000
7571	H & H SALES	1	96,000
3336	H & J WATER COMPANY, INC.	999	
3671	H & J WATER COMPANY, INC.	999	
5627	H&S INTERPRISE	1	12,000
4501	HAMBRICK, MARY ELLEN	1	230,000
7506	HAMILTON PRECISION ASSEMBLY	1	43,000
7415	HAMILTON, BILL	1	60,000
3818	HAMMONDS, GENE	999	
7102	HAMMONDS, GENE E.	1	91,937
6986	HANCE, JOHN F.	1	293,000
5248	HANDLEY, DENNIS	1	25,200
5289	HANNOVER ESTATES LTD.	999	
6987	HANTMAN, JEROME, B.	1	17,640
7285	HARGRAVE ELECTRIC	1	58,800
7911	HARMEIER, SUE	1	7,800
4160	HARRIS CO. FLOOD CONTROL DIST.	1	145,600
3826	HARRIS CO. M.U.D. 115	999	
1612	HARRIS CO. M.U.D. 132	999	
2156	HARRIS CO. M.U.D. 18	999	
3998	HARRIS CO. M.U.D. 199	999	
3714	HARRIS CO. M.U.D. 220	999	
3982	HARRIS CO. M.U.D. 222	999	
3953	HARRIS CO. M.U.D. 231	999	

WELL	OWNER	AGG2000	PUMP2000 (GPY)
4092	HARRIS CO. M.U.D. 249	1	-
4093	HARRIS CO. M.U.D. 249	999	
4107	HARRIS CO. M.U.D. 289	999	
2200	HARRIS CO. M.U.D. 29	999	
4122	HARRIS CO. M.U.D. 317	999	
4110	HARRIS CO. M.U.D. 325	999	
4222	HARRIS CO. M.U.D. 351	999	
2438	HARRIS CO. M.U.D. 44	999	
7622	HARRIS CO. M.U.D. 44		
4030	HARRIS CO. M.U.D. 77	999	
4035	HARRIS CO. M.U.D., INC.	999	
4319	HARRIS CO. TOLL ROAD AUTHORITY	1	24,000
4320	HARRIS CO. TOLL ROAD AUTHORITY	1	24,000
2093	HARRIS CO. W.C.&I.D. 116	999	
3021	HARRIS COUNTY	1	400
2833	HARRIS COUNTY	1	46,500
3933	HARRIS COUNTY	1	93,310
5993	HARRIS COUNTY	1	128,900
3147	HARRIS COUNTY	1	133,255
4326	HARRIS COUNTY	1	280,000
2842	HARRIS COUNTY	2	317,429
4267	HARRIS COUNTY	2	317,429
3603	HARRIS COUNTY	1	402,300
4120	HARRIS COUNTY	1	486,400
4410	HARRIS COUNTY	1	1,317,200
2839	HARRIS COUNTY	999	
2841	HARRIS COUNTY	999	
3018	HARRIS COUNTY	999	
3326	HARRIS COUNTY	999	
4083	HARRIS COUNTY	999	
4084	HARRIS COUNTY	999	
4546	HARRIS COUNTY	999	
4874	HARRIS COUNTY	999	
3325	HARRIS COUNTY MENTAL HEALTH /	999	
7067	HARRISON, DAVID	1	1,620,000
3022	HARRISON, IMOGENE	999	
7946	HART, RICHARD		
7324	HARVILL, ROBERT D.	1	10,000
7808	HASSELL CONSTRUCTION CO., INC.	1	100,000
7832	HAUDE, DIANA	1	74,000
6725	HAWKINS FORD INVESTMENTS	1	7,800
4939	HAYS UTILITY SERVICE CORP.	1	1,075,000
7623	HAYSLIP, GARY & SHERYL	999	
1979	HEGAR BROTHERS	999	
1982	HEGAR BROTHERS	999	
2215	HEIGHTS SAVINGS ASSOCIATION	999	
6390	HEMMAT, JOHN AL. A.	1	3,600
7084	HERRON & TURELL		

WELL	OWNER	AGG2000	PUMP2000 (GPY)
6858	HEYMAN, L.W., ELKIN KENNELS,INC.	1	1,000,000
7101	HIEDEN FEED & SUPPLY	1	2,900
6727	HIEDEN, F.J.	1	25,500
6262	HIGAREDO, FRANCISCO & JUAN	1	900,000
7164	HIGH RIDGE KENNEL, LLC	1	270,000
7208	HINOJOSA, OZIEL	1	3,600
3970	HMW WATER SUPPLY CORP	1	813,000
7200	HOBOCK, JAY	1	9,000
7577	HOFFPAUIR, TOMMY	1	8,400
6989	HOLLINGSWORTH, SUSAN M.	1	500,000
7326	HOLY COMFORTER EPISCOPAL CHURCH	1	100,000
2422	HOMECRAFT LAND DEVELOPMENT, INC.	999	
3091	HOOKS III, CHARLES G.	2	-
3654	HOOKS III, CHARLES G.	2	-
2669	HOOKS, CHARLES G. & SON	999	
2671	HOOKS, CHARLES G. & SON	999	
3653	HOOKS, CHARLES G. & SON	999	
6990	HOPPER KLEIN PAINT & BODY,GEORGE	1	23,400
6991	HOUIS SURVEYING	1	349,999
7676	HOUSTON BOTANICAL SERVICES	1	24,000
1183	HOUSTON LIGHTING & POWER COMPANY	999	
4947	HOUSTON NORTHWEST BAPTIST CHURCI	1	1,644,000
4303	HOUSTON PIONEER DEVELOPMENT, INC	1	89,000
4129	HOUSTON POLY BAG, INC.	1	750,000
4130	HOUSTON POLY BAG, INC.	1	800,000
4223	HOUSTON SHELL & CONCRETE	999	
4186	HUBER CORPORATION, J. M.	1	891,950
7327	HUDSPETH, MARIE	1	73,000
7416	HUFFMEISTER BLD. LANDSCAPING DEV		
6007	HUGHES COMPANY, DAN A.	999	
7131	HUMBLE CARPET & TILE, INC.		
2696	HURRICANE FENCE COMPANY	999	
7948	HUTCHERSON, TERRY E.	1	6,000
7731	HYATT, MARVIN	1	6,000
4446	I.Q. PRODUCTS COMPANY	1	-
4279	I.Q. PRODUCTS COMPANY	999	
6115	I-45 SOIL CENTER	1	2,800
7755	IGLESIA BAUTISTA LIBERTAD	1	41,600
5470	INDUSTRIAL CONTRACTORS	1	30,000
7165	INTER FABRICS	1	54,000
7141	INTERMOTOR AUTO SERVICE INC.	1	100,000
5793	IOTOP INVESTMENTS	1	60,000
5792	IOTOP INVESTMENTS	999	
6001	ITEM PRODUCTS, INC.	1	600,000
7677	ITEQ STORAGE SYSTEMS INC.	1	300,000
4921	IVEST, INC.	1	200,000
7735	IVEY, JAMES	1	77,000
4784	J.V. GROUP II		

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7417	JACOBS, CHAD	1	590
6550	JADE, INC.	1	30,870
2778	JAPHET, E. C.	999	
5573	JAROSZEWSKI, TRAVIS	1	10,200
7779	JDC GREENLEAF LTD.	1	10,333
5422	JEDNOTA HOUSTON LODGE	1	5,950
4638	JEN, YUNG-CHING	999	
3354	JERSEY VILLAGE, CITY OF	1	54,000
1846	JERSEY VILLAGE, CITY OF	999	
1847	JERSEY VILLAGE, CITY OF	999	
4949	JOES QUICK STOP	1	120,000
3965	JOHNSON, GEORGE	999	
4771	JOHNSON, JAYSON T.	1	500,000
7913	JOHNSON, RANDALL & BARBARA	1	5,000
4747	JOHNSON, WAYNE	1	30,593
2502	JOHNSON-LOGGINS, INC.	999	
2504	JOHNSON-LOGGINS, INC.	999	
6905	JOHNSTON UTILITIES, INC.	1	1,720,000
7100	JONES COURT LTD.		
4826	JONES RD. LTD. & ENTERPRISE CAP.		
7115	JONES RESTAURANT, GREGORY L.	1	300,000
7309	JONES ROAD PROPERTIES LTD.	1	10,000
7626	JONES ROAD WEST BUSINESS PARK	1	480,000
7979	JONES, CHARLES E.		
7889	JONES, DEBBIE		
7329	JONES, GLENDA KAREN	1	50,000
4362	JONES, WILLIAM HENRY SR.	1	356,040
4363	JONES, WILLIAM HENRY SR.	999	
7983	KACHELL, JERRY	1	36,000
5139	KAGAN-EDELMAN CAP. FUND SER. VI/	1	288,000
6064	KAISER, CLARENCE	1	-
6812	KAISERHOF LUTHERAN RETREAT CNTR.	1	500,000
7950	KALBACH, KENNETH	1	25,550
4919	KAROLYIS GYMNASTICS		
7436	KASPERLAIN, NORMA	1	-
7732	KEELS, JOHNNY AND KAREN	1	35,000
2712	KEETON, GENE	1	600
5806	KELLY ICE TEE LLC, JIM		
6950	KENNEDY COATING INSPECTION, INC.	1	500,000
7116	KENSINGER, PHIL	1	10,000
7117	KENSINGER, PHIL	1	10,000
7118	KENSINGER, PHIL	1	10,000
7835	KENSINGER, PHIL	1	10,000
5140	KEPPLER JR., KENNETH L.	1	80,000
7168	KEYS, L.R.	1	24,000
4831	KHALIL, HANNA TANNOUS	1	575,000
5771	KICKAPOO FEED	1	14,600
6795	KILLION, CAROL	1	9,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
5002	KIMICH, LUKE		
5107	KINARD, KEN	1	5,400
6359	KING, BEAU	1	1,000,000
7534	KING, MANUEL	1	42,910
3825	KING'S COLONY, INC.	999	
7217	KIRTLEY, PHILIP & CONNIE	1	5,200
5601	KIRTLEY, THERMAN		
6992	KITCHENS, CHARLES R.	1	3,000
7579	KLEB, DAVID	1	125,000
7580	KLEIN BANK	1	76,266
2697	KLEIN I.S.D.	1	-
5652	KLEIN I.S.D.	1	1,267,000
2698	KLEIN I.S.D.	1	1,764,000
2699	KLEIN I.S.D.	999	
2700	KLEIN I.S.D.	999	
7641	KLEIN VOLUNTEER FIRE DEPT.	1	24,000
7119	KLEIN-SPRING MONTESSORI SCHOOL	1	480,000
7210	KLIEN FIRST BAPTIST CHURCH		
6530	KNIGHT, DENNIS A.	1	56,850
6843	KOCH GATEWAY PIPELINE COMPANY	999	
6993	KOL, INC.	1	2,600
5773	KWIK INDUSTRIES	999	
3157	LAKE OWNERS ASSOCIATION	999	
7842	LAKEWOOD FOREST KENNELS	1	192,000
5515	LAMBRECHT CONSTRUCTION, T.J.	999	
7099	LAND, P.C., DONN A.	1	24,000
7098	LANDMARK INDUSTRIES, INC.	1	596,000
7784	LANDMARK INDUSTRIES, LTD.		
6893	LANGDON, TOMMY R.	1	100,000
2452	LAPHAM, IRA G.	999	
2490	LAPHAM, IRA G.	999	
6416	LAWRENCE, WILMA J.	1	-
5173	LEE INVESTMENTS, INC., SUN		
7010	LEE, AN SIK	1	10,000
4955	LEE, EUGENE	1	-
6899	LEE, KENNETH	1	3,600
6814	LEMM, ROBERT B.	1	350,000
3116	LETSON, MRS. JOE	999	
2489	LEWIS & SONS, J. D.	999	
2488	LEWIS & SONS, J.D.	999	
7185	LIBERTY REVIVAL CHURCH	1	318,348
2599	LINDSAY, EDWARD E.	999	
7424	LINDSEY CONSTRUCTION	1	60,000
2464	LINDSEY, C. M.	999	
2465	LINDSEY, C. M.	999	
2466	LINDSEY, C. M.	999	
5225	LINDSEY, HELENE	1	342,500
7955	LITTLE, JOSEP L.	1	111,400

WELL	OWNER	AGG2000	PUMP2000 (GPY)
4402	LITTLES, RAYMOND WALTER	1	968,100
4403	LITTLES, RAYMOND WALTER	2	968,100
5929	LOCKER JR., A.L.	1	800,000
4834	LONE STAR SKATE		
7680	LOOMCRAFT CARPET	1	44,400
5474	LOUETTA RD. BAPTIST CHURCH, INC.	999	
5718	LOWE, MICHAEL	1	-
6082	LOWER, DON	1	8,750
4871	LSS - LONE STAR - HOUSTON, INC.	1	1,030,602
7092	LUCKY, INC., HENRY T.T.	1	216,000
5906	LUE, ROSWELL	1	44,000
6362	LUU, BRUCE	1	898,100
4787	LUU, TRINH NGOC	999	
5921	MADINMA, INC., AL	1	60,000
7358	MALEK BROTHERS CONSTRUCTION	1	22,500
7788	MALEK WAREHOUSE	1	24,000
5772	MALONE, BOB	1	50,000
6817	MANCO ELECTRIC	1	100,000
5726	MANIS, THOMAS G.	1	77,608
5964	MANNING, WALTER	1	650,000
7524	MANTLE, ELLEN L.	1	60,000
5505	MANUFACTURES CAPITAL, INC.	1	1,500,000
4807	MANU-TECH PRODUCTS, INC., SAMUAL	1	203,000
7091	MANZIONE, JOHN E.		
2416	MARSHALL TRUST, DOUGLAS B. JR.	999	
2356	MARSHALL TRUST, HUGH ROY	999	
2359	MARSHALL, DOUGLAS B. JR.	999	
2418	MARSHALL, HUGH ROY	999	
3471	MARSHALL, HUGH ROY	999	
5676	MARTIN, RICKY	1	8,150
5138	MARY IMMACULATE SCHOOL	1	576,000
7011	MAYNARD, WANDA	1	200,000
6678	MCCARTNEY, GERVIS	1	14,400
6900	MCCAULEY LUMBER TOMBALL, INC.	1	300,000
7012	MCCLANAHAN, JACK		
6480	MCCLELLAN, RICHARD J.	1	300,000
5190	MCCOLLUM UPHOLSTERIES	1	96,000
6738	MCCURDY, LLOYD	1	9,600
7957	MCCURLEY, RICHARD	1	-
1917	MCDERMOTT, INC., JOE A.	999	
1919	MCDERMOTT, INC., JOE A.	999	
1921	MCDERMOTT, INC., JOE A.	999	
3094	MCDERMOTT, INC., JOE A.	999	
7013	MCGUFFY INDUSTRIES, INC.	1	97,500
7516	MCNIEL, JOHN R.	1	25,000
7203	MELCHOR, MIKE	1	1,688,900
7014	MELTON, FRED C.	1	100,000
7848	MELVIN, JOE & KAY	1	600

WELL	OWNER	AGG2000	PUMP2000 (GPY)
1546	MEMORIAL HILLS U.D.	999	
7089	MERRILL, ROBERT	1	8,030
5166	MEYER INDUSTRIES, THOMAS & BETTS	2	1,701,100
6613	MEYER INDUSTRIES, THOMAS & BETTS	2	1,701,100
5378	MICHEL, MELVIN	1	8,657
6744	MILLENNIUM INTERESTS, INC.	1	144,000
7929	MILLER, PAT	1	-
4840	MINOR, BOB	1	100,000
7644	MIRABAL, BLAS	1	57,700
5808	MIROCAR COLLISION	1	47,000
7268	MIRROR LAKE LANDSCAPING	1	14,000
5958	MISCELLANEOUS SPECIALTIES, INC.	1	45,600
1869	MISSOURI PACIFIC RAILROAD CO.	999	
3524	MISSOURI PACIFIC RAILROAD CO.	999	
4672	MITTELSTAEDT, OSWALD	1	120,000
2864	MOBIL OIL CORPORATION	999	
3048	MOBIL OIL CORPORATION	999	
3050	MOBIL OIL CORPORATION	999	
5860	MOBILE CAR CARE		
5635	MOBILE MART LLC	1	1,560
5918	MOCEANU GYMNASTICS, INC.	1	-
7083	MOLINA, SR., JAVIER H.	1	420,000
7806	MONKEMEIER, JIM	1	115,200
6735	MOORE, LEROY	1	3,600
7843	MORGAN PERFORMANCE	1	9,100
5764	MORRIS, JIMMY R.	999	
3841	MOTIVA ENTERPRISES L.L.C.	1	-
3175	MOTIVA ENTERPRISES L.L.C.	1	55,000
4613	MOTIVA ENTERPRISES L.L.C.	2	99,996
7895	MOTOR CITY ENGINE		
4835	MOUSA, CHAYN	1	1,200,000
4836	MOUSA, CHAYN	1	1,200,000
6183	MTEC MECHANICAL TESTING SERVICE	1	16,175
5332	MURRAY, BOB	1	2,400
6565	MUSE, LARRY R.	1	10,400
3100	MUSTERMAN, INC., GEORGE H.	999	
3101	MUSTERMAN, INC., GEORGE H.	999	
7016	MYNERS, GERALD M.	1	7,050
4917	NABORS DRILLING USA, INC.		
5591	NAL, JUVE	999	
7166	NAOMI WAREHOUSE JOINT VENTURE	1	36,500
5744	NAPA AUTO PARTS	1	-
4307	NATIONAL CONVENIENCE STORES INC.	1	104,320
4306	NATIONAL CONVENIENCE STORES INC.		
4311	NATIONAL CONVENIENCE STORES INC.	999	
7988	NATIONAL REFURBISHING CENTER INC	1	-
5007	NATIONS BANK STEEPLECHASE	1	300,000
6619	NATIONWIDE HOUSING SYSTEMS, INC.	2	9,950

WELL	OWNER	AGG2000	PUMP2000 (GPY)
6856	NATIONWIDE HOUSING SYSTEMS, INC.	2	9,950
5885	NATURAL LANDSCAPE DESIGN	1	2,700
6798	NEW LIFE CHRISTIAN RFMD CHURCH	1	40,000
7004	NEW LIGHT CHRISTIAN CNTR. CHURCH		
7005	NEW LIGHT CHRISTIAN CNTR. CHURCH		
7143	NEWLIN, MICHELLE	1	100,000
4592	NEWMAN, THOMAS C.	999	
4960	NGO, SHUN LUEN	999	
6212	NGO, TUONG	1	1,000,000
7984	NGUYEN, DAN	1	60,000
6920	NGUYEN, DAN	1	113,000
5108	NGUYEN, HUY DINH	1	3,218
7039	NGUYEN, SONNY THANH	1	600,000
6907	NICHOLS, DEBRA	1	39,100
2141	NINE BAR RANCH	999	
2149	NINE BAR RANCH	999	
2152	NINE BAR RANCH	999	
7902	NOACK MAINT. & LANDSCAPE CO,INC.	1	379,756
7017	NORTH HOUSTON MACHINE	1	30,000
6567	NORTH PARK BAPTIST CHURCH		
7850	NORTH WEST HARRIS CO. M.U.D. 36	1	-
6464	NORTHFIELD CHRISTIAN OUTREACH	1	3,000
5940	NORTHGATE FOREST COUNTRY CLUB	999	
3651	NORTHWEST AIRPORT DEV., INC.	999	
2271	NORTHWEST WATER SYSTEMS, INC.	999	
2656	NORTHWEST WATER SYSTEMS, INC.	999	
2636	NORTHWOOD FARMS JOINT VENTURE	999	
4966	NORTHWOODS PRESBYTERIAN CHURCH	1	922,600
2731	NW HARRIS CO. M.U.D. 6	999	
2550	NW HARRIS CO. M.U.D. 10	999	
7390	NW HARRIS CO. M.U.D. 21		
7736	NW HARRIS CO. M.U.D. 15		
4070	NW HARRIS CO. M.U.D. 28	999	
4111	NW HARRIS CO. M.U.D. 32	999	
4124	NW HARRIS CO. M.U.D. 32	999	
7018	NW HOU SEVENTH-DAY ADVENTIST	1	204,400
7851	OAKS DP INVESTMENTS LTD.	1	15,000
4863	OAKS PRECISION FABRICATING, INC.	1	200,000
5798	OAKWOOD HOMES CORP.		
7019	O'BRIEN, WILLIAM H.	1	100,900
7020	O'CONNOR, PATRICK T.	1	100,000
5765	OIKOSS CORPORATION	999	
7021	OMNI DATA SYSTEMS, INC.	1	119,000
7737	O'NEAL, ROBERT	1	18,250
7738	O'NEAL, ROBERT		
7959	OWNERS OF SASHER LANE	1	700,000
6645	P & B CUSTOM STEEL BUILDERS	1	100,000
7088	P K MANUFACTURING	1	180,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7960	P&M PROPERTIES	1	24,200
7961	PACE, SR., FORREST W.	1	420
6680	PAGITT INSURANCE AGENCY, JIM	1	1,865
7496	PALM HARBOR	1	6,000
7456	PALMER, WANDA	1	3,100
7792	PALUMBO, JOSEPH	1	3,000
5414	PALWASHA, INC.	1	18,200
7269	PANELMATIC TEXAS, INC.	1	91,000
5285	PARK, KWANG HO	1	198,952
3220	PARKER BROTHERS, INC.	1	100,000
4967	PARKER, ROY	1	30,000
4915	PATEL, SHOBHA	1	109,300
5596	PATTERNED CONCRETE BY RICK DAVIS		
3036	PAUL'S GREEN THUMB NURSERY	999	
5328	PAYNE, MIKE	1	280,000
7897	PEARSON, JOHN T.		
5288	PEMARCO, INC.	1	2,376
6646	PERRY, ALLINE	1	1,200,000
7538	PERRY, WILLIAM DOUG	1	864,570
5637	PETERIET, RAY	999	
5981	PETERS, JACK	1	312,000
6647	PETERSON, RALPH	1	43,000
5998	PETROLEUM WHOLESALE, INC.	1	306,684
7271	PHAM, L.	1	930,000
7087	PHILIPPINE AMERICAN BAPTIST CHUR	1	6,950
7962	PIERCE, DARRELL C.	1	3,590
5340	PIPELINE PIGGING PRODUCTS	1	78,000
7022	PLANTS FOR ALL SEASONS	1	800,000
5022	PLUMMER, ROY & LINDA	1	72,000
6822	POLYTRUST	1	160,000
7739	PONDER, JAMES	999	
4847	PORTER, RAYMOND J.	1	901,515
5271	PRECISION FLUOROCARBON, INC.	1	1,723,800
7740	PRECISION HOMES		
5983	PRECISION WELL TESTING COMPANY	1	327,600
6476	PRIME EQUIPMENT - 214	1	91,250
7378	PRIME MECHANICAL & CONST., INC.	1	20,800
2420	PROPERTIES INTERNATIONAL	999	
2421	PROPERTIES INTERNATIONAL	999	
7216	PYE MOTOR CO. INC., JOE	1	25,750
4522	QUADVEST, INC.	1	1,900,000
4521	QUADVEST, INC.	1	1,970,000
5915	QUALITY PRODUCT FINISHERS	1	435,838
5916	QUALITY PRODUCT FINISHERS	1	1,144,150
3385	RAIF, F. A.	999	
5371	RAMSHUR, J.W.	999	
7844	RANASINGHE, ANANDA	1	154,000
6570	RANCH COUNTRY MFGD. HOMES, INC.		

