EXECUTIVE SUMMARY

BACKGROUND

Rapid growth and development in northern Hays County and southwest Travis County have created community concerns with the increasing potential for pollution of groundwater and surface waters. A regional summit was convened to begin discussions on the impacts that development was having on the region and particularly to water quality in the Barton Springs Zone of the Edwards Aquifer. As a result of these discussions, a Regional Group was established, made up of representatives from the Cities of Dripping Springs, Austin, Buda, Kyle, Rollingwood, Sunset Valley, the Village of Bee Cave, Blanco, Hays and Travis Counties, the Barton Springs/Edwards Aquifer Conservation District, the Hays Trinity Groundwater Conservation District, and the Blanco-Pedernales Groundwater Conservation District. This Regional Group set out to develop a regional water quality protection plan to implement local water quality protection measures. This "Regional Water Quality Protection Plan", or simply the "Plan" is the result of that effort.

From the outset of the Project, the development of the Plan was guided by the participation of various stakeholders. A Stakeholder Committee (SHC) was established to coordinate this input. The input obtained at the meetings as well as written comments submitted by members of the Stakeholder Committee and the technical review group were evaluated by the consulting team with many of the comments serving as the basis for subsequent revisions of the various project documents.

The "Planning Region" is defined as the recharge zone for the Barton Springs segment of the Edwards Aquifer and its contributing zone. Located in the Texas Hill Country, one of the states' most unique natural areas, the Planning Region covers portions of northern Hays County, southwest Travis County and a small section of eastern Blanco County. It includes all or a portion of the Cities of Austin, Buda, Dripping Springs, Hays City, Kyle, Mountain City, Rollingwood, Sunset Valley, West Lake Hills and the Villages of Bee Cave, Bear Creek, Lakeway and portions of the Barton Springs/Edwards Aquifer and the Hays Trinity Groundwater Conservation Districts.

Estimates of historical population growth trends for the Planning Region were developed based on U.S. census data. The Planning Region experienced a combined annual growth rate of 3.6% between 1990 and 2000, while the Hays County portion experienced a higher growth rate (5.2%) than tracts within the Travis County portion (3.3%). Future projections indicate that the Planning Region could experience a combined annual growth rate of 1.9% between 2000 and 2060, with the total population within the Planning Region growing from an estimated 122,954 in 2000 to an estimated 385,594 in 2060. This corresponds to an increase of approximately 101,000 households by 2060, or approximately 1,680 households per year.

GUIDING PRINCIPLES

The Stakeholder Committee developed a set of guiding principles to provide direction and a steady reference point as the plan progressed. These guiding principles are presented below.

1. *The economy and environment of this unique part of Texas depend upon the preservation, conservation and management of dependable supplies of clean water. We all recognize the unacceptable consequences that would result if we take no action to protect our water.*

2. *Both private individuals and the Public have a responsibility to respect the legitimate interests of others and to do no harm in their activities.*

3. *Those who benefit from an activity must bear the responsibility for the costs and impacts of that activity.*

4. *We will favor measures which, all else being equal, minimize the risk of failure or of damage to the watershed.*

5. *The water quality protection measures we recommend will strive to balance Government regulations with appropriate economic incentives.*

6. *The regulatory measures we recommend shall be accompanied by strategies for administration and enforcement that provide as much certainty as possible while discouraging exemptions and exceptions.*

7. *We will make all our decisions being mindful of the economic impact of the measures recommended and strive to achieve a fair and reasonable balance among the various interests.*

8. *We will not permit any party or group in this process to have undue or unfair control over the outcome.*

GOALS AND OBJECTIVES

The Stakeholder Committee goals statement.

> ***"Develop an implement-able Regional Water Quality Management Plan that preserves and protects resources and manages activities within the planning region so that existing and future land use, land management, and development activities maintain or enhance the existing water quality of the groundwater and surface water within both the Barton Springs segment of the Edwards Aquifer and the contributing portion of the watersheds within the Planning Region, for the benefit of people and the environment."***

To achieve this goal, the following objectives were identified:

- Objective 1 – Define "Water Quality"
- Objective 2 – Identify Causes of Water Quality Problems
- Objective 3 – Identify Standards to Protect Water Quality
- Objective 4 – Identify Who Can Act to Protect Water Quality
- Objective 5 – Identify Protection Measures that are Already in Place
- Objective 6 – Identify New Measures Needed

- Objective 7 – Develop a Strategy for Action

WHAT DOES THE REGIONAL PLAN PROTECT?

The Regional Plan was to protect "Water Quality", including both surface water and groundwater. "Surface water" includes all forms of water on the surfaces of the earth, including that flowing or stored in above or below ground watercourses or storage features. "Groundwater" is water flowing or stored in the voids of natural earthen material below ground level. Groundwater is found in the voids of many natural earthen materials, often called media. While groundwater is found in all types of earthen media, it is most frequently encountered in useable quantities in sand, gravel and porous rock. Surface water becomes groundwater when it infiltrates into the earthen media through a process called "recharge". The location where this recharge occurs is referred to as the "recharge zone". The earthen media containing groundwater is often referred to as an "aquifer". When groundwater discharges to the land surface, for example at a "spring", the groundwater once again becomes surface water.