WELL	OWNER	AGG2000	PUMP2000 (GPY)
5527	RANESINGHE, ANANDA	1	198,500
4996	RANGER UTILITY CO.	1	1,790,400
3861	RAVENEAUX COUNTRY CLUB	999	
4337	RAVENEAUX COUNTRY CLUB	999	
5239	REALTY INCOME CORPORATION	999	
6839	REECE, DAVID	1	60,000
4253	REFINERY FABRICATING, INC.	999	
1195	RELIANT ENERGY, INCORPORATED	1	42,000
1197	RELIANT ENERGY, INCORPORATED	1	42,000
1200	RELIANT ENERGY, INCORPORATED	1	42,000
3595	RELIANT ENERGY, INCORPORATED	1	42,000
3613	RELIANT ENERGY, INCORPORATED	1	42,000
7854	REORGANIZED CHURCH OF JESUS	1	5,300
7215	RESERVE AT WOODWIND LAKES, THE	0	-
7221	RETSCO INTERNATIONAL	1	160,500
7172	REYES, JOE	1	222,512
7742	RGG MASONARY	1	7,500
5211	RHODES, CHRIS	1	144,000
6765	RHODES, HEATHER		
6086	RICHARDSON, ROGER	1	18,300
7048	RICHEY, CHARLES W.	2	189,000
7049	RICHEY, CHARLES W.	2	189,000
7273	RICHEY, E.R. "BUDDY"	1	96,000
3046	RIDGWAY INVESTMENT CORP., INC.	999	
3045	RIDGWAY, WILLIAM O.		
5303	RIEDEL, ANTHONY	1	609,970
4752	RILEY EQUIPMENT COMPANY, INC.	1	36,000
7155	RITECO SUPPLY COMPANY	1	132,000
5056	ROBERTS, REBECCA	1	-
7385	ROBINSON WATER WELL SERVICE INC.	1	500,000
6022	ROCKING BAR S RANCH	1	108,000
7640	RODGERS, DUANE	1	10,950
5994	RODRIGUEZ ROOFING	1	18,000
6121	RODRIGUEZ ROOFING	1	30,000
7175	RODRIGUEZ, FIDEL & JAN	1	10,400
6537	RODS SURVEYING	1	18,000
7086	ROEDER, HELMUTH V.	1	72,000
7540	ROGERS, DONNA J.	1	14,640
6898	ROLAND, VERNON A.	1	48,000
7274	ROSE HILL UNITED METHODISTCHURCH	1	100,000
7033	ROSEHILL VETERINARY CLINIC	1	32,000
5972	ROSEHILL VOLUNTEER FIRE DEPT.	1	93,000
5110	ROSSI, EDWARD	1	31,488
6474	ROSSMORE ENTERPRISES	1	49,400
7602	ROTHSCHILD, BRYAN	1	840
6747	ROWE, BARBARA A., DVM	1	100,000
7376	ROWE, DWAYNE	1	36,000
4859	ROYAL PROVIDENCE, INC.	1	90,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7995	RUMFOLO, ANNA M.	1	3,650
7964	RUMFOLO, JOHN W.	1	50,400
5100	RUMFOLO, LUCILLE	1	100,000
2914	RUSCHE, A. N. DIST. CO.	999	
2915	RUSCHE, A. N. DIST. CO.	999	
3202	RUSCHE, A. N. DIST. CO.	999	
7444	RUSH RETAIL CENTERS, INC.	1	-
5025	RUSSELL, BOB	1	1,000,000
6016	RUSSELL, KHAI T.		
7035	S&V SURVEYING, INC.	1	65,000
6924	SADDLEBROOK RANCH	1	200,000
2791	SAFEWAY STORES, INC.	999	
2792	SAFEWAY STORES, INC.	999	
7899	SALAZAR, PEDRO	1	800
6799	SALEM LUTHERAN CHURCH CEMETERY	1	-
5461	SANBERG, DON	999	
7025	SARGENT PLUMBING CO.	1	420,000
5098	SARTIN, JACK	1	18,000
7106	SAUNDERS, BILL	999	
7085	SBR HOMEOWNERS ASSOCIATION, INC.		
6823	SCHAUB, DAN	1	8,000
5030	SCHINAS & SCHINAS, INC.	1	-
6344	SCHULTEA JR, JOE	1	100,000
7043	SCHULTEA JR., JOE	1	400,000
7576	SCHULTZ, DAMON R. AND TRACY K.	1	100,000
6911	SCHULTZ, EARL V.	1	1,600,000
7026	SCULLY, T.F., M SCULLY/R SCULLY	1	248,832
5924	SEA SPORTS SCUBA	1	59,415
7583	SEALY, GARY	1	120,000
7855	SELENSKY, ROBERT D.	1	54,800
6912	SELZERS INVESTMENTS	1	13,107
5855	SHADY OAKS BANQUET HALL	1	480,000
7604	SHAH, RAJANJI K.		
4101	SHARONWOOD DEVELOPMENT, INC.	999	
7027	SHARP, JERRY RAY	1	1,021,850
7686	SHAW, C.E.	1	24,000
6913	SHAW, STEVE C.	1	6,000
5016	SHEIKH, AMTUL M.		
2948	SHELL OIL COMPANY	1	5,000
2874	SHELL OIL COMPANY	999	
2974	SHELL OIL COMPANY	999	
4042	SHELL OIL COMPANY	999	
4218	SHELL OIL COMPANY	999	
4375	SHELL OIL COMPANY	999	
5888	SHELL OIL PRODUCTS COMPANY	999	
7728	SHEPHERD TURK, INC.	1	288,000
6896	SHURGARD OF CHAMPIONS	999	
5256	SIDDIQUIENILOFERENUZHAT, SAYEED	1	165,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
3059	SIGMOR CORPORATION	999	
3247	SIGMOR CORPORATION	999	
3773	SILVER DOLLAR CITY, INC.	999	
5162	SILVER SEAL MEAT CO.	1	30,000
7549	SILVER, JAY	1	300,000
6923	SIZENBACH DVM, GARY L.	1	224,000
7966	SLATER, STEPHEN, E.	1	276,000
7340	SLOAN, FAYE	1	710,000
6652	SMITH ESTATE	1	10,400
6929	SMITH JR., ADRIAN LEO	1	1,068,070
3075	SMITH, B.G.		
3076	SMITH, B.G.		
7150	SMITH, DARRYL	1	283,030
4849	SMITH, WILLIAM D.	999	
6466	SNA, INC.	1	6,000
7104	SNOW PLUMBING SUPPLY, INC.	1	79,582
7629	SOUTHERN REFRESHMENT SERVICES	1	18,000
6736	SOUTHLAND CORP., THE	999	
6914	SOUTHWEST ENERGY METALS, INC.	1	4,400
3185	SOUTHWEST METAL FABRICATORS, INC	999	
5854	SOUTHWEST UTILITIES, INC.	1	1,364,000
2375	SOUTHWEST UTILITIES, INC.	999	
2892	SOUTHWESTERN BELL TELEPHONE CO.	1	18,900
2889	SOUTHWESTERN BELL TELEPHONE CO.	1	22,680
2890	SOUTHWESTERN BELL TELEPHONE CO.	1	294,840
3387	SOUTHWESTERN BELL TELEPHONE CO.	1	937,440
2887	SOUTHWESTERN BELL TELEPHONE CO.	999	
2888	SOUTHWESTERN BELL TELEPHONE CO.	999	
2895	SOUTHWESTERN BELL TELEPHONE CO.	999	
2896	SOUTHWESTERN BELL TELEPHONE CO.	999	
2897	SOUTHWESTERN BELL TELEPHONE CO.	999	
3158	SOUTHWESTERN BELL TELEPHONE CO.	999	
6942	SOUTHWINDS BAPTIST CHURCH	1	231,500
6941	SOUTHWINDS BAPTIST CHURCH	1	500,000
7028	SOVEREIGN GRACE BAPTIST CHURCH	1	1,395,000
5339	SPECIALTY OIL TOOLS	1	196,000
7127	SPINKS, CHARLOTTE		
6949	SPRING BIBLE CHURCH	1	77,604
4389	SPRING CENTER, INC.	1	264,000
7178	SPRING CHURCH OF CHRIST	1	36,000
7229	SPRING CREEK CONGREGATION OF/	1	15,750
7858	SPRING CYPRESS AUTO	1	91,250
5111	SPRING CYPRESS PRESBYTERIAN CH.	1	540,000
5401	SPRING CYPRESS RETAIL, INC.		
4137	SPRING CYPRESS ROAD M.U.D./	999	
6002	SPRING CYPRESS RV	1	14,400
5246	SPRING CYPRESS WATER CORPORATION	999	
7128	SPRING GARDENS NURSERY	999	

WELL	OWNER	AGG2000	PUMP2000 (GPY)
3477	SPRING I.S.D.	1	707,500
2658	SPRING I.S.D.	999	
2659	SPRING I.S.D.	999	
2660	SPRING I.S.D.	999	
2662	SPRING I.S.D.	999	
2663	SPRING I.S.D.	999	
3763	SPRING I.S.D.	999	
3807	SPRING I.S.D.	999	
5118	SPRING LODGING, INC.	1	1,825,000
6439	SPRING MEMORIAL BAPTIST CHURCH	1	1,000
6470	SPRING NATURE - RAUL ARGUETA	1	136,000
3096	SPRING NURSERY	999	
3097	SPRING NURSERY	999	
5036	SPRING TABERNACLE	1	500,000
5832	SPRING TIME HOUSE, THE, INC.	999	
7922	SPRING VOLUNTEER FIRE ASSOC.	1	20,000
5445	ST. DUNSTANS EPISCOPAL CHURCH	1	1,276,568
6836	ST. EDWARDS CATHOLIC CHURCH	1	3,400
6837	ST. EDWARDS CATHOLIC CHURCH	1	500,000
5027	ST. JOHN LUTHERAN	1	1,931,000
5504	ST. SAVA SERBIAN ORTHODOX CHURCH	1	202,000
5028	ST. TIMOTHY LUTHERAN CHURCH	1	255,000
5037	STALLONES	999	
5275	STARK, DALE	1	300,000
7846	STATURE CONSTRUCTION		
7631	STEEL CORPORATION OF TEXAS	1	300,000
7046	STEINBACHER, OWEN J.	1	6,000
6916	STEVENS, CHARLES R.	1	120,000
7107	STICK, LARRY	1	15,600
6943	STOCKTON, JR., EDWIN J.	1	1,000,000
6553	STORAGE U.S.A	1	180,000
6287	STRACK ROAD STORAGE	1	1,021,589
7034	STRACK, CARLTON	1	-
2673	STRAKE FND. & '75 REAL EST. TR.	1	60,000
2674	STRAKE FND. & '75 REAL EST. TR.	999	
2002	SUBURBAN UTILITY COMPANY		
2003	SUBURBAN UTILITY COMPANY		
5600	SUPERIOR DERRICK SERVICES, INC.	1	80,600
5163	SUPERIOR DERRICK SERVICES, INC.	999	
7868	SUSTAIRE, W.J. & RUBY	1	2,500
3756	SWACO DIVISION/DRESSER IND.	999	
3757	SWACO DIVISION/DRESSER IND.	999	
7687	T.A.S CONSTRUCTION, INC.	1	46,266
7130	TACHO, INC.	1	146,100
7930	TAGGART, JOHN	999	
2176	TALL PINES UTILITY/K & L UTILITY	999	
2402	TANDEM ENERGY CORPORATION	2	650,200
3297	TANDEM ENERGY CORPORATION	2	650,200

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7154	TAVERAS, MELIDA	1	240,000
7108	TAYLOR, GLENN A.	1	8,500
7228	TCP/GSL INDUSTRIAL PARTNERS	1	180,000
2527	TEAS NURSERY COMPANY, INC.	1	23,874
2528	TEAS NURSERY COMPANY, INC.	999	
7179	TEBCO SERVICES, INC.	1	-
6946	TEE WOOD DRIVING RANGE		
2404	TEJAS GAS PIPELINE COMPANY	1	81,930
5819	TELGE ROAD MATERIALS	1	23,400
6962	TERPSTRA, PETER S.	1	3,000
6994	TERPSTRA, PETER S.	1	3,000
2287	TEXACO, INC.	999	
2292	TEXACO, INC.	999	
2297	TEXACO, INC.	999	
3176	TEXACO, INC.	999	
3655	TEXACO, INC.	999	
4686	TEXAS ARAI, INC.	1	434,100
7859	TEXAS FIRST NATIONAL BANK	1	36,400
3237	TEXAS LIBERTY CONCRETE, INC.	999	
5797	TEXAS MANUFACTURED HOMES	1	7,100
7129	TEXAS MANUFACTURED HOMES	999	
5164	TEX-FAB, INC.	1	11,260
7066	THEIS, A.W.	1	150,000
6752	THEISS PLUMBING CO., INC.	1	100,000
5042	THEISS SUBDIVISION, ALTON H.	1	1,381,800
6928	THEISS, KARL R.	1	850,000
5165	THERMAL CORP.	1	173,000
7810	THOMAS REALTY, PATRICK	1	29,760
6764	THOMPSON, BARBARA	1	6,000
6753	THORNTON, GARY	1	5,000
3276	THREE LAKES M.U.D.	999	
5060	TILLES, TINA	1	100,000
2071	TIMBERLAKE I.D.	999	
5858	TIME SAVER GROCERY	1	336,067
7195	TITAN INDUSTRIES	1	73,800
7918	TLC AMERICA		
7632	TOBIAS, JOHN	1	14,400
5061	TOMBALL BOWLING CENTER		
3388	TOMBALL COUNTRY CLUB	1	817,000
2657	TOMBALL I.S.D.	999	
5394	TOMBALL MOBILE HOME SALES, INC.		
7919	TOMBALL VFW POST 2427	1	48,000
7989	TOMBALL, CITY OF	1	50,000
1935	TOMBALL, CITY OF	999	
3559	TOMBALL, CITY OF	999	
7860	TOMCZSZYN, GRADY P.	1	50,000
7450	TOMPKINS, STATON	1	41,600
5831	TOM'S TREE SERVICE	1	10,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7931	TOP LINE STABLES	1	25,000
6207	TOPPER SALES, INC.	1	-
	TOTALS	221270	119,530,204
4161	TOWER OAK BEND WATER SUPPLY	999	
5044	TOWER OAK CENTER	999	
4216	TOWER OAKS PLAZA M.U.D.	999	
7146	TOWN & COUNTRY BRICK & SUPPLY	1	-
7689	TOWNLEY, RANDALL	1	100,000
5436	TRACY ANIMAL HOSPITAL		
5922	TRAW, JIM	1	33,500
4288	TREELINE GOLF CLUB, INC.	1	288,500
3838	TREELINE GOLF CLUB, INC.	999	
5329	TRINITY LUTHERAN CHURCH	1	470,924
7124	TRINITY LUTHERAN CHURCH CEMETERY	1	8,833
7861	TRINITY STEEL FABRICATORS, INC.	1	91,000
6441	TRUMP MACHINE WORKS	1	8,400
1729	TRUNKLINE GAS COMPANY	2	382,388
5177	TRUNKLINE GAS COMPANY	2	382,388
1728	TRUNKLINE GAS COMPANY	999	
7051	TURK BROTHERS BUILDING	1	150,000
7050	TURK BROTHERS BUILDING	1	200,000
7036	TURNER, R. SCOTT	1	300,000
4870	TURNER, STAN & MARILEE	1	-
5316	TURNER, STAN & MARILEE	2	1,647,400
5317	TURNER, STAN & MARILEE	2	1,647,400
7037	TUTTLE, CLEMONS	1	16,530
3307	U. S. LAND DEVELOPMENT COMPANY	999	
3562	U. S. LAND DEVELOPMENT COMPANY	999	
6452	U.S.A. DREAMLAND, INC.	999	
7923	UC5, LTD.	1	315,000
7986	UNITED CHURCH OF GOD HOUSTON NO.	1	48,427
5473	UNITED MINI WAREHOUSE, INC.	1	200,000
7643	UNITED PENTECOSTAL CHURCH	1	20,000
6655	UNITED STATES POSTAL SERVICE	1	1,956,400
5341	UNIVERSAL DISTRIBUTING	1	480,000
2059	UTOTEM DIV. OF FAIRMONT FOODS	999	
6844	VEROT, ROGER	1	14,050
5119	VFW POST 8905	1	16,728
7152	VON HEDEMANN, CAROLE	1	500,000
3994	W. HARRIS CO. M.U.D. 1	999	
5775	W.S. SYSTEMS	1	1,050
6758	WACHSMAN, MARVIN	1	100,000
6827	WALKER JR., J.F.	1	9,000
5067	WALKER, A.W.	1	200,000
5894	WALLER INDEPENDENT SCHOOL DIST.	999	
7125	WALLS, JANE	1	-
4730	WAL-MART STORES, INC.		
7044	WARREN III, A.J.	1	7,800

WELL	OWNER	AGG2000	PUMP2000 (GPY)
7145	WARREN, J.N.	1	288,000
7144	WARREN, J.N.	1	360,000
5536	WAT BUDDHAVAS OF HOUSTON	1	25,125
7608	WATTS, WILLIAM H.	1	39,500
5082	WBC COLLECTIONS	1	1,000,000
5931	WDBCM CORPORATION	1	3,650
7232	WEATHERFORD EXCAVATION	1	12,000
2435	WEINGARTEN REALTY, INC.	999	
2479	WEINGARTEN, INC., J.	999	
2480	WEINGARTEN, INC., J.	999	
7767	WEISER AIR PARK INC.	1	36,000
5543	WELCH, MAX	1	750,000
5880	WELD-TECH ENGINEERING	1	124,500
5807	WELL HEAD WELDERS		
4502	WHATABURGER, INC.	999	
5292	WHEATON DETAILING SERVICE, INC.	1	990
7987	WHITAKER, ROBERT	1	46,000
7344	WHITE MERCHANDISING, RALPH	1	500,000
5566	WHITE OAK ESTATES LTD.	1	-
4011	WHITE OAK/1960 M.U.D.	999	
5243	WHITE, BRUNHILDE	1	12,000
5725	WICKANDER, NELS	1	300,000
5076	WICKERSHAM, W.D.	1	365,000
6754	WILD WELL CONTROL, INC.	1	15,000
6517	WILKERSON, JAMES, TRUSTEE	1	24,000
3987	WILKINSON, IV, THOMAS B.	999	
7187	WILKINSON, JAMES	1	3,000
4851	WILLIAMS BROTHERS CONST CO., INC	1	-
4852	WILLIAMS BROTHERS CONST CO., INC	1	433,200
4471	WILLIAMS BROTHERS CONST CO., INC	999	
6755	WILLIAMS, LARRY G.	1	6,240
7353	WILLIAMS, R. BRYAN	1	456,059
5073	WILLOW LAKE HOMEOWNERS ASSOC.		
7188	WILLOWBROOK ASSEMBLY OF GOD	1	61,000
5357	WILSON, JIM D.	1	60,000
7869	WINDFERN REALTY CO. L.P.	1	117,500
5120	WINDWOOD WATER SYSTEM, INC.		
5121	WINDWOOD WATER SYSTEM, INC.	999	
7182	WIRT, FREDDY	1	7,200
2675	WOODLANDS LAND DEV. CO. L.P.,THE	1	-
4441	WOOTEN, ANDY	1	6,260
1695	WORTHAM ESTATE, GUS	999	
3416	Y.M.C.A. OF GREATER HOUSTON AREA	1	315,000
4547	Y.M.C.A. OF GREATER HOUSTON AREA	1	600,620
4720	Y.M.C.A. OF GREATER HOUSTON AREA	1	757,946
4676	Y.M.C.A. OF GREATER HOUSTON AREA	1	1,577,460
5187	ZAPATA, MERIH ORER	1	317,424

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
6331	WHIKEHART, BILL & JOE ANN	1	2,000,000
7169	LDS CHURCH-HOUSTON TEXAS TEMPLE	1	2,022,300
5995	BEAZER HOMES	1	2,142,400
4261	HARRIS COUNTY	1	2,207,300
4931	CYPRESS BIBLE CHURCH	1	2,242,800
4325	HARRIS COUNTY	1	2,283,700
4525	HARRIS COUNTY	1	2,288,500
4299	AQUASOURCE, INC.	1	2,337,000
3759	CHAMP'S WATER COMPANY	1	2,347,000
7270	BERGERON, HALE	1	2,400,000
4342	HMW WATER SUPPLY CORP	1	2,402,000
7065	NEEDHAM, BERTON LONNIE	1	2,500,000
6842	HAAS TOYOTA, FRED	1	2,500,563
7029	TOMBALL I.S.D.	1	2,626,900
7874	D&S SERVICES	1	2,754,000
6910	ROSEWOOD HILL HOMEOWNERS ASSOC.	1	2,808,790
5369	WILLOW BRIDGE HOMEOWNERS ASSOC.	1	2,886,800
4126	CAMPBELL READY MIX, L.P.	1	2,964,236
5226	SALEM LUTHERAN SCHOOL	1	3,000,000
7094	LONGBOTHAM, ANN H.	1	3,087,246
5144	SPRING GARDENS NURSERY	1	3,306,700
3681	WILLOW CREEK GOLF CLUB, INC.	1	3,318,000
3719	TIFCO, INC.	1	3,349,000
4728	KWIK-KOPY CORPORATION	1	3,433,800
7076	CALE'S CAR WASH & LUBE	1	3,609,000
5679	NEWMAN, THOMAS C.	1	3,621,300
3932	HMW WATER SUPPLY CORP	1	3,646,000
4669	HOLTKAMP, INC., WAYNE	1	3,752,113
4573	TXI OPERATIONS, L.P.	1	3,810,000
3266	AQUASOURCE, INC.	1	3,848,000
3503	HMW WATER SUPPLY CORP	1	3,988,000
3652	NORTHWEST AIRPORT MGMT., INC.	1	3,992,100
3523	HARRIS COUNTY	1	4,127,307
5244	CBI CONSTRUCTORS, INC.	1	4,411,400
3486	AQUASOURCE, INC.	1	4,530,000
3670	AQUASOURCE, INC.	1	4,585,000
4937	MOORPARK VILLAGE, INC.	1	4,611,600
5116	CHAMPIONS LAKESIDE CLUB	1	4,629,400
6607	SPRING CYPRESS WATER SUPPLY CORP	1	4,704,000
5018	KLEIN UNITED METHODIST CHURCH	1	4,742,000
4045	DUBROOK, INC.	1	4,743,074
5948	LAKES OF ROSEHILL HOA	1	4,776,700
3668	AQUASOURCE, INC.	1	4,902,000
3775	AQUASOURCE, INC.	1	4,914,000
2935	ALDINE I.S.D.	1	4,965,800
5358	LAKEWOOD GROVE ASSOC., LTD.	1	4,973,500
4930	TELGE MANOR MOBILE HOME PARK	1	4,996,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 2 OR MORE GW WELLS		
3820	RELIANT ENERGY, INCORPORATED	2	2,543,800
3821	RELIANT ENERGY, INCORPORATED	2	2,543,800
5640	SPRING BAPTIST CHURCH	2	2,560,244
5641	SPRING BAPTIST CHURCH	2	2,560,244
4452	CW-MHP, LTD.	2	2,680,260
4453	CW-MHP, LTD.	2	2,680,260
4390	SPRING CENTER, INC.	2	2,866,000
4391	SPRING CENTER, INC.	2	2,866,000
5319	SPRING KLEIN SPORTS ASSOCIATION	2	3,242,000
5320	SPRING KLEIN SPORTS ASSOCIATION	2	3,242,000
3505	HMW SPECIAL UTILITY DISTRICT	2	3,898,000
3968	HMW SPECIAL UTILITY DISTRICT	2	3,898,000
4465	RCW NURSERIES, INC.	2	3,962,600
4466	RCW NURSERIES, INC.	2	3,962,600
3322	WINTERHAVEN HOMEOWNERS ASSOC.	2	4,113,801
3323	WINTERHAVEN HOMEOWNERS ASSOC.	2	4,113,801
1923	AQUASOURCE, INC.	2	4,453,000
1924	AQUASOURCE, INC.	2	4,453,000
2734	BOY'S COUNTRY OF HOUSTON, INC.	2	4,606,769
2735	BOY'S COUNTRY OF HOUSTON, INC.	2	4,606,769
2661	SPRING I.S.D.	3	2,612,700
3261	SPRING I.S.D.	3	2,612,700
7186	SPRING I.S.D.	3	2,612,700
4112	CAMPBELL READY MIX, L.P.	3	4,929,606
4113	CAMPBELL READY MIX, L.P.	3	4,929,606
5232	CAMPBELL READY MIX, L.P.	3	4,929,606

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
5049	TOM, JOHN W. SR.	1	5,000,004
5632	KLEIN MEMORIAL PARK & MAUSOLEUM	1	5,028,400
4769	TREES & PLANTS, INC.	1	5,191,100
7230	STERLING GATE ESTATES	1	5,333,601
4687	TEXAS ARAI, INC.	1	5,569,500
4597	C & P UTILITIES, INC.	1	5,683,000
2440	SOUTHWEST UTILITIES, INC.	1	5,688,000
4925	GILBERT, ROBERT C.	1	5,719,000
6223	ENVIRO-GROW NURSERY	1	5,850,000
4596	C & P UTILITIES, INC.	1	5,885,000
2415	CHAMPIONS GLEN, L.P.	1	6,000,820
4832	AMBERWOOD UTILITY CO.	1	6,074,000
7023	RAUB, VAL	1	6,142,360
2617	COMPAQ COMPUTER CORPORATION	1	6,325,000
3517	KLEIN I.S.D.	1	6,417,000
4220	HMW SPECIAL UTILITY DISTRICT	1	6,422,000
3796	AQUASOURCE, INC.	1	6,525,000
6838	WOODWIND LAKES HOMEOWNERS, ASSC	1	6,745,800
5588	JUST TREES INC.	1	7,007,900
7665	BEAZER HOMES	1	7,187,000
4414	KWIK-KOPY CORPORATION	1	7,369,800
6671	JUST TREES INC.	1	7,465,600
	OWNERS WITH 2 OR MORE GW WELLS		
4046	DUBROOK, INC.	2	5,242,874
7675	FRONTIER MATERIALS	2	5,242,874
2034	CEMEX USA	2	5,255,650
7223	CEMEX USA	2	5,255,650
5535	I.Q. PRODUCTS COMPANY	2	5,318,150
6547	I.Q. PRODUCTS COMPANY	2	5,318,150
4437	C & P UTILITIES, INC.	2	5,853,000
4438	C & P UTILITIES, INC.	2	5,853,000
5351	ALLIED CONCRETE MATERIAL, INC.	2	6,356,468
6952	ALLIED CONCRETE MATERIAL, INC.	2	6,356,468
4591	NEWMAN, THOMAS C.	2	6,446,010
7105	NEWMAN, THOMAS C.	2	6,446,010
2670	NORTHWEST AIRPORT MGMT., LP	2	6,654,453
2672	NORTHWEST AIRPORT MGMT., LP	2	6,654,453
3334	AQUASOURCE, INC.	2	6,764,000
3335	AQUASOURCE, INC.	2	6,764,000
3509	HMW SPECIAL UTILITY DISTRICT	2	6,965,000
4077	HMW SPECIAL UTILITY DISTRICT	2	6,965,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
5622	BUSSELL, CRAIG	1	7,700,000
7837	LODGE AT CYPRESSWOOD L.P.	1	7,900,100
7615	AQUASOURCE DEVELOPMENT CO.	1	8,029,000
6062	CASTLE COUNTRY HOMES, INC.	1	8,242,000
5655	LAKE OWNERS ASSOCIATION	1	8,297,000
3947	HARRIS COUNTY	1	8,656,200
4313	HMW SPECIAL UTILITY DISTRICT	1	8,724,000
6867	PITCAIRN WATER SUPPLY	1	8,924,000
4298	COMPAQ COMPUTER CORP.	1	8,962,700
4192	HARRIS COUNTY	1	9,000,400
4677	JAEGER, KENNETH V.	1	9,292,000
4324	HARRIS COUNTY	1	9,629,600
1730	TRUNKLINE GAS COMPANY	1	9,760,200
6052	EJDS, INC.	1	9,976,400
	OWNERS WITH 2 OR MORE GW WELLS		
3667	HMW SPECIAL UTILITY DISTRICT	2	8,365,000
4312	HMW SPECIAL UTILITY DISTRICT	2	8,365,000
4554	HMW SPECIAL UTILITY DISTRICT	2	8,724,000
4555	HMW SPECIAL UTILITY DISTRICT	2	8,724,000
4002	HMW SPECIAL UTILITY DISTRICT	2	9,561,000
4315	HMW SPECIAL UTILITY DISTRICT	2	9,561,000
3510	HMW SPECIAL UTILITY DISTRICT	2	9,602,000
4183	HMW SPECIAL UTILITY DISTRICT	2	9,602,000
1359	JERSEY VILLAGE, CITY OF	3	8,264,000
1361	JERSEY VILLAGE, CITY OF	3	8,264,000
8221	JERSEY VILLAGE, CITY OF	3	8,264,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
7038	WALLER I.S.D.	1	10,027,700
6709	ASHTON HOUSTON RESIDENTIAL, LLC	1	10,599,000
3350	ALBURY MANOR UTILITY CO., INC.	1	11,449,000
2202	PILCHERS OXFORD GROUP	1	11,827,000
3355	TOMBALL COUNTRY CLUB	1	12,126,400
3089	HOE WATER SUPPLY CORPORATION	1	13,075,500
3641	AQUASOURCE, INC.	1	14,071,000
4778	WOODWIND LAKES HOMEOWNERS, ASSC	2	10,164,500
5335	WOODWIND LAKES HOMEOWNERS, ASSC	2	10,164,500
2177	TALL PINES UTILITY/K & L UTILITY	2	10,864,000
5448	TALL PINES UTILITY/K & L UTILITY	2	10,864,000
4282	SCOTT, L. W., JR.	2	10,945,200
4283	SCOTT, L. W., JR.	2	10,945,200
2856	CEMEX USA	2	11,433,200
2857	CEMEX USA	2	11,433,200
6407	FUZZEL FARM, RILEY	2	11,788,500
6419	FUZZEL, RILEY FARM	2	11,788,500
3669	AQUASOURCE, INC.	2	12,207,000
5736	AQUASOURCE, INC.	2	12,207,000
5833	S C UTILITIES, INC.	2	12,536,000
6498	S C UTILITIES, INC.	2	12,536,000
1844	CONSUMERS WATER CORPORATION	2	13,906,000
4009	CONSUMERS WATER CORPORATION	2	13,906,000
3895	CHASEWOOD LAND VENTURE	2	14,695,000
3896	CHASEWOOD LAND VENTURE	2	14,695,000
3544	AQUASOURCE, INC.	2	14,793,000
3593	AQUASOURCE, INC.	2	14,793,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
4489	LAKES OF CYPRESS HILL HOMEOWNERS	1	21,531,400
5477	FURLONG LTD.	1	21,961,769
3238	TOWER OAK BEND WATER SUPPLY	1	22,272,000
7903	R CREEK LP	1	23,831,600
2952	ENCHANTED VALLEY WATER SUPPLY	1	25,223,000
8092	CHAMPIONS GLEN LP	1	25,831,000
5878	LAKES OF FAIRFIELD H.O.A., THE	1	26,754,000
1851	ADAMS RANCHES, INC., BUD	1	26,870,000
5883	LAKES OF FAIRFIELD H.O.A., THE	1	28,774,100
4103	PINEWOOD PLACE, INC.	1	28,976,880
3608	C & P UTILITIES, INC.	1	29,614,000
	OWNERS WITH 2 OR MORE GW WELLS		
4373	WAYNEWOOD PLACE CIVIC CLUB, INC.	2	15,236,000
4374	WAYNEWOOD PLACE CIVIC CLUB, INC.	2	15,236,000
3875	HMW SPECIAL UTILITY DISTRICT	2	16,522,000
3969	HMW SPECIAL UTILITY DISTRICT	2	16,522,000
2949	GRANTWOOD CIVIC CLUB	3	18,072,000
2950	GRANTWOOD CIVIC CLUB	3	18,072,000
3368	GRANTWOOD CIVIC CLUB	3	18,072,000
3960	HMW SPECIAL UTILITY DISTRICT	2	18,203,000
4102	HMW SPECIAL UTILITY DISTRICT	2	18,203,000
3874	HMW SPECIAL UTILITY DISTRICT	2	18,657,000
5449	HMW SPECIAL UTILITY DISTRICT	2	18,657,000
2272	NORTHWEST WATER SYSTEMS, INC.	3	18,709,100
3554	NORTHWEST WATER SYSTEMS, INC.	3	18,709,100
4568	NORTHWEST WATER SYSTEMS, INC.	3	18,709,100
2907	CY-FOREST SERVICE ASSOCIATION	4	21,760,200
2908	CY-FOREST SERVICE ASSOCIATION	4	21,760,200
3195	CY-FOREST SERVICE ASSOCIATION	4	21,760,200
3769	CY-FOREST SERVICE ASSOCIATION	4	21,760,200
5816	AQUASOURCE UTILITY, INC.	2	23,436,000
6909	AQUASOURCE UTILITY, INC.	2	23,436,000
1836	CONSUMERS WATER CORPORATION	2	26,002,000
4008	CONSUMERS WATER CORPORATION	2	26,002,000
6741	INLINE DEVELOPMENT CORP.	2	27,062,000
7531	INLINE DEVELOPMENT CORP.	2	27,062,000
3263	BAYER WATER SYSTEM	2	27,790,900
3264	BAYER WATER SYSTEM	2	27,790,900

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
2333	GLEANNLOCH FARMS COMMUNITY ASSOC	1	31,933,000
4560	W. HARRIS CO. M.U.D. 21	1	35,119,000
3839	TREELINE GOLF CLUB, INC.	1	36,934,100
4567	HOUSTON RACE PARK, SAM	1	37,861,800
8156	WILLOW CREEK GOLF CLUB	1	38,444,100
6606	ATASCOCITA MANAGEMENT CORP.	1	39,607,800
3418	COMPAQ COMPUTER CORP.	1	46,610,000
2065	ENCANTO REAL U.D.	1	47,794,000
3386	AQUASOURCE UTILITY, INC.	1	49,022,000
6164	HARRIS CO. M.U.D. 280	1	49,056,000
3791	SIX FLAGS SPLASHTOWN L.P.	1	53,536,000
3380	RAVENEAUX COUNTRY CLUB	1	55,945,600
6922	WINDERMERE INTERESTS LTD.	1	56,374,000
3726	HARRIS CO. M.U.D. 233	1	56,594,000
4069	HARRIS CO. M.U.D. 275	1	58,845,000
4172	CYPRESSWOOD LTD.	1	68,980,000
	OWNERS WITH 2 OR MORE GW WELLS		
3691	C & P UTILITIES, INC.	2	31,414,000
3692	C & P UTILITIES, INC.	2	31,414,000
3424	NW HARRIS CO. M.U.D. 19	2	31,719,000
8267	NW HARRIS CO. M.U.D. 19	2	31,719,000
7374	JERSEY LAKE HOMEOWNERS ASSOC.	2	34,120,652
7375	JERSEY LAKE HOMEOWNERS ASSOC.	2	34,120,652
3556	SPRING WEST M.U.D.	2	34,554,000
7222	SPRING WEST M.U.D.	2	34,554,000
5406	JOHNSTON UTILITIES, INC.	2	37,766,000
6848	JOHNSTON UTILITIES, INC.	2	37,766,000
4556	HMW SPECIAL UTILITY DISTRICT	3	44,022,000
4557	HMW SPECIAL UTILITY DISTRICT	3	44,022,000
5231	HMW SPECIAL UTILITY DISTRICT	3	44,022,000
4003	NORTHGATE CROSSING M.U.D. 2	2	49,731,000
7460	NORTHGATE CROSSING M.U.D. 2	2	49,731,000
3508	HMW SPECIAL UTILITY DISTRICT	2	51,726,000
3512	HMW SPECIAL UTILITY DISTRICT	2	51,726,000
3771	NW HARRIS CO. M.U.D. 24	2	54,257,000
3797	NW HARRIS CO. M.U.D. 24	2	54,257,000
5946	AQUASOURCE UTILITY, INC.	3	55,312,000
5947	AQUASOURCE UTILITY, INC.	3	55,312,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
4172	CYPRESSWOOD LTD.	1	68,980,000
5907	CYPRESSWOOD LTD.	1	70,209,000
3941	HARRIS CO. M.U.D. 230	1	71,109,000
1860	LOUETTA ROAD U.D.	1	76,800,000
3751	HARRIS CO. M.U.D. 191	1	81,228,000
3296	WHITE OAK BEND M.U.D.	1	85,562,000
3461	HARRIS CO. M.U.D. 170	1	86,856,000
4746	NATIONAL GOLF PROPERTIES, INC.	1	88,652,000
2536	GRANT ROAD P.U.D.	1	89,539,000
	OWNERS WITH 2 OR MORE GW WELLS		
3356	HOMETOWN TIMBERCREST, L.P.	2	61,011,000
7655	HOMETOWN TIMBERCREST, L.P.	2	61,011,000
1593	CHAMPIONS GOLF CLUB, INC.	2	65,140,000
1594	CHAMPIONS GOLF CLUB, INC.	2	65,140,000
4540	HARRIS CO. M.U.D. 368	2	72,500,000
7381	HARRIS CO. M.U.D. 368	2	72,500,000
1868	DOWDELL P.U.D.	2	75,541,000
3777	DOWDELL P.U.D.	2	75,541,000
7734	LOUETTA ROAD U.D.	2	76,800,000
1662	HARRIS CO. W.C.&I.D. 113	2	77,105,000
3937	HARRIS CO. W.C.&I.D. 113	2	77,105,000
3999	NW HARRIS CO. M.U.D. 32	2	82,071,000
6807	NW HARRIS CO. M.U.D. 32	2	82,071,000
1916	BAMMEL FOREST UTILITY COMPANY	2	83,009,000
4098	BAMMEL FOREST UTILITY COMPANY	2	83,009,000
3164	NORTHWEST FREEWAY M.U.D.	2	88,433,000
3165	NORTHWEST FREEWAY M.U.D.	2	88,433,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
2170	SHASLA P.U.D.	1	95,646,000
3867	HARRIS CO. M.U.D. 202	1	98,864,000
7171	PINELAKES LIMITED PARTNERSHIP	1	99,980,000
3605	NW HARRIS CO. M.U.D. 6	1	101,058,000
1615	HARRIS CO. W.C.&I.D. 136	1	107,077,000
3910	NORTHGATE FOREST COUNTRY CLUB	1	107,656,500
2970	HARRIS CO. M.U.D. 104	1	108,503,000
1930	POST WOOD M.U.D.	1	110,363,000
3269	NW HARRIS CO. M.U.D. 15	1	110,379,000
1857	HUNTERS GLEN M.U.D.	1	111,558,000
5828	HARRIS CO. M.U.D. 367	1	112,425,000
	OWNERS WITH 2 OR MORE GW WELLS		
1829	HARRIS CO. W.C.&I.D. 99	2	107,095,000
3111	HARRIS CO. W.C.&I.D. 99	2	107,095,000
2741	CORNELIUS, INC.	7	107,326,846
4104	CORNELIUS, INC.	7	107,326,846
4105	CORNELIUS, INC.	7	107,326,846
4138	CORNELIUS, INC.	7	107,326,846
4165	CORNELIUS, INC.	7	107,326,846
4660	CORNELIUS, INC.	7	107,326,846
5434	CORNELIUS, INC.	7	107,326,846
3234	NW HARRIS CO. M.U.D. 10	2	117,063,000
3634	NW HARRIS CO. M.U.D. 10	2	117,063,000
1724	CANDLELIGHT SERVICE CO., INC.	3	119,734,000
1726	CANDLELIGHT SERVICE CO., INC.	3	119,734,000
3921	CANDLELIGHT SERVICE CO., INC.	3	119,734,000
1545	MEMORIAL HILLS U.D.	2	119,885,000
4286	MEMORIAL HILLS U.D.	2	119,885,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
	OWNERS WITH 1 GW WELL		
1759	HARRIS CO. M.U.D. 25	1	131,998,000
3805	REID ROAD M.U.D. 2	1	140,347,000
3635	NW HARRIS CO. M.U.D. 20	1	144,752,000
4916	DOVE MEADOWS M.U.D.	1	145,000,000
7290	CYPRESS LAKES GOLF COURSE	1	145,696,000
2546	HARRIS CO. M.U.D. 44	1	150,487,000
4099	BAMMEL U.D.	1	151,825,000
4058	TERRANOVA WEST M.U.D.	1	151,957,000
3944	NW HARRIS CO. M.U.D. 29	1	152,401,000
7598	GLEANNLOCH GOLF CLUB, L.P.	1	152,737,920
1852	HARRIS CO. M.U.D. 43	1	161,718,000
3478	HARRIS CO. M.U.D. 16	1	178,205,000
4412	HARRIS CO. M.U.D. 222	1	181,189,000
3956	LOUETTA NORTH P.U.D.	1	182,428,000
3735	HARRIS CO. M.U.D. 69	1	183,930,000
1631	TATTOR ROAD M.U.D.	1	191,470,000
3390	W. HARRIS CO. M.U.D. 9	1	246,294,000
4657	HARRIS CO. M.U.D. 360/PILGRIM	1	276,514,000
	OWNERS WITH 2 OR MORE GW WELLS		
1600	INVERNESS FOREST I.D.	3	120,714,000
1601	INVERNESS FOREST I.D.	3	120,714,000
3962	INVERNESS FOREST I.D.	3	120,714,000
5963	HARRIS CO. M.U.D. 365	2	122,090,000
8303	HARRIS CO. M.U.D. 365	2	122,090,000
3566	CYPRESS HILL M.U.D. 1	3	126,041,000
5330	CYPRESS HILL M.U.D. 1	3	126,041,000
7774	CYPRESS HILL M.U.D. 1	3	126,041,000
2175	HARRIS CO. M.U.D. 1	2	134,334,000
5897	HARRIS CO. M.U.D. 1	2	134,334,000
1664	SPRING CREEK FOREST P.U.D.	2	164,001,000
4241	SPRING CREEK FOREST P.U.D.	2	164,001,000
1537	HARRIS CO. W.C.&I.D. 91	2	181,319,000
1538	HARRIS CO. W.C.&I.D. 91	2	181,319,000
2424	CHARTERWOOD M.U.D.	2	182,462,000
3529	CHARTERWOOD M.U.D.	2	182,462,000
3383	TIMBERLAKE I.D.	2	183,552,000
5616	TIMBERLAKE I.D.	2	183,552,000
2973	MILLS ROAD M.U.D.	2	198,934,000
4010	MILLS ROAD M.U.D.	2	198,934,000
2682	NORTH PARK P.U.D.	2	201,356,000
3527	NORTH PARK P.U.D.	2	201,356,000
1867	HEATHERLOCH M.U.D.	2	217,864,000
4508	HEATHERLOCH M.U.D.	2	217,864,000
1727	KLEINWOOD M.U.D.	2	218,534,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
4413	KLEINWOOD M.U.D.	2	218,534,000
4059	HARRIS CO. M.U.D. 286	2	219,924,000
4297	HARRIS CO. M.U.D. 286	2	219,924,000
1515	HARRIS CO. M.U.D. 26	2	221,756,000
3864	HARRIS CO. M.U.D. 26	2	221,756,000
1544	PRESTONWOOD FOREST U.D.	2	230,170,000
3293	PRESTONWOOD FOREST U.D.	2	230,170,000
1793	HARRIS CO. M.U.D. 82	2	231,702,000
1794	HARRIS CO. M.U.D. 82	2	231,702,000
1606	CYPRESS CREEK U.D.	3	232,952,700
1607	CYPRESS CREEK U.D.	3	232,952,700
3824	CYPRESS CREEK U.D.	3	232,952,700
2609	NW HARRIS CO. M.U.D. 5	2	235,040,000
7441	NW HARRIS CO. M.U.D. 5	2	235,040,000
3448	NW HARRIS CO. M.U.D. 21	2	241,399,000
4178	NW HARRIS CO. M.U.D. 21	2	241,399,000
3229	BILMA P.U.D.	2	248,546,000
7080	BILMA P.U.D.	2	248,546,000
2183	HARRIS CO. W.C.&I.D. 119	2	250,248,000
4091	HARRIS CO. W.C.&I.D. 119	2	250,248,000
1854	FOUNTAINHEAD M.U.D.	2	251,882,000
3428	EMERALD FOREST U.D.	2	257,899,000
4644	EMERALD FOREST U.D.	2	257,899,000
2445	REID ROAD M.U.D. 1	2	263,161,000
3804	REID ROAD M.U.D. 1	2	263,161,000
2943	KLEIN P.U.D.	2	263,342,000
6802	KLEIN P.U.D.	2	263,342,000
4579	W. HARRIS CO. M.U.D. 11	2	272,629,000
7609	W. HARRIS CO. M.U.D. 11	2	272,629,000
3399	NW HARRIS CO. M.U.D. 9	2	274,286,000
4151	NW HARRIS CO. M.U.D. 9	2	274,286,000
2476	HARRIS CO. W.C.&I.D. 92	3	282,525,000
2477	HARRIS CO. W.C.&I.D. 92	3	282,525,000
3966	HARRIS CO. W.C.&I.D. 92	3	282,525,000
3430	HARRIS CO. M.U.D. 18	2	282,639,000
4526	HARRIS CO. M.U.D. 18	2	282,639,000
1620	CYPRESS-KLEIN U.D.	3	289,336,000
4353	CYPRESS-KLEIN U.D.	3	289,336,000
7252	CYPRESS-KLEIN U.D.	3	289,336,000
2094	HARRIS CO. W.C.&I.D. 116	2	290,440,000
3316	HARRIS CO. W.C.&I.D. 116	2	290,440,000
1617	HARRIS CO. W.C.&I.D./M.U.D. 110	2	310,421,000
2903	HARRIS CO. W.C.&I.D./M.U.D. 110	2	310,421,000
2680	BRIDGESTONE M.U.D.	4	320,860,000
3352	BRIDGESTONE M.U.D.	4	320,860,000
4713	BRIDGESTONE M.U.D.	4	320,860,000
8001	BRIDGESTONE M.U.D.	4	320,860,000
1528	HARRIS CO. F.W.S.D. 52	3	336,807,000
1529	HARRIS CO. F.W.S.D. 52	3	336,807,000