There are several defined streams and watersheds within the planning region, generally proceeding from north to south:

- Little Barton Creek
- Barton Creek
- Bee Creek
- Little Bee Creek
- Eanes Creek
- Williamson Creek
- Slaughter Creek
- Bear Creek
- Little Bear Creek
- Onion Creek

Six (6) of these streams (Barton, Williamson, Slaughter, Bear, Little Bear, and Onion) cross the Recharge Zone on their lower reaches and are responsible for a approximately eighty five percent (85%) of the surface recharge to the Barton Springs Zone.

There are numerous springs in and around the Planning Region. The most famous of these springs are the Barton Springs. A few hundred feet upstream of its confluence with the Colorado River, Barton Creek is dammed to capture spring flows at the Edwards Aquifer primary discharge point; the Barton Springs. The captured spring flows create a popular swimming facility known as the Barton Springs Pool.

The Edwards Aquifer Recharge Zone is the outcrop of the geologic unit known as the Edwards Group. The Edwards Group consists of complex carbonate formations with characteristic karst features, formed by solution of limestone by water. The Edwards Aquifer is an important sole source aquifer relied on extensively in Central Texas as a water supply source. The Contributing Zone for the Edwards Aquifer in Hays and Travis Counties is the outcrop of the Glen Rose Formation, which also serves as the recharge zone for the Trinity-Glen Rose aquifer. The Trinity Aquifer group is an important groundwater supply, which extends from Uvalde County in South Texas to Montague County along the Red River in North Texas.

Another aspect of the Planning Region is the existence of Critical Environmental Features (CEFs), which are geological, topographical, physiographical, or hydrological components of the landscape that serve to remediate the quality of water for human use as well as use by terrestrial and aquatic biological resources including endangered species. CEFs consist of four general categories:

- Category 1: Limestone recharge features
- Category 2: Streams and associated streambeds
- Category 3: Floodplains and Wetlands
- Category 4: Edwards Aquifer discharge areas

Categories 1-3 are geographically located within generally finite boundaries, and can function to substantially affect water quality. Therefore, protection of these features is the first line of defense in protecting Category 4 features. The Plan recommends protecting Category 1, 2 and 4 features with dedicated offsets. Category 3 features have been incorporated into the protections for streams.

While there are several threatened and/or endangered species that inhabit the Planning Region, the most prominent is the Barton Springs salamander. The Barton Springs salamander (*Eurycea sosorum*) has been listed as endangered by the U.S. Fish and Wildlife Service (USFWS) and the State of Texas. In response to the federal listing and the recognized threats to the Barton Springs Salamander, the USFWS has taken several measures to protect the species. Individuals and entities that comply with these measures will be in compliance with the requirements of the Endangered Species Act.

EXISTING WATER QUALITY REGULATORY PROGRAMS

There are many existing water quality regulatory programs. Although there are numerous specific water quality regulatory programs at both the federal and state level, the major programs pertaining to the Planning Region include:

- TCEQ Edwards Aquifer Regulations
- TCEQ Texas Pollutant Discharge Elimination System (TPDES) regulations, including point source wastewater discharges, and storm water discharges from industrial sites, construction sites, and certain municipal systems.
- The TCEQ On-Site Sanitary Sewage Facility (OSSF) Program.
- The Federal Endangered Species Program
- The Railroad Commission of Texas' Oil and Gas Environmental Program.
- The TCEQ's Municipal Solid Waste Program.
- The TCEQ's Petroleum Storage Tank Program
- The TCEQ's Industrial and Hazardous Waste Program
- The Texas State Soil and Water Conservation Board (TSSWCB) Agricultural and Silvicultural Water Quality Management Program
- The Federal Spill Prevention, Control and Countermeasure (SPCC) Program
- The Federal Superfund Program
- The Federal Toxic Substances Control Program
- The National Wetlands Program
- The National Floodplain Program

There are also a number of existing regulatory programs at the local level specifically intended to protect water quality, both inside and outside the Planning Region. The Cities of Austin, Buda and Dripping Springs and the Village of Bee Caves have water quality protection ordinances. The LCRA also has existing water quality protection ordinances applicable to portions of Travis County. A summary presentation of these programs is included in Attachment 5. There are several local

jurisdictions in the general area, but outside the Planning Region that have existing water quality regulatory programs and similar hydrogeology. Water quality ordinances from the Cities of New Braunfels, San Antonio and San Marcos have also bee included in Attachment 5 for comparison purposes.