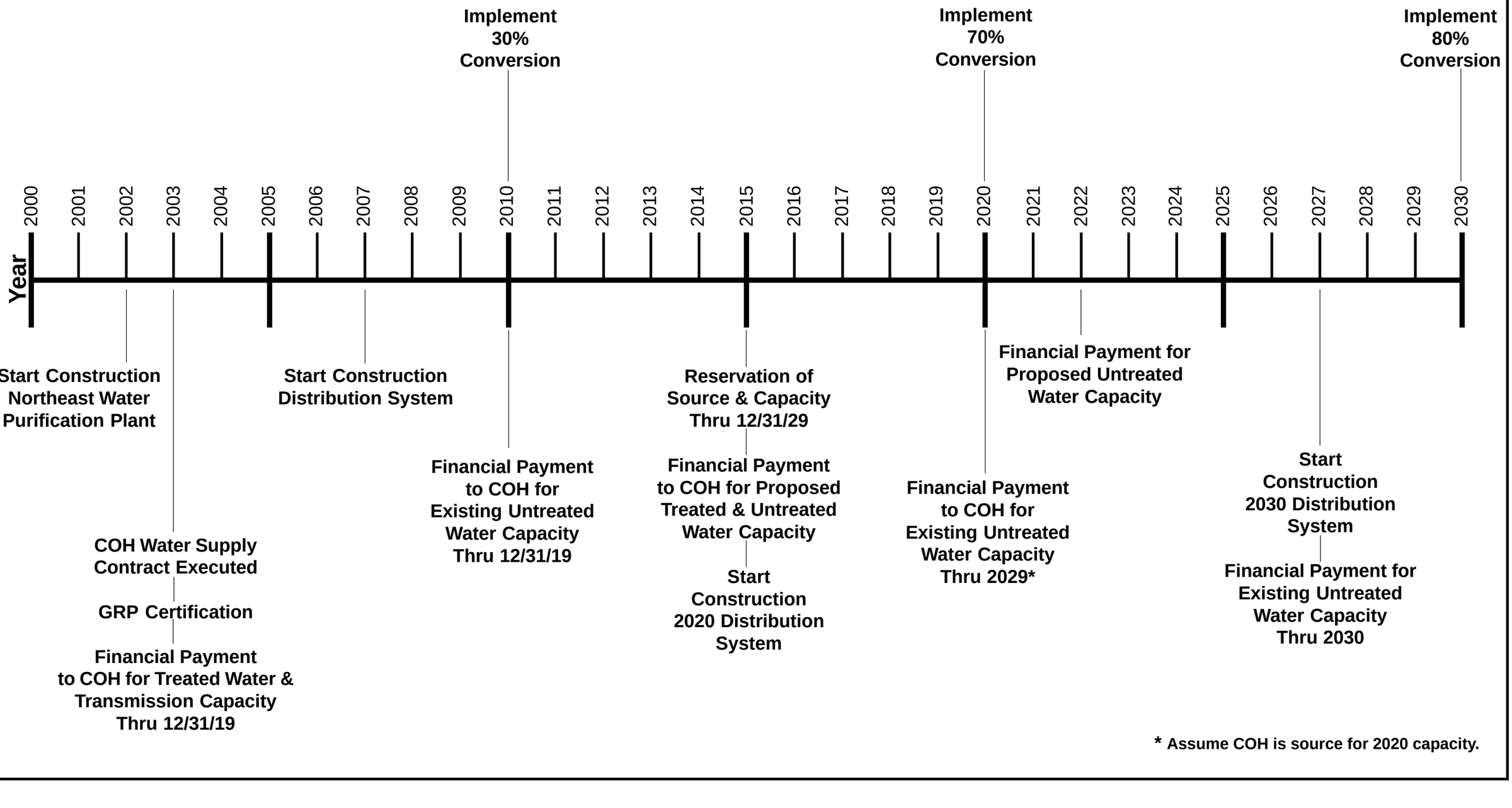
WELL	OWNER	AGG2000	PUMP2000 (GPY)
1630	CY-CHAMP P.U.D.	2	343,934,000
5135	CY-CHAMP P.U.D.	2	343,934,000
1616	MALCOMSON ROAD U.D.	2	346,575,000
5675	MALCOMSON ROAD U.D.	2	346,575,000
3391	W. HARRIS CO. M.U.D. 10	2	355,284,000
5850	W. HARRIS CO. M.U.D. 10	2	355,284,000
3320	JERSEY VILLAGE, CITY OF	4	375,360,000
3872	JERSEY VILLAGE, CITY OF	4	375,360,000
4147	JERSEY VILLAGE, CITY OF	4	375,360,000
7781	JERSEY VILLAGE, CITY OF	4	375,360,000
1904	WESTADOR M.U.D.	3	375,623,000
1905	WESTADOR M.U.D.	3	375,623,000
4115	WESTADOR M.U.D.	3	375,623,000
4162	HARRIS CO. M.U.D. 358	2	404,834,000
4340	HARRIS CO. M.U.D. 358	2	404,834,000
1658	CNP UTILITY DISTRICT	4	410,185,000
2634	CNP UTILITY DISTRICT	4	410,185,000
3564	CNP UTILITY DISTRICT	4	410,185,000
5654	CNP UTILITY DISTRICT	4	410,185,000
1534	HARRIS CO. W.C.&I.D. 114	3	419,591,000
3409	HARRIS CO. W.C.&I.D. 114	3	419,591,000
4316	HARRIS CO. W.C.&I.D. 114	3	419,591,000
2689	LAKE FOREST U.D.	2	421,545,000
4287	LAKE FOREST U.D.	2	421,545,000
1663	PONDEROSA FOREST U.D.	3	428,408,000
2947	PONDEROSA FOREST U.D.	3	428,408,000
3631	PONDEROSA FOREST U.D.	3	428,408,000
1779	HARRIS CO. M.U.D. 24	2	429,600,000
3750	HARRIS CO. M.U.D. 24	2	429,600,000
1611	HARRIS CO. M.U.D. 132	2	435,478,000
4788	HARRIS CO. M.U.D. 132	2	435,478,000
1553	NORTHAMPTON M.U.D.	3	440,217,000
1554	NORTHAMPTON M.U.D.	3	440,217,000
4243	NORTHAMPTON M.U.D.	3	440,217,000
3332	HARRIS CO. M.U.D. 168	2	441,638,000
3412	HARRIS CO. M.U.D. 168	2	441,638,000
1536	TIMBERLANE U.D.	3	441,973,000
3156	TIMBERLANE U.D.	3	441,973,000
4155	TIMBERLANE U.D.	3	441,973,000
1673	HARRIS CO. W.C.&I.D. 132	3	457,187,000
1870	HARRIS CO. W.C.&I.D. 132	3	457,187,000
3648	HARRIS CO. W.C.&I.D. 132	3	457,187,000
2901	FAULKEY GULLY M.U.D.	3	479,712,000
4338	FAULKEY GULLY M.U.D.	3	479,712,000
5496	FAULKEY GULLY M.U.D.	3	479,712,000
1513	HARRIS CO. F.W.S.D. 61	5	553,158,000
1514	HARRIS CO. F.W.S.D. 61	5	553,158,000
3676	HARRIS CO. F.W.S.D. 61	5	553,158,000
5524	HARRIS CO. F.W.S.D. 61	5	553,158,000

WELL	OWNER	AGG2000	PUMP2000 (GPY)
3161	CYPRESS FOREST P.U.D.	2	560,823,000
4086	CYPRESS FOREST P.U.D.	2	560,823,000
1378	HARRIS CO. W.C.&I.D. 109	3	588,698,000
1379	HARRIS CO. W.C.&I.D. 109	3	588,698,000
3333	HARRIS CO. W.C.&I.D. 109	3	588,698,000
1934	TOMBALL, CITY OF	4	691,251,000
4023	TOMBALL, CITY OF	4	691,251,000
4131	TOMBALL, CITY OF	4	691,251,000
6927	TOMBALL, CITY OF	4	691,251,000
1980	HEGAR FARMS	4	779,496,650
1983	HEGAR FARMS	4	779,496,650
1984	HEGAR FARMS	4	779,496,650
4193	HEGAR FARMS	4	779,496,650

APPENDIX C NHCRWA AND CITY OF HOUSTON WATER SUPPLY CONTRACT AND FINANICAL MILESTONES

This section will be provided when it becomes available.

North Harris County Regional Water Authority
Project Timeline for Compliance With
Harris-Galveston Coastal Subsidence District Regulatory Plan



* Assume COH is source for 2020 capacity.

APPENDIX D NHCRWA WATER CONSERVATION PLAN

NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY

WATER CONSERVATION PLAN

MAY 2002

BROWN & GAY ENGINEERS, INC.

CIVIL ENGINEERS & SURVEYORS

11490 WESTHEIMER SUITE 700
HOUSTON, TEXAS 77077-6841
(281) 558-8700 FAX (281) 558-9701

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PREFACE

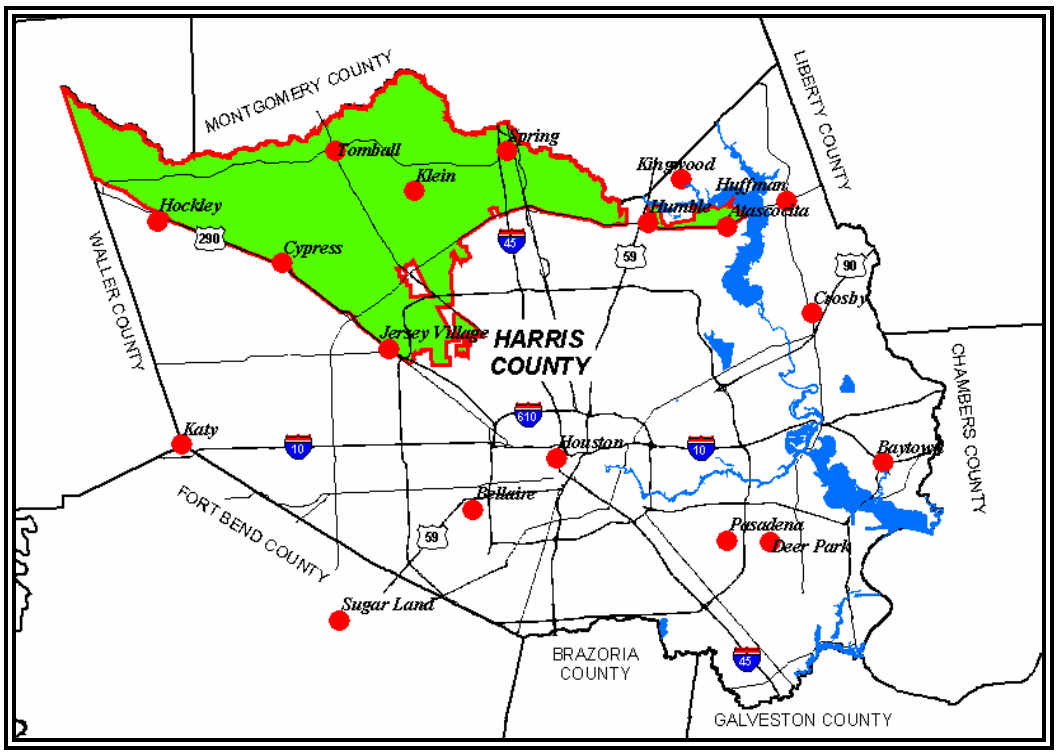
The enclosed Water Conservation Plan (WCP) describes tentative conservation methods, not a fully implemented plan. The North Harris County Regional Water Authority does not currently own and operate a potable water system but anticipates having the first phase operational by first or second quarter of 2009. The WCP offers conservation concepts for the future potable water system. The North Harris County Regional Water Authority Board of Directors will consider for approval and implementation a final WCP closer to the time the potable water system is operational.

1.0 INTRODUCTION

A. Service Area Description

The service area of the North Harris County Regional Water Authority (Authority) is located entirely in northern Harris County. The Authority is generally bounded on the west by SH 290, Spring Creek to the north, Houston to the east and portions of FM 1960 on the south. The southernmost part of the area extends inside Beltway 8 and the easternmost area is located between US 59 and Lake Houston just past US 59. **Figure 1** shows the boundary of the Authority's service area that is approximately 335 square miles with approximately 368,000 residents.

FIGURE 1: SERVICE AREA BOUNDARY



The Authority was created in order to develop a mechanism for coming into regulatory compliance with the requirements of the Harris-Galveston Coastal Subsidence District's (HGCSD) 1999 Regulatory Plan (Plan). The Plan requires a reduction in groundwater

withdrawals to no more than 20% of total water demand by the year 2030. This includes interim reductions in groundwater withdrawals to no more than 30% of total water demand by the year 2010 and no more than 70% of total water demand by the year 2020. The main objective for creation of the Plan is to reduce or stop subsidence due to excessive withdrawals of groundwater by the well owners. A component of reducing water use, whether it is groundwater or surface water, is water conservation.

The first planning milestone for the Authority requires the preparation and submittal of a Groundwater Reduction Plan (GRP) report that describes the mechanisms identified for meeting HGCSD's groundwater reduction mandates. The Authority will attain the phased groundwater reduction as a wholesale public water supplier (wholesale supplier) providing wholesale water to retail public water suppliers (retail suppliers). One component of a GRP is the preparation of a Water Conservation Plan (WCP). The Texas Water Development Board (TWDB) requires a WCP be prepared for those projects receiving TWDB grants from the Regional Facilities Planning Grant Program. This WCP will satisfy both of these requirements.

B. TWDB Regional Water Supply Facilities Program

The Authority received grant authorization from TWDB *Regional Water Supply Facilities Planning Program* (Regional Facility Planning Grant) in August 2000 under TWDB Contract No. 2001-483-366. The Regional Facility Planning Grant program is for studies and analyses to evaluate alternatives that meet regional water supply facility needs, estimate the costs associated with implementing feasible regional water supply facility alternatives, and identify institutional arrangements to provide regional water supply services for proposed planning areas in Texas. The Authority's commitment to its constituents is to provide adequate and reliable potable water to its customers at the lowest possible cost. Funding assistance from the Texas Water Development Board will offset a portion of the planning costs required to develop the GRP.

The Authority's Regional Facility Planning Grant has three major tasks that include the WCP. In accordance with 31 Texas Administrative Code Chapter 357, development of a Water Conservation Plan (WCP) must be included as a specific task in the scope of work for proposed

planning areas in Texas without a previously approved WCP by TWDB or TNRCC. The Authority submits this report to TWDB in compliance with this regulation and the Authority's contract.

C. Population Projections

The Authority will provide wholesale water for municipal use to 160 independent water districts, municipal utility districts, permitted well owners located in Northwest Harris County and the cities of Tomball and Jersey Village. The report entitled *Update of Population and Water Demand Forecasts for the Harris-Galveston Coastal Subsidence District* (Update Report) was prepared by Turner Collie & Braden in March 1996 for the HGCSD and projected population and water demand at the census-tract level. The Update Report gave projections by census tract for Harris and Galveston Counties for every five years from 1990 to 2030. These population and water demand projections were used to develop the WCP. Table No. 1 shows the projected census population and HGCSD annual average water demand for 2000.

TABLE NO. 1

YEAR 2000 POPULATION AND AVERAGE WATER DEMAND

Consumer	Year 2000 Projected Service Area Population	**Year 2000 Average Day Water Demand (mgd)**
North Harris County Regional Water Authority	367,722	71.27

Population projection development included the actual census population and HGCSD annual average water demand for 1990. The population projection was based on actual 1990 census block group data based on delineated geographical boundaries. The census block group and population data was obtained from the USGS Census Bureau 1990 Census Tracts for Harris County, Texas. Each census block group with the corresponding projected population for years 2000, 2010, 2020 and 2030, and the total population within the boundary of the Authority is shown in Appendix A.

D. Water Demand Projections

The calculation of water demand was performed at the geographic level of a census block group. Each category of water demand was calculated separately. Agricultural demand was computed by multiplying the unit factor of irrigation times the acreage of irrigated cropland. Industrial usage was determined by prorating the total usage at each physical location of the industrial facility times the projected increase overall by county.

Municipal demand was calculated by the sum of single family demand plus multi-family demand plus commercial demand. Multi-family unit usage factors were determined to be 254 gallons per unit. Unit factors of 450.8 gallons per single family connection and 115 gallons per multi-family occupant were applied. Total demand was then a function of multiplying the projected population times the respective unit factor. The division between single and multi-family population growth was assumed to exhibit the same ratio as exhibited in 1990. Commercial demand was calculated as the projected employment times the unit factor for water consumption per employee, adopted as 27 gallons per day.

The issue most important to the Subsidence District is the geographic distribution of water production based on water demand. A part of the issue concerns the geographic distribution of water demand and where water will be produced to meet this demand. The use of GIS became an integral part of the geographic distribution of water demand. Aggregation of water demand was accomplished by using GIS software to intersect a 2½ x 2½-mile grid with census block groups. The GIS was used to overlay the geographic delineation of the regulatory areas over the census block groups. Each census block group in Harris and Galveston counties was assigned to an area in this manner. A mathematical relationship between area and density of demand was then used to calculate the final water demand in each grid cell. Appendix B shows the projected annual average water demand for 2010, 2020, and 2030.

E. Wastewater Demand Projections

Wastewater demand data is not provided because the Authority will solely be a wholesale regional water supplier and will only be responsible for maintaining and supplying potable water

to its customers. It is not anticipated at this time that the Authority will ever be a wastewater treatment provider, therefore, the determination of projected wastewater demand is not included as part of this WCP.

2.0 CONSERVATION GOALS

The goal of the Authority is the assurance of an adequate and safe potable water supply for its customers in years to come. The goals of a WCP are to reduce water consumption, limit unaccounted for water, and protect both existing and future water supplies. The result of a successful WCP will be reduced peak-day demands, thereby potentially reducing, or downsizing distribution and treatment facilities, resulting in economic benefits to the Authority and it's customers. Reduced peak day demand could also delay the construction of facilities.

The Authority is expected to complete construction of a wholesale regional water supply system in 2009. One year later in 2010, approximately 30 percent of the water demand in the Authority will be converted to surface water and will be distributed to designated participants. Participants will be required to execute a contract with the Authority.

The most direct effects a wholesale water provider can make to water conservation are to reduce unaccounted for water and protect water supplies. Unaccounted for water is the difference between the quantity of water that is withdrawn from a supply source and the amount that is actually delivered to the customer. If the supply is raw water, the "supply source" is defined as the forebay or raw water storage reservoir ahead of a water treatment plant. If the supply is potable water, the "supply source" is defined as the take point for the potable water. The goal of the Authority will be to limit unaccounted for water to less than 10 percent of reported water usage.

Both surface water supplies and groundwater supplies must be protected. This includes preventing pollution of water supplies and assuring the availability of water supplies for future needs. Supply source contamination and issues related to public health and safety will be monitored through all applicable testing procedures as defined by American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), American Water Works Association (AWWA), and any additional Local, State or Federal Agencies that are applicable.

The goals of the WCP are:

- Reduce water consumption by its retail suppliers. Reduction of water consumption by retail suppliers will begin as soon as a contractual agreement with the retail suppliers is entered into. These will be in place by 2010.
- Limit unaccounted for water to no more than 10 percent of the reported water usage. Limiting unaccounted for water will begin at such time as the Authority constructs its water supply infrastructure. Based on the timetable for conversion to surface water, it is anticipated that the infrastructure will be in place by 2010.
- Prevent pollution of surface water and groundwater supplies. This has already begun and will be an ongoing effort.
- Sustain water supplies for future users. This has already begun and will be an ongoing effort.

3.0 CONSERVATION STRATEGIES

The WCP is a strategy, or combination of strategies, for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water.