WATER QUALITY PARAMETERS AND MONITORING

In general, "water quality parameters" are defined as physical, chemical or biological constituents in water or other indicators used to assess, monitor and control water quality. While the scope of this Plan prevents a complete listing of all the parameters utilized by all the current water quality regulatory programs, several general categories of water quality parameters have been identified for use in the plan. These include:

- Solids
- Dissolved Oxygen/Oxygen-demanding Substances
- Nutrients (primarily nitrogen and phosphorus)
- Pathogens
- Petroleum Hydrocarbons
- Metals
- Synthetic Organic Compounds
- Physical Parameters, including temperature and pH

In addition, a significant amount of historical monitoring has been conducted in the Planning Region by a variety of entities. A coordinated data collection, monitoring and evaluation system is recommended as a part of this Plan.

Water quality data used for planning and design should be evaluated and treated differently than data used for monitoring and evaluation. Water quality parameters used for planning and design have been selected to be representative of the major broad issues, while an expanded list of parameters is recommended for monitoring and evaluation purposes. The following water quality parameters have been identified for use in planning and design:

- Suspended Solids/Sediment
- Total Dissolved Solids
- Suspended biological constituents/oxygen depleting constituents

An on-going water quality monitoring and evaluation process will be an integral part of implementing the water quality protection measures from this Plan. This monitoring program should encompass a variety of water quality parameters and should include all surface watersheds, and representative groundwater wells within the Planning Region.

WATER QUALITY THREATS

Based on the goals and objectives established for the Plan, there are many potential water quality threats and many different types of pollutants that may affect water quality. Many of these threats or pollutants result in some way from human activity. The major threats identified by the consultant team and Stakeholder Committee are presented below.

- **Urbanization** can threaten water quality by removing natural vegetation, increasing erosion and sedimentation, and by increasing impervious cover, resulting in increased storm water runoff rates and volumes. Urbanization also increases human activity, resulting in additional pollutant loadings, the generation of more wastes, and an increased use of potentially harmful materials.
- **Long-Term Groundwater Withdrawal Exceeding Recharge** result in "outflows" exceeding "inflows" within an aquifer. Over time, this net decrease could deplete the aquifer. Modeling conducted by the Barton Springs Edwards Aquifer Conservation District concluded that with current pumping rates and a recurrence of the drought of record, water levels in the aquifer could decrease to the point where the Barton Springs would go dry, saline water could intrude into the fresh water zone, and some existing domestic supply wells could go dry.
- **Point source discharges** result from a limited number of activities, but account for a majority of the non-storm water flows. Almost all point source discharges result from the treatment of either domestic wastewater or from industrial/commercial process wastewater, with major threat being the excessive discharge of biological constituents and nutrients.
- **Storm Water/Non-Point Source Pollution** - NPS pollution occurs as a result of rainfall events. When human activities or natural processes result in pollutants being present at or near the land surface, these pollutants can be taken up by storm water runoff and can result in NPS pollution. Several specific threats from storm water NPS pollution include: construction site storm water discharges, discharges from industrial activities and from urbanized areas.
- **Domestic Wastewater Collection, Treatment and Discharge** - the major threats arise from biological constituents and nutrients through unintended discharges, inadequate treatment, or the improper design and application of treated wastewater effluent.
- **Lack of Water Quality Protection Measures on Existing Development** poses a threat to water quality in the Planning Region, in much the same way that Urbanization does.
- **Failure to Implement/Enforce Existing Regulations** presents a significant threat to water quality from construction site storm water controls, sanitary sewer overflows, on-site, decentralized sewage facilities, and structural best management practices (BMPs) and storm water control systems.
- **Use, Storage and Disposal of Harmful Materials** can threaten water quality through the improper management of hazardous materials, wastes, pesticides and nutrients.
- **Improper Vegetative Management** threatens waster quality through excessive erosion/sedimentation and excessive nutrients and biological constituents.
- **Improper Agricultural Practices** also adversely impact water quality through excessive erosion/sedimentation and excessive nutrients.

STRATEGY FOR SELECTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

As outlined in the Goals Statement developed by the Stakeholder Committee, the ultimate goal of the water quality protection measures presented in this Plan is to maintain or enhance the existing water quality, including both surface water and groundwater. To accomplish this objective, the strategy has been to select measures that facilitate no net increase in anticipated pollutant loadings

for individual sites or developments. This strategy will require a site specific evaluation of pre- and post-development conditions, along with a technical demonstration that the objective can be met.

While the Planning Region has been designated based on the Edwards Aquifer recharge zone and contributing zone, the water quality protection measures presented in this Plan will also protect other water resources. These measures will protect surface water and groundwater in the Planning Region, including groundwater in the Trinity-Glen Rose aquifer system. These measures will maintain and enhance water quality wherever they are applied.