The conservation strategies used to attain the goals mentioned in Section Two can be divided into three (3) categories: operational, administrative and educational.

A. Operational Strategies

The following operational strategies are considered for implementation:

- Effective use of groundwater and surface water.
- Efficient utilization of existing water supplies through universal metering.
- Water Audits and Leak Detection.
- Reservoir Systems Operation Plan.
- Methods to Monitor the Effectiveness and Efficiency.
- Wastewater Reclamation

1. Effective Use of Groundwater and Surface Water

The major water source for surface water has not been determined at this time, however municipal users will continue to provide groundwater from existing wells to supplement the use of surface water.

Surface water is a renewable resource; groundwater is not as easily renewable. The use of surface water will extend the availability of groundwater for future use. In addition, the future availability of groundwater may supplement surface water in times of drought or other emergencies. The supply lines constructed by the Authority will have sufficient pressure to distribute wholesale water to the participants; fill retail suppliers ground storage tanks; and

deliver peak hour and/or peak day volumes, whereby the retail suppliers will be required to meet the distribution pressure and system requirements outlined by the TNRCC.

The total cost to the Authority will be affected by the supplemental use of ground water in areas where it may be cost prohibitive to build surface water lines. Providing surface water to those areas located remotely from the surface water lines will be costly. Some of the NHCRWA customers on the outer reaches will not be provided treated surface water, while other customers will be delayed until a time that it is feasible to construct surface water transmission lines to these customers. The Authority's ability to delay construction of these lines will not affect the overall goals of the WCP.

2. Efficient Utilization of Existing Water Supplies through Universal Metering

Water meters at point of delivery of wholesale supply to the Authority and at the Authority's delivery point to its customers will serve as a means for leak detection, thus providing a cost benefit savings to the Authority by lowering unaccounted water use. The Authority will be responsible for its meters that lead up to the point of connection at the retail supplier's main point of distribution.

Because the Authority's customers will use their existing water distribution facilities, a program for the testing and calibration of retail water meters will be required. Retail suppliers will be required to provide documentation demonstrating that existing water meters on its water mains and at its water treatment plants have been tested and calibrated prior to connection to the wholesale supplier's distribution system. This will serve as a means of documenting unaccounted water use in the retail distribution systems.

3. Water Audits and Leak Detection

Water audits and leak detection in water systems are effective ways to achieve water conservation and offer a cost savings to both the retail supplier and the Authority. Successful leak detection programs benefit everyone because they prevent unnecessary costs and lost revenue. Periodic testing and calibration of the Authority's meters will reduce the chance of lost revenues and prevent leaks, which also benefits the Authority. The Authority will implement a method for record management and testing of its water meters. **Table No. 2** shows an estimated

daily loss of revenue due to water leaks based on total projected water demand for years 2010, 2020 and 2030.

TABLE NO. 2

PROJECTED AVERAGE DAILY WATER LOSSES

Description	2010	2020	2030
[(1)]Total Daily Demand (mgd):	76.9	87.3	99.9
[(2)]Estimated Water Loss (mgd):	7.7	8.7	10.0
[(3)]Estimated Revenue Loss (dollars):	$1,922	$2,183	$2,498
[(4)]Total Estimated Daily Revenue Losses After Leak Detection and Repair (dollars):	**$961**	**$1,091**	**$1,249**

Source: AWWA Leak Detection Committee.1999, pp 5-33. *Water Audits and Leak Detection.* Manual of Water Supply Practices. (M36). American Water Works Association: Denver, CO. Notes: [(1)] Total projected daily demands based on Table No. 1 shown in Section 1 – Introduction. [(2)] Assumes 10% unaccountable due to leaks, system losses, system flushing, etc., [(3)] Based on estimated $0.25 / 1000 gallons fee imposed by wholesale water provider, [(4)] Estimated 50% recoverable leakage due to leak detection system and repairs.

Table No. 3 shows an estimated annual loss of revenue due to water leaks based on total projected water demand for years 2010, 2020 and 2030. Similar assumptions and methodology were used to determine annual revenue losses as those used to create **Table No. 2**.

TABLE NO. 3

PROJECTED AVERAGE ANNUAL WATER LOSSES

Description	2010	2020	2030
Total Yearly Demand (mgd):	28,056.5	31,864.8	36,476.1
Estimated Water Loss (mgd):	2,805.7	3,186.5	3,647.6
Estimated Revenue Loss (dollars):	$701,413	$796,619	$911,902
Total Estimated Annual Revenue Losses After Leak Detection and Repair (dollars):	**$350,706**	**$398,309**	**$455,951**

Source: AWWA Leak Detection Committee.1999, pp. 5-33. *Water Audits and Leak Detection.* Manual of Water Supply Practices. (M36). American Water Works Association: Denver, CO.

The Authority will require each retail supplier who enters into contract for purchasing water to submit a water conservation plan that includes a water audit and leak detection program approved by the Authority. Each retail supplier will provide forms for conducting a comprehensive, system wide audit of its internal distribution system. These forms, sometimes referred to as "water audit worksheets," should consist of the following:

- ✓ Frequency of Audit.
- ✓ Means to measure the required water supply.
- ✓ Means to measure authorized metered use.
- ✓ Means to measure authorized unmetered use.
- ✓ Calculation of water losses.
- ✓ Analysis of water audit results.

The submittal of a leak detection program, or a "leak detection worksheet," by the retail supplier should include the following:

- ✓ Description of the area surveyed for leaks.
- ✓ List of procedures and equipment used during the leak detection process.
- ✓ Leak detection costs, budget and repair schedule.
- ✓ Means to track daily surveys or log books.
- ✓ Means to monitor repair history of service lines.
- ✓ Leak detection summary.

The water audit will quantify the water losses and the leak detection program will determine if the losses are due to leaks or unauthorized uses. Leaks will be located and repaired and unauthorized uses will be located and shut down.

4. Reservoir Systems Operation Plan

The Authority will address the requirements and consider the need for a reservoir systems operation plan, if necessary, once the primary source for water has been determined.

5. Methods to Monitor the Effectiveness and Efficiency of the WCP.

The Authority will develop a plan for monitoring the effectiveness and efficiency of the WCP. This plan will include contractual requirements of the retail supplier to establish a method to monitor their individual conservation plans.

B. Administrative Strategies

The Authority could implement several administrative strategies to encourage water conservation by its customers to lower overall demand for water. These strategies include:

- Water Rate Structure.
- Water Rates and Related Charges.
- Prepare and implement a Drought Contingency Plan.
- Water Conservation Plan.
- Implementation and Enforcement.

1. Water Rate Structure

Wholesale rates will be designed to recover the costs of providing service based on usage, pattern of usage, and level of service to retail suppliers. The wholesale rate structures that are typically used to promote conservation are uniform volume, seasonal, increasing block, and demand rates.

The Authority will evaluate the different types of rate structures and select the one which best suits its need for revenue and the promotion of water conservation. Currently, the four rate structures mentioned above are being considered by the Authority.

For uniform volume rates, the basis for recovering costs is the same for all retail suppliers and is incurred by the wholesale supplier through an average price for water. Uniform rates tend to facilitate the basic principles of water conservation because customer bills vary directly with the level of water usage. The actual efficiency of the uniform rate depends on the circumstances of the wholesale supplier.

Seasonal demand rates allow the Authority the ability to recover costs associated with high demands imposed by the retail customer during a few months of the year. In cases where seasonal increases are weather related, applying seasonal rates to large wholesale customers may affect the Authority's financial stability or require it to establish a rate stabilization fund. Setting seasonal rates is more complex than setting a uniform volume rate for the wholesale customer class.

The increasing block rate structure usually conserves more water than the uniform rate structure because it tends to be conservation-oriented. Increasing block rates would allow the Authority the ability to send consistent price signals to retail suppliers without over earning or under earning revenues. At its optimum, no customer within a given class, using similar amounts of water, should be rewarded more or less than another customer for saving a gallon of water. The increasing block rate structure will provide the Authority the flexibility to deal with difficult situations such as increased growth in water demand, decreased existing water supplies, and regional requirements to improve water efficiency and decrease subsidence due to groundwater withdrawals.

The demand rate structure is less common to the water industry than in the electric industry. This rate structure allocates, or reserves, a portion of water production facilities for a given customer or customer class. The capacity allocated or reserved is the peak-daily or peak-hourly demand allowed for the customer class. For this reserved capacity, the retail customer pays a fixed charge per month to cover demand or extra capacity-related costs. Commodity or base-related charges are then recovered through a uniform charge per unit of volume. While demand rates can effectively reduce the peak usage, they may not be as effective as seasonal rates at reducing total annual usage. The economic impacts should be carefully considered as well. If peak demand is a major determinant of system capacity and the need for system expansion, a demand charge is appropriate. If system expansion is driven more by the total annual use, a demand charge is less appropriate.

2. Water Rates and Related Charges

Properly designed rates will recover the cost, as nearly as is practicable, of providing service to the retail supplier. Water rates will consider operation and maintenance costs related to

only the Authority's wholesale distribution system. The retail suppliers will be required to provide and maintain their own distribution facilities. Depending on specific circumstances, the cost analysis may determine that some of the costs for smaller distribution mains will not be allocated to the retail suppliers.

As with any rate structure, the effect of a change to uniform rates varies depending on the magnitude of the change and the means of implementation. A transition from block rates can be accomplished by gradually reducing the number of rate blocks and the differentials among them. A phased approach can reduce the rate shock, particularly for large-volume customers.

Source: AWWA Leak Detection Committee.1999, pp. 1-6, 43-77. *Water Rate Structures and Pricing.* Manual of Water Supply Practices. (M34). American Water Works Association: Denver, CO.

3. Drought Contingency Plan

A Drought Contingency Plan (DCP) is a strategy or combination of strategies for temporary supply and demand management responses to temporary and potentially recurring water supply shortages and other supply emergencies. A DCP is useful to sustain water supplies for the highest priority uses during times of shortage and to preserve the water for human sustenance. Drought conditions are usually the result of extended periods of below average rainfall but could result from equipment failure. The Authority will develop a DCP to provide an orderly procedure for the limitation of water to its retail suppliers in accordance with §288.22 at a later date.

4. Water Conservation Plan

The Authority will require its retail suppliers to have approved WCP's prior to connection to the wholesale supply distribution system. Before executing a water supply contract, each retail supplier will be required to develop and implement a WCP or applicable water conservation measures in accordance with §288.2. The retail supplier's WCP will provide a means to control the rate structure and pricing of the retail water supply.

5. Means of Implementation and Enforcement

The Authority will require all retail suppliers to comply with the Authority's WCP by contractual agreement. The means of enforcement will be considered by the Authority when a final WCP is adopted.

C. Educational Strategies

Educational strategies provide an overall savings benefit to the retail supplier and its customers, thereby lowering the overall demand for water. Although consumer education programs exist, the Authority will not require its customers to enforce or maintain a customer education program; however, several strategies are described below.

- Water Conservation Devices.
- Consumer Education Programs.
- Prepare and implement a Drought Contingency Plan.

1. Water Conservation Devices

Retail suppliers could provide information of water conservation strategies, including the adoption of low flow devices in the home. These low flow devices could include showerheads, lavatory faucets, kitchen faucets, toilet dams, outdoor watering timers, etc. Large water users, such as apartments, schools, office buildings, and City facilities could be fitted, or retrofitted, with these devices as well. A reduction could be realized at apartment complexes where most tenants are not aware of water use because they are not directly metered like homeowners. **Table No. 4** lists several types of water conservation devices and estimated unit water savings based on selected water conservation programs or devices.

TABLE NO. 4

ESTIMATED UNIT WATER SAVINGS BASED ON SELECTED WATER CONSERVATION DEVICES

Appliance/Fixture	Typical Flow Rates	Water Savings
Standard toilet	5.5 gal/flush	---
Low-flush toilet	3.5 gal/flush	2 gal/flush
Ultra-low-flush toilet	1.6 gal/flush	3.9 gal/flush
Toilet dam	---	1 gal/flush

Appliance/Fixture	Typical Flow Rates	Water Savings
Toilet tank bag	---	0.7 gal/flush
Toilet tank replacement bottles (2)	---	0.5 gal/flush
Standard showerhead	3.4 gal/minute	---
Low-flow showerhead	1.9 gal/minute	1.5 gal/minute
Standard washing machine	55 gal/load	---
Water-efficient washing machine	42 gal/load	13 gal/load
Standard dishwasher	14 gal/load	---
Water-efficient dishwasher	8.5 gal/load	5.5 gal/load

Source: Dziegielewski, Benedykt, Eva M. Opitz, Jack C. Keifer, and Duane D. Baumann. 1993, p. 74. *Evaluating Urban Water Conservation Programs: A Procedures Manual*. Planning and Management Consultants, Ltd.: Carbondale, IL.

The retail supplier should educate its customers of the benefits of water conservation practices. More emphasis should be placed on lawn watering schedules that incorporate the effective use of water timers and ideal watering times during the daytime in summer months. Commercial water sprinklers in esplanades are highly visible sources of improper watering techniques that commonly yield complaints from citizens. The use of water-wise, landscaping, effective irrigation systems, proper mowing and proper fertilizer techniques can also lower the water consumption and waste. **Table No. 5** shows potential water savings for selected water conservation practices on an annual basis.

TABLE NO. 5

POTENTIAL WATER SAVINGS FOR SELECTED CONSERVATION PRACTICES

Measure Description	Estimated Water Savings[1]		
	gpcd[2]	gphd[3]	Percent
Single-family retrofit (pre-1980 homes)			
Toilet retrofit	1.3	4	1% of annual use
Low-flow showerhead	7.2	22	4% of annual use
Multi-family retrofit (pre-1980 homes)			
Toilet retrofit	1.3	3	1% of annual use
Low-flow showerhead	7.2	17	6% of annual use
Home water audits (pre-1980 single-family homes)			
Toilet retrofit	1.3	4	1% of annual use
Low-flow showerhead	7.2	22	5% of annual use
Leak repair	0.5	2	<1% of annual use
Outdoor use	---	---	5-10% of outdoor use
Home water audits (post-1980 single-family homes)			
Low-flow showerhead	2.9	9	2% of annual use
Leak repair	0.5	2	<1% of annual use
Outdoor use	---	---	5-10% of outdoor use
Large landscape water audits	---	---	10-20% of irrigation use in affected sectors
Landscape requirements for new commercial, industrial, multifamily complexes	---	---	10-20% of irrigation use in affected sectors
Distribution system water audits and leak detection	---	---	<10% of total production

Source: Dziegielewski, Benedykt, Eva M. Opitz, Jack C. Keifer, and Duane D. Baumann. 1993, p. 77. *Evaluating Urban Water Conservation Programs: A Procedures Manual*. Planning and Management Consultants, Ltd.: Carbondale, IL. Notes: [1] Estimated savings based on practices in California, but not substantiated with empirical data, [2] gpcd=gallons per capita per day, [3] gphd=gallons per household per day.

2. Consumer Education Programs

Programs designed to educate water consumers could include any one or combinations of the following: doorhanger notifications, rebates, subsidies, telephone solicitation, internet sites, direct written contact, mass-media contacts including radio and/or television spots, mailed flyers, water bill inserts, billboards and invitational workshops. Most water conservation programs rely on the customer to install a device or modify a behavior based on education information, products, or assistance provided by the utility. Costs to residential customers must be considered if a water retailer is to make recommendations to its customers. Any customers who feel that the program will cost them too much will not participate. **Table No. 6** shows energy savings associated with residential water conservation.

TABLE NO. 6

POTENTIAL ENERGY SAVINGS ASSOCIATED WITH RESIDENTIAL WATER CONSERVATION PRACTICES

Device	Water saved Gal/day/person	Annual Energy Saved per Person		Value of Energy Saved per Person $/year	
		Gas Water Heaters Therm/year	Electric Water Heaters KWh/year	Gas	Electric
Low-flow shower-heads, 2.75 gpm	7.2	11.6	275	$8.30	$33.0
Water-saving dishwashers	1.0	3.0	71	$2.20	$8.50
Water-saving clothes washer	1.7	5.1	121	$3.70	$14.50
Total	9.9	19.7	467	$14.20	$56.00

Source: Dziegielewski, Benedykt, Eva M. Opitz, Jack C. Keifer, and Duane D. Baumann. 1993, p. 104. *Evaluating Urban Water Conservation Programs: A Procedures Manual*. Planning and Management Consultants, Ltd.: Carbondale, IL.

3. Prepare and Implement a Drought Contingency Plan

The Authority will develop a program to assist customers in the development of drought contingency plans and conservation pollution prevention abatement plans. The extent of this assistance will be determined when the Authority enters a contractual agreement with its customers. These contracts should be in place by 2010.

D. Wastewater Reclamation

Treated wastewater effluent for reuse is an effective means by which conservation can be achieved at a minimum cost to the Authority. An expressed interest from various users of groundwater could justify the cost to supply reclaimed water. A separate water reclamation study identified these various users by conducting a survey of potential reclaimed water users located within the boundaries of the Authority. School grounds and athletic fields were considered as potential reuse candidates, but rejected due to the small amount of irrigation water needed by these facilities. Its was determined that the cost to provide reclaimed water to these facilities greatly outweighed the benefit of groundwater pumpage reduction.

The water reclamation study reported that thirteen potential reuse projects were evaluated as part of this study, including twelve golf courses and one park facility. Evaluations include preliminary distribution system layouts; determination of reclaimed water demand and availability and detailed cost estimates for each project. Several of the projects were evaluated as joint facilities serving two or more users based on the proximity of single reclaimed water production facilities to multiple potential users. In addition, the Reliant Energy power plant on SH 249 is considering operating up to 70 percent of its present demand using reclaimed water as an alternative supply for its industrial use. This is an effective means of substituting recycled water for treated potable water. The Authority is pursuing the use of reclaimed water by the power plant.

A regional reclaimed water plan could provide economic and regulatory benefits to all participants and to the Authority as a whole by reducing the demand for potable water for irrigation applications. The golf courses and park / recreation facilities considered as potential reclaimed water users represent a potential reduction of groundwater pumpage of 1.13 billion

gallons per year, which is 4.5% of the Authority's current groundwater demand of 25 billion gallons per year.

Implementation of a regional reclaimed water system, to be planned, constructed and maintained by the Authority, is a viable solution to providing a low cost, readily available irrigation resource that is beneficial to the environment as well as to the constituents of the Authority by reducing overall groundwater pumpage requirements.

PROJECTED POPULATION

Census Tract	Population Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0244.01:1	2,754	2,754	3,051	3,051	3,300	3,300	3,574	3,574
0244.01:2	1,516	1,516	1,753	1,753	1,952	1,952	2,171	2,171
0244.01:3	1,397	1,397	1,444	1,444	1,482	1,482	1,525	1,525
0244.01:4	1,969	1,969	3,111	3,111	4,068	4,068	5,123	5,123
0244.12:1	681	681	789	789	880	880	976	976
0244.12:2	80	80	131	131	174	174	220	220
0244.22:1	1,643	1,643	1,919	1,919	2,149	2,149	2,393	2,393
0244.22:2	1,785	1,785	2,217	2,217	2,578	2,578	2,962	2,962
0244.22:3	2,917	2,917	2,979	2,979	3,030	3,030	3,084	3,084
0244.22:4	3,980	1,274	5,384	1,723	6,555	2,098	7,802	2,497
0248.00:1	1,324	583	2,101	924	2,765	1,216	3,538	1,557
0248.00:2	1,514	560	3,039	1,124	4,344	1,607	5,863	2,169
0248.00:3	2,926	2,926	3,034	3,034	3,126	3,126	3,234	3,234
0248.00:4	3,800	3,420	4,313	3,882	4,752	4,277	5,263	4,737
0248.00:5	2,673	1,363	3,357	1,712	3,942	2,011	4,624	2,358
0248.00:6	1,968	1,968	2,010	2,010	2,046	2,046	2,088	2,088
0530.01:1	2,467	2,467	2,935	2,935	3,459	3,459	5,992	5,992
0530.03:3	3,079	800	3,406	886	3,620	941	3,745	974
0530.03:4	2,453	883	3,635	1,309	4,405	1,586	4,857	1,748
0530.03:5	4,979	3,187	5,936	3,799	6,560	4,198	6,926	4,433
0530.03:6	2,313	1,735	2,596	1,947	2,781	2,085	2,889	2,167
0536.11:1	1,561	1,561	1,676	1,676	1,790	1,790	1,905	1,905
0536.11:2	1,493	1,493	1,494	1,494	1,496	1,496	1,497	1,497
0536.11:3	1,305	1,305	1,314	1,314	1,324	1,324	1,333	1,333
0536.11:4	1,596	1,596	1,644	1,644	1,692	1,692	1,740	1,740
0536.11:5	1,128	1,128	1,128	1,128	1,128	1,128	1,128	1,128
0536.21:1	2,988	2,988	3,113	3,113	3,139	3,139	3,164	3,164
0536.21:2	1,286	746	1,685	977	1,765	1,024	1,845	1,070
0536.21:3	2,398	1,631	2,440	1,659	2,448	1,665	2,456	1,670
0536.21:4	3,025	3,025	3,744	3,744	3,889	3,889	4,034	4,034
0536.21:5	2,341	2,341	2,672	2,672	2,739	2,739	2,806	2,806
0537.01:1	1,467	1,467	1,839	1,839	2,157	2,157	2,569	2,569
0537.01:2	1,857	1,857	2,166	2,166	2,429	2,429	2,771	2,771
0537.01:3	2,166	2,166	2,319	2,319	2,449	2,449	2,619	2,619
0537.01:4	3,915	3,915	5,360	5,360	6,589	6,589	8,186	8,186
0537.12:1	492	462	721	678	916	861	1,145	1,076

PROJECTED POPULATION (cont.)