The measures presented and discussed included both "structural" and "non-structural" measures, or "Best Management Practices" (BMPs). Structural BMPs are generally engineered and constructed systems, while non-structural BMPs are generally institutional and pollution prevention practices. The approach outlined in this Plan is a combination of structural and non-structural BMPs, with a preference for non-structural. However, non-structural BMPs alone will not always be suffficient. If development activities are to meet the Plan Objectives, they will typically require both structural and non-structural controls.

There are several aspects unique to the Planning Region that require any measures considered to be consistent with these unique aspects. This is particularly true of structural BMPs and their tendency to concentrate water quality pollutants in the vicinity of the structural control. For example, to prevent localized excessive pollutant loadings to groundwater recharge, it may be necessary to place a recharge barrier underneath some BMPs. Where these unique aspects are important to the description of a measure, they have been explicitly addressed.

1.1.1. Applicability of Water Quality Parameters

As outlined above, only a portion of the previously monitored water quality parameters have been selected for use in planning and design of new development. The parameters selected for use during planning and design were based on the availability of a relatively extensive database of monitoring data for these parameters and their relationship to a variety of activities. Certain selected parameters (e.g. total dissolved solids) are intended to be representative of other parameters (e.g. dissolved toxic compounds) that are transmitted in essentially the same way. Their use in planning and design is not intended to replace water quality monitoring.

There are other water quality threats posed by parameters which have not been selected for use in planning and design of new development. The general approach used to address these other parameters is through the use of non-structural measures, including use restrictions and public education. These non-structural measures allow a wider range of parameters to be addressed than those traditionally addressed in current water quality protection programs.

DESCRIPTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

A wide variety of different water quality protection measures were considered and evaluated during this process, and are presented are in the general order of the level of water quality protection provided.

Natural Area and Open Space Conservation

During the initial identification of issues by the stakeholders early in the process, the concept of natural area/open space conservation consistently ranked among the most important objectives for the Plan. The purpose of this measure is to restrict the land in that space from further development. This can be accomplished through conservation easements of land acquired for habitat protection.

Transferable Development Rights

This concept would allow development rights to be transferred from one property to another, while ensuring that the net effect complied with the water quality protection measures presented in the Plan. The intended outcome of this concept is to direct higher intensity development either outside the Planning Region or into preferred growth areas

Comprehensive Site Planning and Pre-Development Review

To ensure that the water quality protection measures are incorporated into the site design, a comprehensive site plan should be prepared, including:

- A thorough site characterization
- A presentation of design details for the technical elements of the site plan
- A technical demonstration that the site design meets the water quality protection objectives of this Plan
- An operations, maintenance, monitoring and funding plan to ensure the long term function of the water quality protection measures for the site.

Location of Development

It was determined that the location of development activities can have significant impacts on water quality, and the concepts of streams offsets/buffer zones, and offsets from CEFs were incorporated to address these impacts. The following stream buffer zones would be required:

Table ES-1 - Required Buffer Zone Widths (from Stream Centerline)

Contributing Area	Width/Offset (feet, each side of centerline)	Total width (feet)
32 to 120 Acres	100	200
120 to 300 Acres	150	300
300 to 640	200	400
Greater than 640 Acres	300	600

The following offsets from CEFs would be required:

Table ES-2 - Required Offset Distances for Critical Environmental Features

Type of Feature	Upstream Offset (feet)	Downstream Offset (feet)
Point recharge feature (direct communication with aquifer)	Upper catchment divide or 300, not less than 150	150
Indirect feature (no direct communication with aquifer)	150	150

Intensity of Development

Several scientific studies have identified a direct relationship between the intensity of development (impervious cover) and water quality. In general terms, as development intensity increases, water quality impacts also increase. A number of relevant water quality studies have been conducted in and around the Planning Region. In general, these studies indicate that significant water quality impacts begin to occur at between five and eighteen percent (5-18%) impervious cover. Based on the evaluations of the scientific studies presented, the consulting team determined that the approximate quantity of impervious cover which can occur while remaining protective of water quality in the Planning Region is in the range of ten to fifteen percent (10% to 15%), on a gross site area basis.

Due to the established correlation between increasing impervious cover and decreases in water quality, the concept of limiting impervious cover would be one measure to help achieve the goals and objectives of the Plan. The following tables summarize the recommended impervious cover limitations recommended by the consulting team and the stakeholders. Detailed explanatory notes for each table are included in the Plan.

Table ES-3 - Required Impervious Cover Limits – Consulting Team Recommendation

Location	Simplified	Standard Methods	Standard Methods + TDRs
Recharge Zone	5	10	15
Contributing Zone, outside "preferred growth areas" (PGAs)	7.5	15	25
Contributing Zone, Single Family Residential inside PGAs	7.5	15	30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	7.5	25	45 or No Limit [1]

[1] The "No Limit" option requires that building roof runoff be captured through rainwater harvesting with fourteen (14) days storage capacity, used for landscape irrigation.

Table ES-4 - Required Impervious Cover Limits – Range of Stakeholder Recommendations

Location	Simplified	Standard Methods	Standard Methods + TDRs
Recharge Zone	3 to 5	5 to 15	10 to 25
Contributing Zone, outside "preferred growth areas" (PGAs)	5 to 10	10 to 25 + TDRs	15 to 30
Contributing Zone, Single Family Residential inside PGAs	5 to 20	10 to 30 + TDRs	20 to 30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	5 to 20	20 to 40 + TDRs	30 to No Limit

Control of Hydrologic Regime

Scientific studies have established that increases in the rate and volume of storm water runoff generally have an adverse impact on water quality in natural streams. To address adverse impacts, measures are recommended to control the rate and volume of storm water runoff. For site designs that provide for discharge of surface water, adequate retention/detention should be incorporated into the site design to limit flows into the receiving stream consistent with the volume from the two (2) year, three (3) hour duration rainfall, evenly distributed over a twenty four (24) hour period. In addition to limiting the rate of discharge, prior to discharge into the buffer zone, all concentrated flows should be properly distributed to provide for sheet flow through the buffer zone into the stream channel. Drainage structures providing discharge routes for flood flows should be sized to maintain flood flow velocities below erosive levels, up to the twenty five (25) year, three (3) hour duration. All discharge points from ponds or other accumulation areas must provide for energy dissipation prior to exiting the site, in order to minimize erosion.

Structural BMPs for Discharges from Developed Land

As indicated previously, structural BMP's should be utilized in conjunction with the other water quality protection measures presented in this Plan, to minimize the localized impacts of development. However, the removal effectiveness of most structural BMPs varies significantly, and in some instances, BMPs operating in sequence together, or "treatment trains" are required to achieve specific performance goals. Structural BMPs are also less effective at removing dissolved constituents than at removing suspended constituents. Due to the uncertainty and variability, design considerations have be incorporated. The BMPs recommended for use in the Planning Region are broken down into two (2) categories: primary and secondary. The primary BMPs, working alone within their documented operating range, should meet the objective of "no net increase" of pollutants, and include retention/irrigation, bio-retention, and created wetlands. The secondary BMPs presented may not meet the objectives working alone, but may be useful working in conjunction with other measures. Secondary BMPs include:

- Infiltration System
- Detention/Sedimentation Systems
- Sand Filtration Systems

- Vegetative Filter Strips
- Vegetated Swales

Specific requirements for operations and maintenance of BMPs are also included.

Local Enforcement of Construction Site Controls

Because the failure to use the appropriate controls for storm water discharges from construction sites poses a significant threat to water quality, local jurisdictions should request delegation of the TCEQ's Edwards Aquifer rules and the TPDES Storm Water Construction Site program. Another mechanism for ensuring local enforcement of construction site storm water controls is by requiring that they be submitted and reviewed by the local jurisdiction in conjunction with the development review process. The local jurisdiction should require the following items in conjunction with a construction site storm water control plan:

- A demonstration that the estimated sediment capturing capacity of each type of control measures is capable of handling the expected sediment loading rate
- A demonstration that control measures for concentrated flow are suitable for the quantity and rate of flow expected

The review of these items should be incorporated into the development review and construction plan approval process, and will require appropriate technical expertise on behalf of the reviewing entity. The inspection of storm water controls should also be incorporated into other inspection activities.

Wastewater Management

While the improper management of wastewater can pose a significant threat to water quality, the proper management of wastewater can be of great benefit in maintaining and enhancing water quality. The following specific measures are recommended:

- Increased inspection frequency for centralized wastewater collection systems
- Providing secondary treatment of wastewater
- Limitations on the characteristics of the receiving site for wastewater effluent land application
- Controlling the hydraulic loading rate of wastewater effluent land application
- Additional design and inspection requirements for OSSFs
- Requiring an operations, maintenance and funding plan

Alternative Water Sources/Uses and Conservation

Rainwater harvesting and water conservation are included as recommended strategies for improving water quality. Rainwater harvesting has also been incorporated into the strategy to allow increased development density in certain situations.

Characteristics of Development and Land Use

There are varying potential threats to water quality that depend on the specific characteristics of the development. These threats need to be addressed through a number of water quality

protection measures unique to the type of development occurring, and through various land use restrictions, related to existing state law.

Restrictions on Use, Storage and Disposal of Potentially Harmful Materials

Restrictions on the use, storage and disposal of potentially harmful materials help address the threats posed by these substances to water quality. These restrictions include:

- Limitations on the concentrated storage of hazardous materials
- Response requirements to transportation incidents
- The use of certain petroleum products (e.g. “Coal tar” sealants)
- Proper Management of wastes
- Proper use and application of pesticides and nutrients

Proper Vegetative Management

Good vegetative ground cover slows and filters surface sediment from storm runoff, prevents erosion, and improves infiltration of water into the soil. Requirements have been included for the restoration of natural vegetation following land disturbance, and recommendations have been included for restoring/improving existing vegetation to improve water quality.