Census Tract	Population Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0537.12:2	1,901	1,969	1,521	2,040	2,099	1,632	2,159	2,221
0537.12:3	1,312	1,377	1,312	1,446	1,503	1,446	1,560	1,621
0538.11:1	2,086	2,227	2,086	2,383	2,508	2,383	2,640	2,790
0538.11:2	2,582	3,006	1,730	3,475	3,851	2,328	4,249	4,700
0538.12:1	2,125	2,125	1,849	2,125	2,125	1,849	2,125	2,125
0538.12:2	1,338	1,367	1,338	1,398	1,423	1,398	1,448	1,474
0538.12:3	1,458	1,458	1,458	1,458	1,458	1,458	1,458	1,458
0538.12:4	1,368	1,368	1,368	1,368	1,368	1,368	1,368	1,368
0538.12:5	1,757	1,757	1,757	1,757	1,758	1,757	1,758	1,758
0538.12:6	2,968	4,196	2,434	5,480	6,527	4,494	7,580	8,653
0538.12:7	2,366	2,521	2,366	2,683	2,815	2,683	2,948	3,083
0538.21:1	954	1,045	954	1,142	1,220	1,142	1,299	1,385
0538.21:2	1,303	1,381	1,303	1,466	1,533	1,466	1,602	1,676
0538.21:3	1,846	2,116	1,846	2,406	2,637	2,406	2,874	3,127
0538.21:4	2,096	2,346	2,096	2,613	2,826	2,613	3,045	3,279
0538.31:1	1,434	1,435	1,434	1,437	1,438	1,437	1,438	1,438
0538.31:2	2,265	2,748	2,265	3,249	3,638	3,249	3,889	3,960
0538.31:3	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425
0538.31:4	1,441	1,441	1,441	1,441	1,441	1,441	1,441	1,441
0538.31:5	1,442	1,817	1,442	2,206	2,507	2,206	2,701	2,757
0539.00:4	2,316	2,790	2,153	3,284	3,691	3,054	4,174	5,130
0540.01:3	6,016	6,885	6,016	7,786	8,530	7,786	9,306	10,146
0540.12:2	2,436	2,442	682	2,448	2,452	685	2,457	2,465
0540.12:3	1,213	1,399	1,213	1,591	1,738	1,591	1,903	2,174
0540.12:4	5,391	6,039	5,121	6,707	7,220	6,372	7,793	8,739
0540.12:5	1,895	2,101	891	2,314	2,477	1,088	2,660	2,961
0540.22:3	2,625	2,920	2,337	3,221	3,429	2,866	3,673	4,168
0540.22:5	1,716	1,814	429	1,915	1,984	479	2,066	2,231
0541.10:1	1,101	1,167	507	1,253	1,331	576	1,424	1,560
0541.10:2	1,697	1,911	1,069	2,186	2,440	1,377	2,738	3,176
0541.10:3	1,050	1,418	1,050	1,892	2,329	1,892	2,842	3,596
0541.20:1	3,204	3,391	2,564	3,593	3,763	2,874	3,939	4,133
0541.20:3	1,505	1,746	1,505	2,007	2,227	2,007	2,454	2,705
0541.20:4	3,501	3,763	3,501	4,046	4,284	4,046	4,530	4,802
0541.20:5	2,763	2,875	2,763	2,995	3,097	2,995	3,202	3,318
0541.20:6	5,124	5,608	5,124	6,131	6,571	6,131	7,027	7,530

PROJECTED POPULATION (cont.)

Census Tract	Population Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0541.20:7	5,154	5,254	5,154	5,362	5,452	5,362	5,546	5,650
0541.20:8	7,439	9,031	7,439	10,749	12,196	10,749	13,695	15,349
0541.30:1	1,022	1,037	1,022	1,052	1,068	1,052	1,083	1,098
0541.30:2	2,019	2,035	1,878	2,052	2,068	1,908	2,085	2,101
0541.30:3	1,977	2,007	1,839	2,037	2,066	1,894	2,096	2,126
0545.01:1	1,614	1,645	1,614	1,683	1,719	1,683	1,759	1,810
0545.01:2	634	829	634	1,072	1,299	1,072	1,552	1,874
0545.01:3	3,370	4,102	3,370	5,013	5,863	5,013	6,811	8,015
0545.12:1	1,999	2,020	1,999	2,044	2,064	2,044	2,085	2,108
0545.12:2	1,683	1,935	1,683	2,222	2,453	2,222	2,706	2,986
0545.12:3	1,656	2,143	1,656	2,696	3,141	2,696	3,630	4,170
0545.22:1	1,713	2,038	1,713	2,393	2,666	2,393	2,952	3,147
0545.22:2	3,178	3,560	3,178	3,978	4,299	3,978	4,634	4,864
0545.22:3	1,060	1,060	1,060	1,060	1,060	1,060	1,060	1,060
0545.22:4	3,109	3,575	3,109	4,084	4,476	4,084	4,884	5,165
0545.32:1	2,528	3,105	1,997	3,716	4,187	2,936	4,665	4,838
0545.32:2	3,555	4,447	3,555	5,394	6,122	5,394	6,863	7,131
0545.32:3	2,599	2,629	2,599	2,660	2,684	2,660	2,708	2,717
0545.32:4	1,737	1,737	1,737	1,737	1,737	1,737	1,737	1,737
0545.32:5	1,696	1,696	1,696	1,696	1,696	1,696	1,696	1,696
0545.32:6	1,331	1,374	1,331	1,419	1,454	1,419	1,489	1,502
0548.98:9	582	587	518	589	567	524	545	525
0549.00:1	1,878	1,891	1,878	1,904	1,903	1,904	1,902	1,901
0549.00:2	708	817	680	927	912	890	904	902
0550.00:9	2,417	2,565	2,417	2,715	2,749	2,715	2,788	2,832
0551.01:1	2,104	2,296	2,104	2,520	2,707	2,520	2,915	3,150
0551.01:2	2,558	2,636	2,558	2,727	2,802	2,727	2,887	2,982
0551.01:3	892	1,002	892	1,130	1,237	1,130	1,356	1,490
0551.01:4	3,534	4,582	3,534	5,797	6,813	5,797	7,944	9,222
0551.12:1	1,864	1,889	1,864	1,915	1,941	1,915	1,966	1,992
0551.12:2	2,379	2,380	2,379	2,380	2,381	2,380	2,381	2,382
0551.12:3	1,582	1,605	1,582	1,628	1,652	1,628	1,675	1,698
0551.12:4	2,232	2,232	2,232	2,232	2,232	2,232	2,233	2,233
0551.12:5	2,087	2,087	2,087	2,087	2,087	2,087	2,087	2,087
0551.12:6	1,600	1,694	1,600	1,788	1,881	1,788	1,975	2,069
0551.22:1	3,133	3,646	3,133	4,195	4,622	4,195	5,059	5,506

PROJECTED POPULATION (cont.)

Census Tract	Population Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0551.22:2	761	887	761	1,022	1,127	1,022	1,234	1,344
0551.22:3	2,955	3,098	2,955	3,251	3,371	3,251	3,493	3,618
0551.22:4	2,765	2,895	2,765	3,035	3,143	3,035	3,254	3,368
0551.22:5	1,025	1,324	451	1,642	1,890	723	2,144	2,404
0552.00:1	2,350	2,712	2,350	3,156	3,556	3,156	3,999	4,562
0552.00:2	1,916	2,257	1,916	2,677	3,054	2,677	3,473	4,005
0552.00:3	1,604	1,784	1,604	2,006	2,205	2,006	2,425	2,706
0553.00:1	1,291	1,299	1,291	1,308	1,313	1,308	1,319	1,325
0553.00:2	2,118	2,244	2,118	2,379	2,465	2,379	2,557	2,655
0553.00:3	937	1,152	937	1,382	1,529	1,382	1,685	1,852
0553.00:4	1,911	2,194	1,911	2,496	2,689	2,496	2,895	3,114
0553.00:5	1,368	1,492	1,368	1,625	1,710	1,625	1,800	1,897
0554.00:1	1,276	1,512	1,276	1,814	2,109	1,814	2,439	2,872
0555.01:1	1,426	1,580	1,426	1,768	1,937	1,768	2,128	2,358
0555.01:2	815	1,054	815	1,345	1,608	1,345	1,902	2,260
0555.12:1	1,564	1,861	1,564	2,200	2,475	2,200	2,777	3,116
0555.12:2	2,411	2,672	2,411	2,970	3,213	2,970	3,478	3,776
0555.22:1	1,557	1,805	1,557	2,003	2,029	2,003	2,055	2,082
0555.22:2	2,244	2,653	2,244	2,980	3,024	2,980	3,068	3,111
0555.22:3	2,388	2,468	2,388	2,531	2,540	2,531	2,548	2,557
0555.22:4	3,423	3,987	3,423	4,438	4,498	4,438	4,559	4,619
0555.22:5	3,383	3,974	3,383	4,446	4,509	4,446	4,572	4,635
0555.22:6	3,071	3,430	3,071	3,717	3,755	3,717	3,793	3,831
0555.32:1	1,450	1,572	1,450	1,710	1,819	1,710	1,936	2,067
0555.32:2	1,159	1,487	1,159	1,856	2,148	1,856	2,461	2,811
0555.32:3	2,188	2,348	2,188	2,527	2,669	2,527	2,820	2,991
0555.32:4	1,880	2,160	1,880	2,474	2,722	2,474	2,988	3,287
0556.01:1	2,002	2,060	2,002	2,128	2,188	2,128	2,255	2,335
0556.01:2	1,793	1,978	1,793	2,199	2,393	2,199	2,609	2,864
0556.01:3	2,021	2,338	2,021	2,716	3,047	2,716	3,417	3,854
0556.01:4	1,675	2,357	1,675	3,170	3,882	3,170	4,677	5,616
0556.12:1	1,684	1,696	1,684	1,710	1,720	1,710	1,732	1,734
0556.12:2	1,237	1,242	1,237	1,246	1,250	1,246	1,255	1,255
0556.12:3	2,233	2,233	2,233	2,233	2,233	2,233	2,233	2,233
0556.12:4	2,710	3,570	2,710	4,543	5,319	4,543	6,171	6,330
0556.12:5	1,995	2,511	1,995	3,095	3,561	3,095	4,072	4,167

PROJECTED POPULATION (cont.)

Census Tract	Population Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0556.22:1	2,504	2,773	2,504	3,066	3,291	3,066	3,526	3,689
0556.22:2	3,227	3,481	3,227	3,758	3,971	3,758	4,193	4,347
0556.22:3	1,261	1,550	1,261	1,866	2,108	1,866	2,360	2,536
0556.22:4	2,923	3,380	2,923	3,878	4,260	3,878	4,658	4,936
0557.00:1	896	939	896	986	1,014	986	1,044	1,076
0557.00:2	1,777	1,987	1,777	2,210	2,347	2,210	2,491	2,646
0558.01:1	2,431	2,953	2,431	3,565	4,082	3,565	4,660	5,322
0558.01:2	5,622	6,036	5,622	6,521	6,931	6,521	7,390	7,915
0558.01:3	2,787	3,224	2,787	3,736	4,170	3,736	4,654	5,209
0558.01:4	3,118	3,981	3,118	4,991	5,847	4,991	6,802	7,896
0558.12:1	1,325	1,938	1,325	2,632	3,189	2,632	3,799	4,473
0558.12:2	2,188	2,403	2,188	2,647	2,843	2,647	3,057	3,293
0558.12:3	1,995	2,102	1,995	2,223	2,320	2,223	2,427	2,544
0558.12:4	2,203	2,353	2,203	2,523	2,659	2,523	2,808	2,974
0558.12:5	1,590	1,793	1,590	2,024	2,209	2,024	2,411	2,635
0558.22:1	2,713	2,751	2,713	2,766	2,780	2,766	2,794	2,809
0558.22:2	3,350	3,433	3,350	3,464	3,495	3,464	3,526	3,557
0558.22:3	2,678	2,847	2,678	2,911	2,975	2,911	3,038	3,102
0559.01:1	1,223	1,763	1,223	2,377	2,871	2,377	3,415	4,015
0559.01:2	523	700	523	900	1,062	900	1,239	1,436
0559.01:3	1,021	1,294	1,021	1,604	1,853	1,604	2,127	2,430
0559.01:4	1,154	1,329	1,154	1,528	1,688	1,528	1,864	2,058
0559.01:5	2,940	3,177	2,940	3,446	3,663	3,446	3,901	4,164
0559.01:6	3,177	3,221	3,177	3,271	3,311	3,271	3,355	3,403
0559.02:1	4,967	5,417	4,967	5,935	6,349	5,935	6,800	7,321
0559.02:2	5,375	6,055	5,375	6,837	7,463	6,837	8,145	8,933
0559.02:3	2,714	3,063	2,714	3,465	3,786	3,465	4,136	4,540
0559.02:4	3,225	3,230	3,225	3,236	3,240	3,236	3,245	3,250
0559.02:5	3,877	4,454	3,877	5,119	5,650	5,119	6,229	6,897
0559.02:6	6,356	8,614	6,356	11,212	13,289	11,212	15,555	18,171
0559.02:7	3,732	3,942	3,732	4,185	4,379	4,185	4,591	4,835
0559.02:8	1,177	1,269	1,177	1,374	1,458	1,374	1,549	1,655
Totals	**391,519**	**367,722**	**485,532**	**455,085**	**563,479**	**527,769**	**657,038**	**615,197**

Source: *Update of Population and Water Demand Forecasts for the Harris-Galveston Coastal Subsidence District (Update Report),* Turner Collie & Braden, Inc., March 1996.

PROJECTED WATER DEMAND

Census Tract	Water Demand Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0244.01:1	0.47	0.48	0.47	0.50	0.51	0.50	0.53	0.54
0244.01:2	0.25	0.26	0.25	0.28	0.29	0.28	0.30	0.32
0244.01:3	0.24	0.25	0.24	0.25	0.25	0.25	0.25	0.26
0244.01:4	0.27	0.35	0.27	0.43	0.49	0.43	0.56	0.63
0244.12:1	0.14	0.15	0.14	0.17	0.17	0.17	0.18	0.19
0244.12:2	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05
0244.22:1	0.28	0.29	0.28	0.31	0.33	0.31	0.35	0.36
0244.22:2	0.29	0.31	0.29	0.35	0.37	0.35	0.40	0.42
0244.22:3	0.51	0.51	0.51	0.52	0.52	0.52	0.52	0.53
0244.22:4	0.76	0.97	0.24	1.10	1.22	0.35	1.34	1.46
0248.00:1	0.23	0.28	0.10	0.34	0.39	0.15	0.44	0.49
0248.00:2	0.16	0.25	0.06	0.35	0.43	0.13	0.51	0.60
0248.00:3	0.52	0.53	0.52	0.54	0.54	0.54	0.55	0.56
0248.00:4	0.67	0.70	0.60	0.74	0.77	0.67	0.80	0.84
0248.00:5	0.48	0.53	0.24	0.58	0.62	0.29	0.66	0.71
0248.00:6	0.35	0.35	0.35	0.36	0.36	0.36	0.36	0.36
0530.01:1	0.43	0.47	0.43	0.50	0.52	0.50	0.57	0.72
0530.03:3	0.20	0.22	0.05	0.24	0.25	0.06	0.26	0.27
0530.03:4	0.25	0.32	0.09	0.38	0.43	0.14	0.47	0.51
0530.03:5	0.82	0.89	0.53	0.96	1.00	0.61	1.04	1.08
0530.03:6	0.41	0.43	0.31	0.44	0.46	0.33	0.47	0.48
0536.11:1	0.23	0.24	0.23	0.24	0.25	0.24	0.26	0.27
0536.11:2	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
0536.11:3	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0536.11:4	0.26	0.27	0.26	0.27	0.27	0.27	0.27	0.28
0536.11:5	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
0536.21:1	0.53	0.55	0.53	0.55	0.55	0.55	0.55	0.55
0536.21:2	0.24	0.28	0.14	0.29	0.30	0.17	0.31	0.31
0536.21:3	0.44	0.45	0.30	0.45	0.45	0.30	0.45	0.45
0536.21:4	0.56	0.65	0.56	0.67	0.69	0.67	0.70	0.71
0536.21:5	0.43	0.47	0.43	0.48	0.49	0.48	0.49	0.50
0537.01:1	0.27	0.30	0.27	0.33	0.35	0.33	0.37	0.40
0537.01:2	0.34	0.36	0.34	0.39	0.41	0.39	0.43	0.45
0537.01:3	0.39	0.41	0.39	0.42	0.43	0.42	0.44	0.45
0537.01:4	0.65	0.75	0.65	0.86	0.94	0.86	1.03	1.13
0537.12:1	0.10	0.11	0.09	0.12	0.14	0.12	0.15	0.16

PROJECTED WATER DEMAND (cont.)

Census Tract	Water Demand Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0537.12:2	0.35	0.36	0.28	0.37	0.38	0.30	0.39	0.40
0537.12:3	0.29	0.30	0.29	0.31	0.32	0.31	0.32	0.33
0538.11:1	0.36	0.38	0.36	0.40	0.42	0.40	0.44	0.46
0538.11:2	0.41	0.46	0.27	0.53	0.57	0.35	0.63	0.69
0538.12:1	0.40	0.40	0.35	0.40	0.40	0.35	0.40	0.40
0538.12:2	0.26	0.27	0.26	0.27	0.27	0.27	0.28	0.28
0538.12:3	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
0538.12:4	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
0538.12:5	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
0538.12:6	0.44	0.61	0.36	0.78	0.92	0.64	1.07	1.21
0538.12:7	0.44	0.46	0.44	0.49	0.51	0.49	0.53	0.55
0538.21:1	0.20	0.21	0.20	0.22	0.23	0.22	0.24	0.26
0538.21:2	0.26	0.27	0.26	0.28	0.29	0.28	0.30	0.31
0538.21:3	0.34	0.38	0.34	0.42	0.45	0.42	0.49	0.52
0538.21:4	0.39	0.42	0.39	0.46	0.49	0.46	0.52	0.55
0538.31:1	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
0538.31:2	0.36	0.43	0.36	0.49	0.55	0.49	0.58	0.59
0538.31:3	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
0538.31:4	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
0538.31:5	0.24	0.30	0.24	0.36	0.41	0.36	0.43	0.44
0539.00:4	0.34	0.41	0.32	0.47	0.53	0.44	0.59	0.72
0540.01:3	0.97	1.10	0.97	1.23	1.34	1.23	1.46	1.63
0540.12:2	0.11	0.11	0.03	0.11	0.11	0.03	0.11	0.11
0540.12:3	0.20	0.22	0.20	0.25	0.27	0.25	0.30	0.34
0540.12:4	0.89	0.98	0.84	1.07	1.15	1.02	1.23	1.37
0540.12:5	0.32	0.35	0.15	0.38	0.41	0.18	0.43	0.48
0540.22:3	0.44	0.49	0.39	0.53	0.58	0.47	0.63	0.69
0540.22:5	0.18	0.19	0.05	0.20	0.22	0.05	0.23	0.25
0541.10:1	0.20	0.21	0.09	0.22	0.24	0.10	0.25	0.27
0541.10:2	0.31	0.34	0.19	0.38	0.42	0.24	0.47	0.53
0541.10:3	0.17	0.22	0.17	0.29	0.35	0.29	0.43	0.54
0541.20:1	0.57	0.60	0.45	0.63	0.65	0.50	0.68	0.71
0541.20:3	0.33	0.36	0.33	0.40	0.43	0.40	0.47	0.51
0541.20:4	0.64	0.68	0.64	0.72	0.75	0.72	0.79	0.83
0541.20:5	0.61	0.65	0.61	0.57	0.59	0.57	0.61	0.63
0541.20:6	0.87	0.94	0.87	1.02	1.08	1.02	1.15	1.23

PROJECTED WATER DEMAND (cont.)

Census Tract	Water Demand Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0541.20:7	0.92	0.93	0.92	0.95	0.96	0.95	0.98	0.99
0541.20:8	1.19	1.43	1.19	1.67	1.89	1.67	2.11	2.36
0541.30:1	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24
0541.30:2	0.46	0.46	0.43	0.47	0.47	0.43	0.47	0.47
0541.30:3	0.59	0.59	0.55	0.60	0.60	0.56	0.61	0.61
0545.01:1	0.29	0.29	0.29	0.30	0.31	0.30	0.31	0.32
0545.01:2	0.15	0.18	0.15	0.22	0.25	0.22	0.29	0.33
0545.01:3	0.62	0.73	0.62	0.87	1.00	0.87	1.13	1.31
0545.12:1	0.36	0.36	0.36	0.36	0.37	0.36	0.37	0.37
0545.12:2	0.28	0.32	0.28	0.36	0.40	0.36	0.43	0.47
0545.12:3	0.26	0.33	0.26	0.41	0.47	0.41	0.54	0.62
0545.22:1	0.27	0.31	0.27	0.35	0.38	0.35	0.42	0.44
0545.22:2	0.53	0.59	0.53	0.64	0.69	0.64	0.73	0.76
0545.22:3	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
0545.22:4	0.50	0.57	0.50	0.64	0.70	0.64	0.75	0.79
0545.32:1	0.46	0.54	0.36	0.62	0.69	0.49	0.76	0.78
0545.32:2	0.61	0.73	0.61	0.85	0.95	0.85	1.05	1.08
0545.32:3	0.49	0.50	0.49	0.50	0.51	0.50	0.51	0.51
0545.32:4	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
0545.32:5	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
0545.32:6	0.30	0.30	0.30	0.31	0.31	0.31	0.32	0.32
0548.98:9	0.11	0.11	0.10	0.11	0.11	0.10	0.11	0.11
0549.00:1	0.37	0.38	0.37	0.38	0.38	0.38	0.38	0.38
0549.00:2	0.13	0.15	0.13	0.16	0.16	0.16	0.16	0.16
0550.00:9	0.42	0.45	0.42	0.47	0.47	0.47	0.48	0.48
0551.01:1	0.39	0.41	0.39	0.44	0.47	0.44	0.50	0.53
0551.01:2	0.49	0.50	0.49	0.51	0.52	0.51	0.53	0.55
0551.01:3	0.17	0.19	0.17	0.21	0.22	0.21	0.24	0.26
0551.01:4	0.70	0.85	0.70	1.02	1.17	1.02	1.33	1.51
0551.12:1	0.43	0.43	0.43	0.44	0.44	0.44	0.45	0.45
0551.12:2	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
0551.12:3	0.34	0.34	0.34	0.34	0.35	0.34	0.35	0.36
0551.12:4	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
0551.12:5	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
0551.12:6	0.25	0.27	0.25	0.28	0.30	0.28	0.31	0.33
0551.22:1	0.51	0.58	0.51	0.66	0.72	0.66	0.78	0.85

PROJECTED WATER DEMAND (cont.)