Proper Agricultural Practices

Proper livestock/range and cropland practices have been included to to minimize adverse water quality impacts from improper agricultural practices.

Protection of Endangered and Threatened Species

Scientific evidence supports the conclusion that water quality impacts can adversely affect the Barton Springs Salamander and other endangered species. The types of endangered species protective measures outlined under existing federal programs have been incorporated into the Plan.

Public Education/Outreach

Public education and outreach is a major factor in the success of many water quality protection measures. Through public education, people gain an understanding of how their actions can affect water quality and become more informed about water quality issues in their community. Public education, awareness and acceptance are crucial for the political and financial sustainability of water quality protection measures implemented by local governments. Public Education is also the primary driver for the voluntary implementation of water quality protection measures. Specific public education recommendations include:

- Developing awareness and support for the Regional Plan,
- Public Education/Outreach for Homeowners
- Education/Outreach for Commercial Activities
- Outreach Programs to Minority and Disadvantaged Communities and Children

- Public Outreach Programs for New Development
- Public Assistance with Problem Identification and Enforcement
- Public Education Outreach Avenues

IMPLEMENTATION, ENFORCEMENT AND ACCOUNTABILITY

Existing Entities

There are a number of different types of governmental and quasi-governmental entities that have existing legal authority for implementing certain parts of the Plan. The following types of existing entities are described in the Plan, along with an explanation of their powers and limitations.

- Texas Commission on Environmental Quality
- Home Rule Municipalities
- Counties
- Special Purpose Districts
- Groundwater Conservation Districts
- Public Improvement Districts
- Authorities

There are several areas of overlapping jurisdiction between existing entities within the Planning Region, including between municipalities and counties, and between special districts and other governmental jurisdictions. A detailed explanation of these overlapping jurisdictions are provided in the Plan.

The following table lists the municipalities and counties within the planning area, the estimated area within their municipal boundaries, areas within the Extra Territorial Jurisdiction (ETJ) of municipalities, and unincorporated areas of the counties outside the incorporated boundaries and ETJs.

Table ES-5 – Approximate Areas Under the Jurisdiction of Local Entities Within the Planning Region[2]

LOCAL ENTITY	Area (Ac.)	% of study area
City of Austin (Incorporated)	22,384	9.26
City of Austin (Limited Purpose ETJ)	5,470	2.26
City of Austin (2 mile ETJ)	23,587	9.76
City of Austin (5 mile ETJ)	17,836	7.38
Village of Bear Creek (Incorporated)	739	0.31
Village of Bee Cave (Incorporated)	1,200	0.50
Village of Bee Cave (1 mile ETJ)	5,582	2.31
City of Buda (Incorporated)	91	0.04
City of Buda (ETJ)	1,338	0.55
City of Dripping Springs (Incorporated)	2,536	1.05
City of Dripping Springs (ETJ)	69,335	28.68
City of Hays (Incorporated)	2,539	1.05
City of Kyle (ETJ) [Estimated]	100	0.04
Village of Lakeway (Incorporated)	140	0.06
Village of Lakeway (ETJ)	3	0.00
Mountain City (Incorporated)	157	0.07
Mountain City (0.5 mile ETJ)	840	0.35
City of Rollingwood (Incorporated)	441	0.18
City of Sunset Valley (Incorporated)	154	0.06
City of Sunset Valley (0.5 mile ETJ)	724	0.30
City of West Lake Hills (Incorporated)	763	0.32
SUB-TOTAL	**155,960**	**64.51**
Blanco County (Unincorporated outside ETJs)	3,304	1.37
Hays County (Unincorporated outside ETJs)	73,540	30.42
Travis County (Unincorporated outside ETJs)	8,952	3.70
SUB-TOTAL	**85,796**	**35.49**
TOTAL	**241,756**	**100.00**

Figure 6, shows the location of these areas municipalities and their ETJ within the Planning Region.

Recommended Implementation Strategy

The successful implementation of this Plan will depend on a number of factors, including: the type of growth and development that local governments want to encourage, the adoption of water quality ordinances and orders that will complement platting and subdivision regulation, effective operations and maintenance of facilities and educating the public on the importance of managing their activities to minimize the potential for adversely impacting water quality. The implementation recommendations presented in the plan are both long term and short term. The

[2] Base data taken from "Northern Hays and Southwestern Travis Counties, Water Supply System Project Environmental Impact Study", BIO-WEST, Inc. and LCRA, June 2002. Data supplemented with information provided directly by local entities.

short term recommendations have been developed to rely solely on local jurisdictions involved in the planning process, working strictly within their existing legal authority. Due to the time required and the uncertainty in outcome, the establishment of a single implementing entity has been incorporated as an alternative, long term objective.

As shown in the previous section, the Planning Region consists of portions of eleven cities and three counties with a combined area of approximately 240,000 acres. The unincorporated area of Hays County accounts for 30.7% of the Planning Region, while the City of Dripping Springs and its ETJ accounts for 29.7%; the City of Austin accounts for 28.8%, and the unincorporated area of Travis County accounts for 3.7%. These four entities have approximately 93% of the Planning Region within their jurisdictional boundaries.

Since a small number of the local governments control the vast majority of the Planning Region, the initial (short-term) implementation strategies have been developed focusing on municipalities and counties. Other types of entities, whose establishment is within the powers of existing local jurisdictions, can be utilized to supplement this implementation. Additional long-term alternatives have been suggested by the Stakeholder Committee and are presented in subsequent sections.

Implementation Mechanisms for All Jurisdictions

The following specific measures are recommended for all public entities:

- Incorporating the recommended water quality protection measures into existing design Criteria
- Establishing or modifying their pre-development review process to incorporate these measures
- Modifying their construction inspection to include water quality protection measures
- Incorporating Water Quality Protection Measures into Public Projects
- Requesting delegation from TCEQ for local enforcement of the Edwards Aquifer program, TPDES construction site storm water permit program, and the OSSF program
- Using development agreements to encourage compliance with and not circumvent the water quality protection measures
- Requiring financial assurance and long-term funding for operations and maintenance of water quality protection measures
- Cooperating with other political subdivisions on water quality protection
- Developing public-private partnerships with conservancy groups

Specific recommendations are included for municipalities, including:

- Enforcing water quality protection measures through zoning
- The use of development agreements to secure financial assurance and long-term funding
- The possible use of special taxing entities (special districts) including MUDs, WCIDs and PIDs.
- Mechanisms for operations, maintenance and monitoring

Specific recommendations are included for counties, including:

- Enforcing water quality protection measures through limited land use powers
- The use of development agreements to secure financial assurance and long-term funding
- The possible use of special districts (including MUDs, WCIDs) to address water quality protection measures
- The use of special taxing entities (MUDs, WCIDs & PIDs) as funding mechanisms
- Mechanisms for operations, maintenance and monitoring

Although limited in their ability to directly participate in regulation, recommendations are included for authorities and special districts.

Natural Area Conservation

Natural area/open space conservation can be accomplished through a combination of voluntary conservation and conservation in exchange for flexibility in other areas. However, if these areas are to provide these benefits in perpetuity, their conservation must be ensured by preventing their future development.

Conservation easements can be used to bring the "as-built" impervious cover in the Planning Region closer to the uniform development intensities presented in this Plan. Based on an evaluation of impervious cover within the Planning Region, the Plan recommends that approximately 20,000 acres of natural area conservation be implemented within the Planning Region to address the equity issues with prior development. Conservation easements can also be used to secure transferable development rights, by applying restrictive mechanisms to ensure that future development of the property will not occur. There are several different aspects to the process for ensuring that future development of designated natural area/open space conservation easements is prohibited, including:

- Controlling Ownership
- Zoning Restrictions
- Easements to the Public
- Restrictive Covenants
- Physical Barriers

Other aspects of assuring the long term protection of conservation easements include the appointment of a conservator responsible for long-term custodial management, and securing long-term funding.

Transferable Development Rights Secured by Retrofitting Prior Development

The recommended strategy for securing TDRs through retrofitting was to allow credits only for net reductions in impervious cover, and defer the evaluation of quantifying any future TDR credits that may be obtained through the adaptive management process. In instances where this is utilized, the party responsible for the site to be developed must perform the retrofit. Local

jurisdictions may also establish a retrofit program which allows developers to make a cash payment in lieu of the required retrofit.

Uncertainties and the Fear of Unintended Consequences

As with any new venture, even a thorough evaluation of the concepts and strategies may not always identify and avoid uncertainty and unintended consequences. It is absolutely imperative that the institution of the concept of TDRs be evaluated by each entity and be an evaluation factor during the adaptive management process. The outcome intended for TDRs in this Plan is to bring equity to the development process and prevent early projects from exceeding protective intensities at the expense of later development that would have to be further restricted beyond protective levels. Given this understanding of the purpose and intended outcome of the use of TDR's, the following restrictions should be incorporated into the implementation process:

- TDRs are a voluntary component intended to create a market for flexibility in development intensity and can not be secured through the use of eminent domain or the right of condemnation. Entities with the right of eminent domain should be encouraged to use TDRs, where appropriate or desirable, but must secure them through an open market and not through the use of eminent domain.
- TDRs are not intended to have an independent or inherent taxable value. In accordance with established Texas law and tax policy, the tax status, including any exemptions, for all property should be based on the use of that property and not on the status of the TDRs.

On-going Monitoring Program

Most of the water quality protection measures included in the Plan have been based to varying degrees on monitoring data. A cooperative, on-going monitoring program should be implemented to allow better use of this monitoring data through the Planning Region.

Public Education

A comprehensive and coordinated public education program should be included as a part of implementing these measures. This coordinated effort could be accomplished by identifying one coordinating entity that executed the public education efforts through cooperative agreement with the public entities.