Census Tract	Water Demand Projections							
	2000	2000 Adjusted	2010	2010 Adjusted	2020	2020 Adjusted	2030	2030 Adjusted
0551.22:2	0.13	0.15	0.13	0.17	0.18	0.17	0.20	0.21
0551.22:3	0.51	0.53	0.51	0.55	0.57	0.55	0.58	0.60
0551.22:4	0.48	0.49	0.48	0.51	0.53	0.51	0.54	0.56
0551.22:5	0.14	0.18	0.06	0.21	0.24	0.09	0.27	0.30
0552.00:1	0.39	0.44	0.39	0.50	0.55	0.50	0.61	0.69
0552.00:2	0.31	0.35	0.31	0.41	0.46	0.41	0.51	0.58
0552.00:3	0.27	0.29	0.27	0.32	0.35	0.32	0.38	0.42
0553.00:1	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19
0553.00:2	0.25	0.26	0.25	0.35	0.36	0.35	0.37	0.39
0553.00:3	0.10	0.11	0.10	0.20	0.22	0.20	0.25	0.27
0553.00:4	0.22	0.23	0.22	0.36	0.39	0.36	0.42	0.45
0553.00:5	0.17	0.18	0.17	0.24	0.25	0.24	0.26	0.28
0554.00:1	0.21	0.25	0.21	0.29	0.33	0.29	0.38	0.44
0555.01:1	0.25	0.28	0.25	0.31	0.35	0.31	0.39	0.44
0555.01:2	0.13	0.17	0.13	0.22	0.27	0.22	0.33	0.40
0555.12:1	0.26	0.30	0.26	0.35	0.38	0.35	0.43	0.47
0555.12:2	0.42	0.45	0.42	0.50	0.53	0.50	0.57	0.61
0555.22:1	0.27	0.31	0.27	0.34	0.34	0.34	0.34	0.35
0555.22:2	0.38	0.44	0.38	0.49	0.49	0.49	0.50	0.51
0555.22:3	0.44	0.46	0.44	0.46	0.47	0.46	0.47	0.47
0555.22:4	0.58	0.66	0.58	0.72	0.73	0.72	0.74	0.75
0555.22:5	0.56	0.65	0.56	0.72	0.72	0.72	0.73	0.74
0555.22:6	0.54	0.59	0.54	0.63	0.64	0.63	0.65	0.65
0555.32:1	0.28	0.30	0.28	0.32	0.33	0.32	0.35	0.37
0555.32:2	0.23	0.28	0.23	0.34	0.38	0.34	0.43	0.48
0555.32:3	0.42	0.44	0.42	0.47	0.49	0.47	0.52	0.54
0555.32:4	0.36	0.40	0.36	0.45	0.49	0.45	0.53	0.57
0556.01:1	0.38	0.39	0.38	0.40	0.41	0.40	0.42	0.43
0556.01:2	0.36	0.38	0.36	0.42	0.45	0.42	0.48	0.52
0556.01:3	0.40	0.45	0.40	0.50	0.55	0.50	0.60	0.67
0556.01:4	0.36	0.46	0.36	0.58	0.68	0.58	0.80	0.94
0556.12:1	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
0556.12:2	0.22	0.22	0.22	0.23	0.23	0.23	0.23	0.23
0556.12:3	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
0556.12:4	0.41	0.54	0.41	0.67	0.78	0.67	0.90	0.93
0556.12:5	0.32	0.40	0.32	0.48	0.55	0.48	0.62	0.63

PROJECTED WATER DEMAND (cont.)

Census Tract	Water Demand Projections							
	2000	**2000 Adjusted**	**2010**	**2010 Adjusted**	**2020**	**2020 Adjusted**	**2030**	**2030 Adjusted**
0556.22:1	0.42	0.46	0.42	0.49	0.52	0.49	0.56	0.58
0556.22:2	0.57	0.61	0.57	0.65	0.68	0.65	0.71	0.74
0556.22:3	0.20	0.25	0.20	0.29	0.33	0.29	0.36	0.39
0556.22:4	0.48	0.54	0.48	0.61	0.66	0.61	0.72	0.75
0557.00:1	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.19
0557.00:2	0.33	0.36	0.33	0.39	0.41	0.39	0.43	0.45
0558.01:1	0.39	0.46	0.39	0.54	0.61	0.54	0.69	0.78
0558.01:2	0.98	1.04	0.98	1.11	1.16	1.11	1.23	1.30
0558.01:3	0.48	0.54	0.48	0.61	0.67	0.61	0.74	0.82
0558.01:4	0.50	0.63	0.50	0.77	0.89	0.77	1.02	1.18
0558.12:1	0.19	0.27	0.19	0.36	0.44	0.36	0.52	0.61
0558.12:2	0.39	0.42	0.39	0.46	0.48	0.46	0.51	0.55
0558.12:3	0.36	0.38	0.36	0.40	0.41	0.40	0.43	0.44
0558.12:4	0.39	0.41	0.39	0.44	0.46	0.44	0.48	0.50
0558.12:5	0.28	0.31	0.28	0.34	0.37	0.34	0.40	0.43
0558.22:1	0.48	0.48	0.48	0.49	0.49	0.49	0.49	0.49
0558.22:2	0.57	0.59	0.57	0.59	0.60	0.59	0.60	0.60
0558.22:3	0.42	0.44	0.42	0.45	0.46	0.45	0.47	0.48
0559.01:1	0.23	0.32	0.23	0.41	0.49	0.41	0.57	0.66
0559.01:2	0.09	0.11	0.09	0.14	0.17	0.14	0.20	0.23
0559.01:3	0.16	0.20	0.16	0.25	0.29	0.25	0.33	0.38
0559.01:4	0.19	0.22	0.19	0.25	0.27	0.25	0.30	0.33
0559.01:5	0.54	0.57	0.54	0.61	0.65	0.61	0.69	0.73
0559.01:6	0.58	0.59	0.58	0.60	0.60	0.60	0.61	0.62
0559.02:1	0.84	0.90	0.84	0.98	1.04	0.98	1.10	1.18
0559.02:2	0.88	0.98	0.88	1.09	1.18	1.09	1.28	1.39
0559.02:3	0.44	0.49	0.44	0.55	0.59	0.55	0.64	0.70
0559.02:4	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
0559.02:5	0.64	0.73	0.64	0.82	0.90	0.82	0.98	1.08
0559.02:6	0.94	1.26	0.94	1.63	1.93	1.63	2.25	2.62
0559.02:7	0.65	0.68	0.65	0.72	0.75	0.72	0.78	0.81
0559.02:8	0.21	0.22	0.21	0.23	0.25	0.23	0.26	0.27
Totals	**67.74**	**64.29**	**81.29**	**76.87**	**92.48**	**87.30**	**105.99**	**99.93**

Source: *Update of Population and Water Demand Forecasts for the Harris-Galveston Coastal Subsidence District (Update Report),* Turner Collie & Braden, Inc., March 1996.

APPENDIX E DRAFT PROJECT SCHEDULE FOR NHCRWA 2010 CONVERSION PROGRAM

NORTH HARRIS COUNTY
REGIONAL WATER
AUTHORITY

Ed Shackelford, P.E.
General Manager

September 4, 2002

Delivered Via Messenger

Ron Neighbors, General Manager
Harris-Galveston Coastal Subsidence District
1660 West Bay Area Boulevard
Friendswood, TX 77546-2640

Dear Mr. Neighbors:

Please find enclosed a draft Project Schedule for the North Harris County Regional Water Authority's (the "Authority") proposed 2010-2019 Surface Water Conversion Project. The Project Schedule depicts the Authority delineating the required infrastructure projects for delivering at least 30 percent surface water through 2019 by category (i.e., Northeast Water Purification Plant, Regional Water Wells (3 projects), Regional Water Plants, Transmission Systems (2 projects), Distribution System (4 projects).

Each project within each category has an engineering and construction component. The engineering component generally includes detailed engineering design services, surveying, geotechnical investigation, environmental investigation, existing utility investigation, route study, right of way investigation, easement/right of way document preparation and acquisition. The construction component typically includes notifying prospective bidders of a project, legal advertisement, prebid meetings, receipt of bids, tabulation of bids, awarding of project to the low bidder, preconstruction meetings, notice to proceed, construction administration, project inspection, final inspections, and notice of substantial completion.

The remaining item necessary to complete the Authority's GRP submittal to the HGCSD is the water supply contract with the City of Houston. The Authority is in the final stages of negotiating the contract language. The contract financially commits the Authority for water supply capacity through 2019 (30 percent surface water delivery). Additionally, the contract allows for financial commitment and water supply capacities reservation in 2015 for 2020 and beyond (70 percent to 80 percent surface water delivery). A timeline will be provided with a copy of the contract depicting milestones and financial commitment dates.

We have two public meetings scheduled, September 5, 2002 at 7:00 p.m. and September 7, 2002 at 9:00 a.m., to discuss in detail the water supply contract final draft. The special meeting on September 7, 2002 also allows the Board of Directors to vote on the contract. Additional dates can be scheduled should it be necessary. It is anticipated that the water supply contract could be executed by both parties by mid to late October 2002.

Thank you for your cooperation. Please contact me, at (281) 440-3924, should you have questions.

Sincerely,

Ed Shackelford, P.E.
General Manager

EHS/lrs
Attachment-Draft Project Schedule

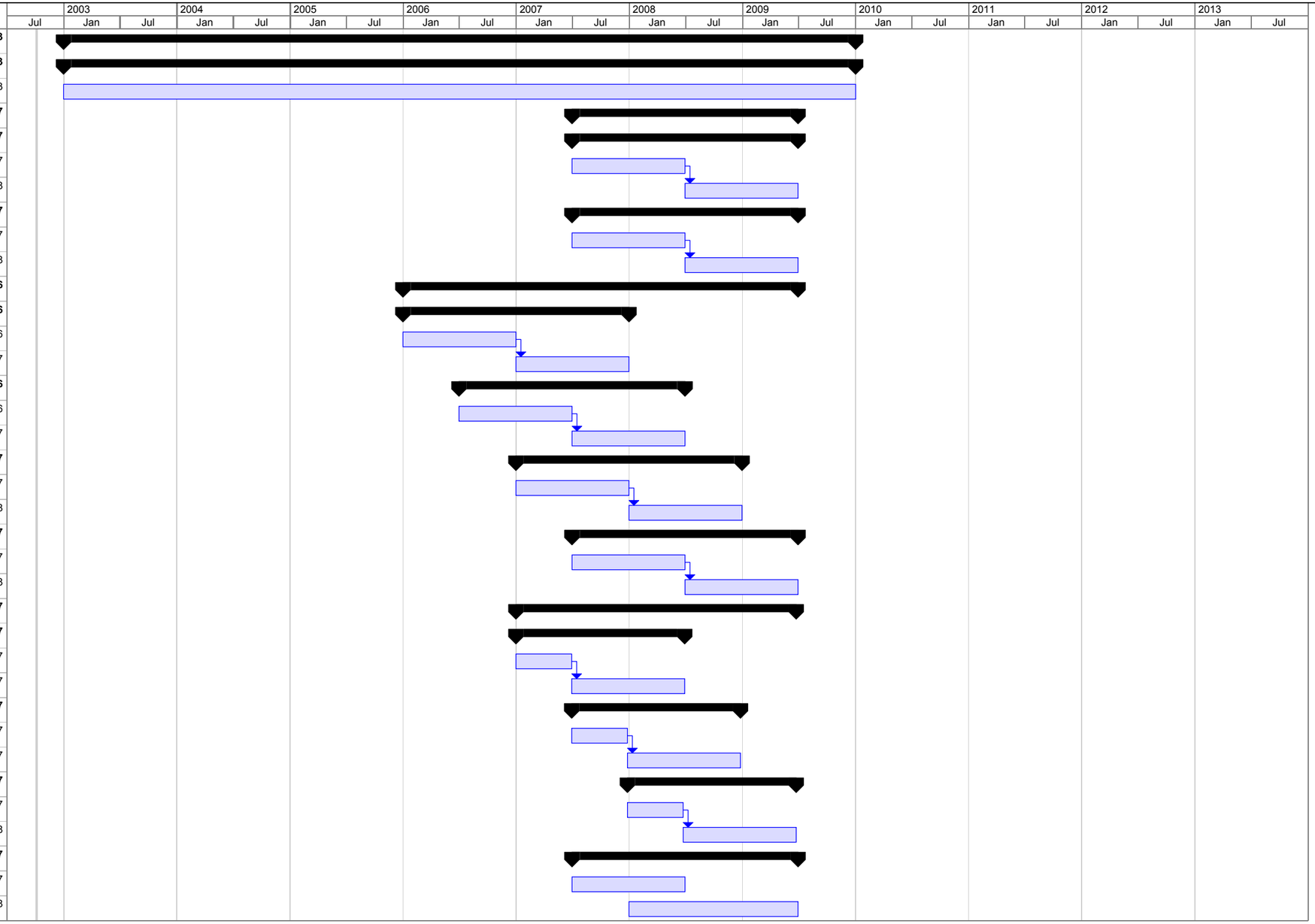
cc: NHCRWA Board of Directors
R. Bobbitt, Johnson Radcliffe Petrov & Bobbitt PLLC

North Harris County REGIONAL WATER Authority

PROJECT SCHEDULE
FOR
NHCRWA 2010 CONVERSION PROGRAM

DRAFT

ID	Task Name	Duration	Start
1	**NHCRWA 2010 Conversion Program**	**2558 days**	**Wed 1/1/03**
2	**COH Northeast Water Purification Plant**	**2558 days**	**Wed 1/1/03**
3	Design/Build Contract	2558 days	Wed 1/1/03
4	**Transmission System**	**730 days**	**Sun 7/1/07**
5	**Phase I**	**730 days**	**Sun 7/1/07**
6	Engineering	365 days	Sun 7/1/07
7	Construction	365 days	Mon 6/30/08
8	**Phase II**	**730 days**	**Sun 7/1/07**
9	Engineering	365 days	Sun 7/1/07
10	Construction	365 days	Mon 6/30/08
11	**Distribution System**	**1276 days**	**Sun 1/1/06**
12	**Phase I**	**730 days**	**Sun 1/1/06**
13	Engineering	365 days	Sun 1/1/06
14	Construction	365 days	Mon 1/1/07
15	**Phase II**	**730 days**	**Sat 7/1/06**
16	Engineering	365 days	Sat 7/1/06
17	Construction	365 days	Sun 7/1/07
18	**Phase III**	**730 days**	**Mon 1/1/07**
19	Engineering	365 days	Mon 1/1/07
20	Construction	365 days	Tue 1/1/08
21	**Phase IV**	**730 days**	**Sun 7/1/07**
22	Engineering	365 days	Sun 7/1/07
23	Construction	365 days	Mon 6/30/08
24	**Regional Water Wells**	**905 days**	**Mon 1/1/07**
25	**Phase I**	**545 days**	**Mon 1/1/07**
26	Engineering	180 days	Mon 1/1/07
27	Construction	365 days	Sat 6/30/07
28	**Phase II**	**545 days**	**Sat 6/30/07**
29	Engineering	180 days	Sat 6/30/07
30	Construction	365 days	Thu 12/27/07
31	**Phase III**	**545 days**	**Thu 12/27/07**
32	Engineering	180 days	Thu 12/27/07
33	Construction	365 days	Tue 6/24/08
34	**Regional Water Plants**	**730 days**	**Sun 7/1/07**
35	Engineering	365 days	Sun 7/1/07
36	Construction	546 days	Tue 1/1/08



Project: 2010 CP Schedule2-98
Date: Fri 10/4/02

Task | Progress | Summary | *Rolled Up Task
Split | Milestone | Project Summary | *Rolled Up Split

North Harris County REGIONAL WATER Authority

Jimmie Schindewolf, P.E.
General Manager

August 2, 2004

Mr. Ron Neighbors
General Manager
Harris-Galveston Coastal Subsidence District
1660 W. Bay Area Blvd.
Friendswood, TX 77546

Re: Proposed Amendment 1 to the North Harris County Regional Water Authority Groundwater Reduction Plan

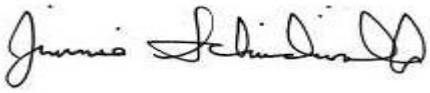
Dear Mr. Neighbors,

The North Harris County Regional Water Authority (the "Authority") Board of Directors adopted an Order Adding Land and Redefining Boundaries of the Authority (the "Order") at the March 1, 2004 Board meeting. The Order adds the additional land of CMH Parks, Inc. – Northwest Pines Mobile Home Park, AquaSource Utility, Inc. – Atascocita Acres subdivision, Lochinvar Golf Club, and AquaSource Utility, Inc. – Mobile Home Estates subdivision into the boundaries of the Authority for all purposes.

In order to include the previously listed entities in the Authority's Groundwater Reduction Plan (the "GRP"), which was certified at your June 11, 2003 Board of Directors meeting, the Authority has prepared Amendment 1 to the GRP. On behalf of the North Harris County Regional Water Authority, I am herewith respectfully requesting that the Harris-Galveston Coastal Subsidence District approve the attached amendment to the Authority's Groundwater Reduction Plan.

Please call me if you have any questions or need any additional information relative to this matter.

Sincerely,



Jimmie Schindewolf, P.E.
General Manager

JAS/cp

Attachment
cc: Authority Board of Directors
Tom Michel, Harris-Galveston Coastal Subsidence District
Tom Rolen, P.E., Turner Collie & Braden Inc.
Robin Bobbitt, Johnson Radcliffe Petrov & Bobbitt PLLC
Showri Nandagiri, Authority Engineer Coordinator
Cyndi Plunkett, Authority Financial Assistant

AMENDMENT 1

to the

North Harris County Regional Water Authority
Groundwater Reduction Plan

presented to

Harris-Galveston Coastal Subsidence District

August 2004

TABLE OF CONTENTS

AMENDMENT OVERVIEW

March 1, 2004 the North Harris County Regional Water Board adopted an Order Adding Land and Redefining Boundaries of the Authority (the "Order"). The Order added land in the following entities:

- AquaSource Utility, Inc. – Atascocita Acres subdivision
- AquaSource Utility, Inc. – Mobile Home Estates subdivision
- CMH Parks, Inc. – Northwest Pines Mobile Home Park
- Lochinvar Golf Course

All of the entities have been added as non-customers to the 2030 Service Area. The addition of these entities slightly increased the overall water demands for the Authority. However, the increase will not result in any changes to the proposed water system as described in the Authority's certified Groundwater Reduction Plan (GRP).

Tables 3 and 4 and Exhibit 2 of the GRP have been revised to reflect addition of the four entities.

TABLE 3 THE NHCRWA SURFACE WATER CONVERSION GOALS

Population	**2000**	**2010**	**2019**	**2020**	**2029**	**2030**
Residential (1)	397,074	487,499	595,568	607,576	680,057	688,111
Employment (2)	95,432	117,730	135,946	137,970	160,510	163,015
Water Demands (mgd)						
Residential (3)	58.81	72.37	88.59	90.39	101.26	102.47
Employment (4)	2.58	3.18	3.67	3.73	4.33	4.40
Agricultural - Wells are Exempt (5)	0.00	0.00	0.00	0.00	0.00	0.00
Other - Includes Golf Courses (6)	3.54	3.54	3.54	3.54	3.54	3.54
Industrial (6)	0.32	0.32	0.32	0.32	0.32	0.32
Aqua Texas - Atascocita Acres (7)	0.04	0.04	0.04	0.04	0.04	0.04
Aqua Texas - Mobile Home Estates (7)	0.05	0.06	0.06	0.06	0.06	0.06
Lochinvar Golf Club (7)	0.14	0.14	0.14	0.14	0.14	0.14
Northwest Pines Mobile Home Park (7)	0.11	0.13	0.15	0.15	0.15	0.15
Total (mgd)	**65.58**	**79.79**	**96.50**	**98.36**	**109.84**	**111.12**
Required HGCSD Surface Water Conversion Percentages		30%	30%	70%	70%	80%
Surface Water Conversion Goals (mgd)		**23.94**	**28.95**	**68.85**	**76.89**	**88.89**

Notes:

1. Year 2000 population is from the U.S. Bureau of Census. The population projections were provided by the University of Houston - Center for Public Policy.

2. Year 2000 employment data and projections are from *TC&B 1996 Report.*

3. Residential water demand based on 150 gpcd from *TC&B 1996 Report.* This demand excludes 750,000 gpd that the City of Jersey Village receives from the City of Houston through a system interconnect.

4. Employment water demand based on 27 gpcd per report from *TC&B 1996 Report.*

5. Wells designated as Agricultural by the HGCSD are exempt from inclusion in the GRP.

6. Year 2000 "Other" and "Industrial" water demands based on HGCSD Year 2000 pumpage reports. Assumed pumpages are constant throughout the planning period.

7. Added since Groundwater Reduction Plan certification.

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
	47 WHOLESALE CUSTOMERS FOR 2010 SERVICE AREA						
2	Bammel Forest Utility Company	158	201	240	244	270	273
2	BAMMEL U.D.	289	368	410	415	415	415
2	BILMA P.U.D.	473	603	689	698	698	698
2	BRIDGESTONE M.U.D.	610	779	928	945	1,043	1,054
2	Candlelight Service Co. Inc. aka Candlelight Hills and AquaSource Utility, Inc.	228	291	345	350	350	350
2	CNP UTILITY DISTRICT	780	912	912	912	912	912
3	CY-CHAMP P.U.D.	654	826	1,039	1,063	1,175	1,188
3	CYPRESS FOREST P.U.D.	1,067	1,347	1,695	1,734	1,802	1,809
2	CYPRESS KLEIN U.D. (WP to SI HCMUD 316)	550	702	837	852	941	951
2	CYPRESSWOOD UD (SI HCWCID No. 132)	NA	NA	NA	NA	NA	NA
3	FOUNTAINHEAD M.U.D. (WP and SI NWHCMUD 21)	479	587	587	587	587	587
3	HARRIS CO. F.W.S.D. 52	641	809	1,018	1,041	1,096	1,103
2	HARRIS CO. M.U.D. 016	339	432	515	525	579	586
3	HARRIS CO. M.U.D. 024	817	983	983	983	983	983
2	HARRIS CO. M.U.D. 044	286	365	381	383	383	383
3	HARRIS CO. M.U.D. 048	0	135	257	271	392	406
2	HARRIS CO. M.U.D. 104	206	263	314	319	353	357
3	HARRIS CO. M.U.D. 191	155	195	245	251	278	280
3	HARRIS CO. M.U.D. 202	188	237	299	306	338	341
2	HARRIS CO. M.U.D. 211 (SI MUD 233)	NA	NA	NA	NA	NA	NA
2	HARRIS CO. M.U.D. 233 (WP to SI MUD 211)	108	137	164	167	184	186
2	HARRIS CO. M.U.D. 275	112	143	170	173	191	193
5	HARRIS CO. M.U.D. 286	418	469	533	540	540	540
2	HARRIS CO. M.U.D. 316 (SI Cypress Klein UD)	NA	NA	NA	NA	NA	NA
2	HARRIS CO. W.C.I.D. 091	345	440	524	534	542	543
3	HARRIS CO. W.C.I.D. 109	1,120	1,414	1,482	1,490	1,490	1,490
2	HARRIS CO. W.C.I.D. 110	591	753	898	914	1,009	1,020
3	HARRIS CO. W.C.I.D. 114	798	901	901	901	901	901
3	HARRIS CO. W.C.I.D. 116	553	639	639	639	639	639
3	HARRIS CO. W.C.I.D. 119	476	601	748	764	764	764
2	HARRIS CO. W.C.I.D. 132 (WP to SI Cypresswood UD)	870	1,084	1,084	1,084	1,084	1,084
3	HEATHERLOCH M.U.D.	415	462	462	462	462	462
2	KLEIN P.U.D. (WP to SI NWHCMUD 36)	501	639	762	775	785	786
3	KLEINWOOD M.U.D.	416	525	660	676	747	755

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
3	LOUETTA NORTH P.U.D.	347	438	551	564	623	630
2	LOUETTA ROAD U.D. (WP to SI Terranova West MUD)	146	186	222	226	250	252
5	MALCOMSON ROAD U.D.	659	739	856	869	924	930
3	NW HARRIS CO. M.U.D. 06	192	243	305	312	345	349
2	NW HARRIS CO. M.U.D. 20	275	351	357	358	358	358
3	NW HARRIS CO. M.U.D. 21 (SI w/ MUD 22 and Fountainhead MUD)	459	580	626	631	631	631
3	NW HARRIS CO. M.U.D. 22 (SI w/ MUD 21)	NA	NA	NA	NA	NA	NA
2	NW HARRIS CO. M.U.D. 36 (SI from Klein PUD)	NA	NA	NA	NA	NA	NA
2	PONDEROSA FOREST U.D.	815	940	940	940	940	940
3	PRESTONWOOD FOREST U.D.	438	532	532	532	532	532
2	SPRING CREEK FOREST P.U.D.	312	398	462	469	469	469
2	TERRANOVA WEST M.U.D. (WP and SI Louetta Road PUD)	289	369	407	412	412	412
2	WESTADOR M.U.D.	715	717	717	717	717	717
	Water Demand at ADF (gpm)	19,292	23,734	26,697	27,026	28,134	28,257
	Water Demand at ADF (mgd)	**27.78**	**34.18**	**38.44**	**38.92**	**40.51**	**40.69**
	73 WHOLESALE CUSTOMERS ADDED FOR 2020 SERVICE AREA						
1	Bayer Water System	53	72	98	100	125	128
3	CHARTERWOOD M.U.D.	347	438	551	564	623	630
4	CITY OF JERSEY VILLAGE (3)	193	403	652	679	807	822
2	Consumers Water Corporation	76	97	115	117	130	131
5	CYPRESS CREEK U.D.	443	496	575	584	621	625
5	EMERALD FOREST U.D. (Very small flow from SI FWSD 61)	491	550	637	647	688	692
5	Enchanted Valley Estates Water Supply	48	48	48	48	48	48
5	FAULKEY GULLY M.U.D.	913	1,022	1,185	1,203	1,279	1,287
1	FOREST POINT MUD	NA	152	289	304	440	456
5	GRANT ROAD P.U.D.	170	191	221	225	239	240
5	HARRIS CO. F.W.S.D. 61 (WP to HCMUD 248 and a little to SI Emerald Forest UD)	1,052	1,179	1,367	1,387	1,475	1,484
5	HARRIS CO. M.U.D. 018	538	602	643	648	648	648
1	HARRIS CO. M.U.D. 043	308	418	568	585	591	592
5	HARRIS CO. M.U.D. 052	NA	45	85	90	130	134
5	HARRIS CO. M.U.D. 069	350	392	454	461	462	462
1	HARRIS CO. M.U.D. 077	0	117	223	234	340	352

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
1	HARRIS CO. M.U.D. 082	441	599	814	838	1,043	1,066
2	HARRIS CO. M.U.D. 086	105	134	159	162	179	181
1	HARRIS CO. M.U.D. 115	0	38	73	76	111	115
4	HARRIS CO. M.U.D. 168	840	929	929	929	929	929
4	HARRIS CO. M.U.D. 170	165	214	214	214	214	214
5	HARRIS CO. M.U.D. 222	345	386	448	454	483	486
5	HARRIS CO. M.U.D. 230	135	152	176	178	190	191
1	HARRIS CO. M.U.D. 231	0	76	145	153	221	229
5	HARRIS CO. M.U.D. 248 (SI HCFWSD 61)	NA	NA	NA	NA	NA	NA
1	HARRIS CO. M.U.D. 249	0	85	116	119	148	151
5	HARRIS CO. M.U.D. 280, now named NORTH POINTE WCID (SI NWHCMUD 15)	93	105	121	123	131	132
5	HARRIS CO. M.U.D. 360/PILGRIM	526	589	683	694	737	742
3	HARRIS CO. M.U.D. 367	214	270	340	348	384	388
3	HARRIS CO. M.U.D. 368	138	174	219	224	248	250
3	HARRIS CO. M.U.D. 383, Comrcial. Dev.	0	264	502	529	766	793
1	HARRIS CO. W.C.I.D. 092	538	730	835	847	847	847
1	HARRIS CO. W.C.I.D. 099	204	277	376	387	467	476
1	HARRIS CO. W.C.I.D. 136	204	277	376	387	408	410
1	HUNTERS GLEN M.U.D.	212	288	392	403	502	513
1	INVERNESS FOREST U.D. (partially w/in NHCRWA	230	312	424	436	543	555
4	Jersey Lake Homeowners Assoc aka Lakeside Club	65	65	65	65	65	65
5	LAKE FOREST U.D.	802	898	1,041	1,057	1,124	1,131
2	MEADOWHILL REGIONAL MUD aka DOVE MEADOWS M.U.D. (WP to SI NWM28)	276	352	419	427	471	476
1	MEMORIAL HILLS U.D.	228	310	421	433	540	551
5	MILLS ROAD M.U.D.	378	424	491	499	520	522
1	NORTH PARK P.U.D.	383	383	383	383	383	383
1	NORTHGATE CROSSING M.U.D. 1 (SI Northgate Crossing 2)	NA	NA	NA	NA	NA	NA
1	NORTHGATE CROSSING M.U.D. 2 (WP to SI Northgate Crossing 1)	95	129	175	180	224	229
5	NW HARRIS CO. M.U.D. 09	522	584	678	688	731	736
5	NW HARRIS CO. M.U.D. 15 (SI MUD 280)	210	235	273	277	294	296
3	NW HARRIS CO. M.U.D. 24	103	130	164	168	185	187
5	NW HARRIS CO. M.U.D. 27	0	34	64	67	97	101

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
2	NW HARRIS CO. M.U.D. 28 (SI to Meadowhill MUD)	0		117	221	233	338	350
4	NW HARRIS CO. M.U.D. 29	290		375	476	487	539	545
2	NW HARRIS CO. M.U.D. 30	0		312	592	623	904	935
2	NW HARRIS CO. M.U.D. 32	156		199	237	242	267	270
1	Pilchers Oxford Group aka Splashtown	23		23	23	23	23	23
1	POST WOOD M.U.D.	210		285	388	399	407	408
4	REID ROAD M.U.D. 1	501		648	822	841	931	941
4	REID ROAD M.U.D. 2	267		345	438	449	497	502
1	RICHEY ROAD MUD	109		148	201	207	257	263
2	SHASLA P.U.D.	182		232	263	267	267	267
1	Six Flags Splashtown L.P.	102		102	102	102	102	102
2	SPRING WEST M.U.D.	66		84	100	102	112	114
1	TATTOR ROAD M.U.D.	364		495	616	630	630	630
1	TIMBER LANE U.D.	841		1,143	1,444	1,478	1,478	1,478
5	TIMBERLAKE I.D.	349		391	410	412	412	412
3	Undeveloped Area A	0		601	1,143	1,203	1,744	1,804
7	Undeveloped Area B	0		527	1,001	1,053	1,528	1,580
6	Undeveloped Area C	0		323	613	645	936	968
6	Undeveloped Area D	0		413	784	825	1,196	1,238
6	Undeveloped Area E	0		495	940	989	1,435	1,484
4	White Oak Manor Mobile Home Comm.	32		32	32	32	32	32
4	W. HARRIS CO. M.U.D. 09	469		540	540	540	540	540
4	W. HARRIS CO. M.U.D. 10	676		874	885	886	886	886
4	W. HARRIS CO. M.U.D. 11	519		671	852	872	965	975
4	W. HARRIS CO. M.U.D. 21	67		86	110	112	124	126
4	WHITE OAK BEND M.U.D.	163		211	267	274	303	306
	Water Demand at ADF (gpm)	17,818		25,334	32,727	33,548	38,682	39,253
	Water Demand at ADF (mgd)	**25.66**		**36.48**	**47.13**	**48.31**	**55.70**	**56.52**
	121 WHOLESALE CUSTOMERS CUMULATIVE TOTALS FOR 2010 THROUGH 2029							
	Water Demand at ADF (gpm)	37,110		49,068	59,423	60,574	66,816	67,509
	Water Demand at ADF (mgd)	**53.44**		**70.66**	**85.57**	**87.23**	**96.21**	**97.21**
	16 WHOLESALE CUSTOMERS ADDED FOR 2030 SERVICE AREA							
1	Amberwood Utility Co.	12		16	21	22	27	28
7	CYPRESS HILL M.U.D. 1	240		249	259	260	270	271
7	CYPRESS HILL M.U.D. 2	0		212	402	424	614	635

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
1	HARRIS CO. M.U.D. 026	422		573	779	802	998	1,020
1	HARRIS CO. M.U.D. 085	0		56	107	113	163	169
7	HARRIS CO. M.U.D. 289	0		130	247	260	378	391
7	HARRIS CO. M.U.D. 322 (SI MUD 354 and 358)	NA		NA	NA	NA	NA	NA
7	HARRIS CO. M.U.D. 354 (SI MUDs 322 and 358)	NA		NA	NA	NA	NA	NA
7	HARRIS CO. M.U.D. 358 (WP to SI MUDs 322 and 354)	770		800	831	835	868	872
7	HARRIS CO. M.U.D. 364 (SI MUD 365)	NA		NA	NA	NA	NA	NA
7	HARRIS CO. M.U.D. 365 (WP to SI MUD 364)	232		241	251	252	262	263
5	HARRIS CO. W.C.I.D. 113	147		164	190	193	206	207
5	NW HARRIS CO. M.U.D. 05	447		501	581	590	627	631
7	NW HARRIS CO. M.U.D. 10	223		231	240	241	251	252
1	Oak Hill Estates Water Co.	0		42	79	84	121	125
7	Suburban Utility Co.	0		140	266	280	406	420
	Water Demand at ADF (gpm)	2,492		3,355	4,254	4,354	5,191	5,284
	Water Demand at ADF (mgd)	**3.59**		**4.83**	**6.13**	**6.27**	**7.47**	**7.61**
	137 WHOLESALE CUSTOMERS CUMULATIVE TOTALS FOR 2010 THROUGH 2030							
	Water Demand at ADF (gpm)	39,602		52,423	63,678	64,928	72,007	72,793
	Water Demand at ADF (mgd)	**57.03**		**75.49**	**91.70**	**93.50**	**103.69**	**104.82**
	118 OWNERS NOT INCLUDED IN THE NHCRWA 2030 OVERALL SERVICE AREA							
6	Albury Manor Utility Co.	22		23	26	26	28	28
7	Allied Concrete Materials	12		13	13	13	14	14
3	Aqua Texas aka Atascocita Acres	26		31	31	31	31	31
3	Aqua Texas aka Bammel Oaks 2	13		16	20	21	23	23
4	Aqua Texas aka Creekside Estates	93		121	153	157	173	175
7	Aqua Texas aka Cypress Fields	28		29	30	30	32	32
7	Aqua Texas aka Lakes of Rosehill	105		109	114	114	119	119
5	Aqua Texas aka Marks Glen	23		26	30	31	33	33
4	Aqua Texas aka Mobile Home Estates	35		42	42	42	42	42
6	Aqua Texas aka Oakwood Village	12		13	15	15	16	16
5	Aqua Texas aka Park Forest	45		50	58	59	62	63
6	Aqua Texas aka Rolling Oaks	27		29	32	32	35	35
5	Aqua Texas aka Stable Gate Homeowners Assoc.	15		15	15	15	15	15

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
7	Ashton Houston Residence	20	52	54	54	56	57
6	Atascocita Management Corp.	75	81	89	90	98	99
6	Augusta Pines Golf Course aka Tour 18	15					
5	Beazer Homes	18	20	23	23	25	25
6	Bussell, Craig	15	16	17	17	19	19
4	C&P Utilities, Inc.	56	73	93	95	105	106
2	C&P Utilities, Inc.	60	76	91	92	102	103
7	C&P Utilities, Inc.	11	11	12	12	12	12
4	C&P Utilities, Inc.	11	14	18	19	21	21
7	C&P Utilities, Inc.	11	12	12	12	13	13
1	Castle Country Homes, Inc.	16	21	29	30	37	38
1	Cemex USA	10	10	10	10	10	10
3	Cemex USA	22	22	22	22	22	22
7	Champions Glen, L.P.	12	12	13	13	13	13
3	Champions Golf Club	124	124	124	124	124	124
5	Chasewood Land Venture	28	31	36	37	39	39
4	City of Jersey Village for Jersey Meadows Golf Course	16	53	53	53	53	53
6	CITY OF TOMBALL	1,315	1,414	1,549	1,564	1,705	1,720
7	Compaq Computer Corp.	89	89	89	89	89	89
3	Compaq Computer Corp.	17	17	17	17	17	17
3	Compaq Computer Corporation	12	12	12	12	12	12
5	Cypress Forest Service Assoc.	41	46	54	55	58	58
7	Cypress Lakes Golf Course aka Middleton Properties	277	277	277	277	277	277
1	Cypresswood Golf Club aka Cypresswood LTD - US golf Corp	268	268	268	268	268	268
6	DOWDELL P.U.D.	144	155	169	171	186	188
6	Dubrook, Inc./Frontier Materials	10	11	12	12	13	13
7	EJDS Inc.	19	20	20	21	21	21
6	ENCANTO REAL U.D.	91	98	107	108	118	119
2	Enviro-Grow Nursery	11	14	17	17	19	19
4	Furlong LTD	42	54	69	70	78	79
1	Fussel Farm, Riley	22	30	41	43	53	54
2	Gilbert, Robert C.	11	14	17	17	19	19
3	Gleannloch Farms Comm. Assoc. Inc. (aka Champions Glen LP)	110	110	110	110	110	110
3	Gleannloch Golf Club L.P.	291	291	291	291	291	291
7	Grand Northwest MUD	0	224	425	447	648	671
5	Grantwood Civic Club aka Grantwood Water Supply Corp.	34	34	34	34	34	34
6	HARRIS CO. M.U.D. 001	256	275	301	304	331	334

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
6	HARRIS CO. M.U.D. 009	0	129	245	258	374	387
6	HARRIS CO. M.U.D. 022	0	184	349	368	533	552
4	HARRIS CO. M.U.D. 025 (WP to SI WHCMUD 1)	251	325	412	422	467	472
6	HARRIS CO. M.U.D. 109	727	782	856	865	942	951
6	HARRIS CO. M.U.D. 383 Golf Club (Proposed)	0	169	169	169	169	169
7	HARRIS CO. W.C.I.D. 155	0	192	365	384	556	576
3	Harris County	16	16	16	16	16	16
4	Harris County	17	17	17	17	17	17
2	Harris County	18	18	18	18	18	18
6	HMW Special Utility District	13	14	16	16	17	17
7	HMW Special Utility District aka 2920 West	35	36	37	38	39	39
7	HMW Special Utility District aka Alice Acres	18	19	20	20	21	21
2	HMW Special Utility District aka Brandywine Pines	18	23	28	28	31	31
5	HMW Special Utility District aka Cypress Pass	17	19	22	22	23	23
7	HMW Special Utility District aka Holly Lakes	17	17	18	18	19	19
7	HMW Special Utility District aka New Kentucky	84	87	90	91	94	95
4	HMW Special Utility District aka Red Oak Terrace	16	21	26	27	30	30
7	HMW Special Utility District aka Rosewood Hill	98	102	106	107	111	111
6	HMW Special Utility District aka Timberwilde	35	38	42	42	46	46
7	HMW Special Utility District aka Treichel Woods	12	13	13	13	14	14
6	HMW Special Utility District aka Willow Oaks	31	34	37	37	41	41
6	HOE Water Supply Corp.	25	27	29	30	32	33
6	Hometown Timbercrest, L.P.	116	125	137	138	150	152
4	Houston Race Park, Sam	72	72	72	72	72	72
3	I.Q. Products Company	10	13	16	16	18	18
6	Inline Development Corp. aka Sugarberry Place	51	55	61	61	67	67
1	Jaeger, Kenneth V.	18	24	33	34	42	43
7	Johnston Utilities Inc. aka Powder Mill Estates	72	75	78	78	81	81

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)	2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
2	Klein I.S.D.	12	16	19	19	21	21
6	Klein Memorial Park and Mausoleum	10	10	11	11	12	13
	KWIK KOPY CORP NORTHWEST FOREST	14					
7	Lake Owners Association	16	16	16	16	16	16
7	Lakes of Cypress Hill Homeowners	41	41	41	41	41	41
7	Lakes of Fairfield H.O.A.	106	106	106	106	106	106
5	Lakewood Grove Assoc. Ltd.	9	9	9	9	9	9
1	Lochinvar Golf Club	94	94	94	94	94	94
3	Lodge at Cypresswood L.P.	15	15	15	15	15	15
5	National Golf Properties, Inc. aka Longwood Golf Club	169	169	169	169	169	169
3	Newman, Thomas C.	19	24	30	31	34	35
6	NORTHAMPTON M.U.D. (WP to SI Oakmont PUD)	838	901	986	996	1,086	1,096
2	Northgate Country Club	205	207	207	207	207	207
2	Northwest Airport MGMT., L.P.	20	20	20	20	20	20
7	NORTHWEST FREEWAY M.U.D.	168	175	182	182	190	190
3	NORTHWEST PINES MHP	74	93	103	103	103	103
7	Northwest Water Systems Inc.	36	37	38	39	40	40
6	NW HARRIS CO. M.U.D. 19	60	65	71	72	78	79
6	OAKMONT PUD (SI to NORTHAMPTON M.U.D.)	0	174	332	349	506	523
2	Pinelakes LP now named Windrose Golf Club	190	190	190	190	190	190
6	Pinewood Place, Inc.	55	59	65	66	71	72
7	Pitcairn W.S.C.	17	18	18	18	19	19
7	Raub, Val	12	12	13	13	13	13
3	Raveneaux Country Club	106	106	106	106	106	106
5	Rock Creek LP	45	51	59	60	64	64
3	S C Utilities	24	24	24	24	24	24
1	Sasson, Eli aka Greens Rd Mobile Home Community	48	66	71	72	72	72
1	Southwest Utilities, Inc.	11	15	20	21	26	26
3	Sterling Gates Estates	10	13	16	16	18	18
5	Tall Pines Utility Inc.	21	23	27	27	29	29
4	Texas Arai, Inc.	11	14	17	18	20	20
6	Tom, John W. Sr.	10	10	11	11	12	12
6	Tomball Country Club	23	23	23	23	23	23
5	Tower Oak Bend Water Supply	42	47	55	56	59	60
5	Treeline Golf Club, INC	70	70	70	70	70	70
3	Trees & Plants Inc	10	12	16	16	18	18
6	Trunkline Gas Company	19	20	22	22	24	24

TABLE 4 WHOLESALE CUSTOMERS AND NON-CUSTOMERS WITHIN THE NHCRWA – EXISTING AND PROJECTED ADF WATER DEMAND PER CONSTRUCTION PHASE *(CONTINUED)*

PLN REG	OWNER (1)	Year 2000 ADF (2) (gpm)		2010 ADF (gpm)	2019 ADF (gpm)	2020 ADF (gpm)	2029 ADF (gpm)	2030 ADF (gpm)
6	Undeveloped Area F (new Woodlds Area)	0		2,057	2,057	2,057	2,057	2,057
4	W. HARRIS CO. M.U.D. 01 (SI MUD 25)	0						
7	Waller I.S.D.	19		20	21	21	22	22
7	Waynewood Place Civic Club, INC	29		30	31	31	33	33
6	Willow Creek Golf Club	73		73	73	73	73	73
4	Windermere Interests LTD	107		139	176	180	199	202
3	Woodwind Lakes Homeowners Assoc. aka Creekside U.C.	32		32	32	32	32	32
	Water Demand (gpy)	8,714		12,540	14,144	14,321	15,783	15,945
	Water Demand at ADF (mgd)	**12.55**		**18.06**	**20.37**	**20.62**	**22.73**	**22.96**
	TOTAL FLOWS WITHIN NHCRWA'S BOUNDARY >= 5.0 MGY							
	ADF (gpm)	**48,316**		**64,963**	**77,822**	**79,249**	**87,790**	**88,739**
	ADF (mgd)	**69.58**		**93.55**	**112.06**	**114.12**	**126.42**	**127.78**

Notes:
PLN REG: Planning Region Nos. 1 through 7 as shown in *Exhibit 4*; NA: Not applicable
(1) Some owners supply or receive their water from other owners through system interconnects (SI). Projected water demands for owners receiving water were combined into the projected water demands for the owner supplying their water.
(2) ADF: Annual average daily flow was calculated from HGCSD's Year 2000 pumpage.
(3) These water demands exclude the 750,000 gpd the City of Jersey Village receives from the City of Houston through its system interconnect.
(4) Water demand projections were calculated using the UH CPP census tract population and employment forecasts, unit demand factors, and HGCSD Year 2000 pumpages.

N
W E
S
17500 0 17500 Feet

LEGEND
NHCRWA Boundary
CCN
Utility Districts

249 TEXAS
1960
1960
59
45
290
1960
6 TEXAS
8 TEXAS
610

North Harris County Regional Water Authority

GROUNDWATER REDUCTION PLAN

NHCRWA BOUNDARY AND MEMBER ENTITIES

Turner Collie & Braden Inc.
Engineers • Planners • Project Managers

REVISION DATE: AUGUST 2004	TC&B JOB NO: 052311509.0002	EXHIBIT: 2