Alternative Implementation Mechanisms

During the identification of issues by the stakeholders, the concept of a single regional entity to implement the Plan was consistently popular and considered important by many stakeholders. Such an entity would have several distinct advantages, including consistency of implementation across the entire Planning Region, eliminating replicated administration and overhead, and the economies of scale typically associated with larger entities. Due to the legal authority required for such an entity, it could only be created by the Texas Legislature. There are two alternatives presented to implementation using only local jurisdictions: the creation of a new regulatory entity or expanding the authority of an existing entity. Under either alternative, it would require an extended time frame and multiple existing jurisdictions would need to agree on its

establishment. Issues to be resolved during either alternative would include additional legal authority, addressing the interaction of the new jurisdiction with existing entities, and funding.

Adaptive Management

Adaptive management is a process allowing for periodic evaluation and adjustment of programs. The adaptive management process should include all aspects of the plan in all jurisdictions. A standing committee should oversee this process, and should include representatives of the entities responsible for implementing and enforcing the plan, and representation from members of the public. The committee overseeing the adaptive management process should perform an annual evaluation to assess the effectiveness of the Plan. This evaluation should include:

- Review and Evaluation of Monitoring Data
- Review of the Implementation Process
- Development of Recommendations
- Implementation by Local Jurisdictions

Water Quality Protection Measures as Regulatory "Takings"

In any consideration of water quality protection measures to be adopted by local governmental entities, it is necessary to consider whether or to what extent such measures may be vulnerable to legal challenges on the grounds that they may constitute a prohibited "regulatory taking." A regulatory taking is a governmental action which regulates a private property interest to such a degree that it violates the Constitutional prohibition on the taking of private property without just compensation. Water quality protection measures such as the impervious cover and setback requirements of this Plan are good examples of potential regulatory takings.

The U.S. Supreme Court and the Texas Supreme Court have struggled to formulate a standard for governmental takings, and have adopted the following basic legal principles:

- Remedies for a taking are to invalidate the regulation or make the governmental entity liable for monetary damages.
- The governmental entity must show that the regulation actually substantially advances a legitimate state interest, including such things as protecting residents from the "ill effects of urbanization" and the preservation of desirable aesthetic features.
- A compensable taking occurs when a land use regulation denies the landowner economically viable uses of the property, or unreasonably interferes with the owner's right to use and enjoy his property.
- In determining whether a taking has occurred a court must evaluate the economic impact of the regulation and the extent to which the regulation interferes with "distinct investment backed expectations" of the landowner.
- In the case of governmental exactions, the required dedication for public use or of public facilities must be roughly proportional to the actual need for those public facilities which is generated by the proposed development.

In response to widespread concerns about governmental intrusions on private real property rights the Legislature enacted the Texas Real Property Rights Preservation Act to ensure that governmental entities in Texas take a "hard look" at the effects on private real property rights of

the regulations they adopt. It appears that reasonable water quality protection measures, such as impervious cover limits and setback requirements from critical environmental features, are not of such an extreme character as would constitute a regulatory taking. However, it is the responsibility of each jurisdiction within the planning region to obtain specific legal advice on proposed actions and to conduct a thorough takings impact assessment prior to adopting regulatory measures and/or rules as prescribed by Texas state law.

IMPLICATIONS

There are many implications of the implementation of the water quality protection measures presented in this Plan. These include social, political, economic and environmental impacts. While it is not possible to provide a detailed quantitative evaluation of each potential impact, the following sections attempt to address the major issues from a qualitative perspective, supplemented with quantitative information where available.

Economic Impacts

There are numerous potential economic impacts associated with the water quality protection measures included in the Plan. Some of them will require fundamental changes in the way certain activities are conducted, resulting in addition costs. Others will require new expenditures for which no source currently exists. Still others will impose limits of on activities that some perceive to be a restriction of rights. However, the economic impacts of the water quality protection measures must be gauged against the value of the resources they are designed to protect.

The potential adverse economic impacts of the "No Action" alternative are staggering. As recognized in Stakeholder Guiding Principal No. 1, this "no action" alternative is unacceptable. The threats to water quality and environmental resources in the Planning Region have already been established. In addition, the value of the unique, "one of a kind" resources to both public and private interests is also unquestioned. The groundwater and surface water resources within the Planning Region are irreplaceable. Should these resources be damaged, impaired or destroyed, the economic damages would be incalculable.

The economic impacts of the proposed water quality protection measures will vary significantly depending on their location and the nature of the activities requiring the incorporation of protective measures. Another factor affecting the economic impact is identifying the true basis for assessing the incremental cost of the new proposal. The following elements have been included in the economic impacts evaluation:

- Land Value/Costs
- Costs of Structural BMPs
- Impact of Incremental Costs on Total Costs

The following figure presents the estimated economic impacts in terms of impact on total costs:

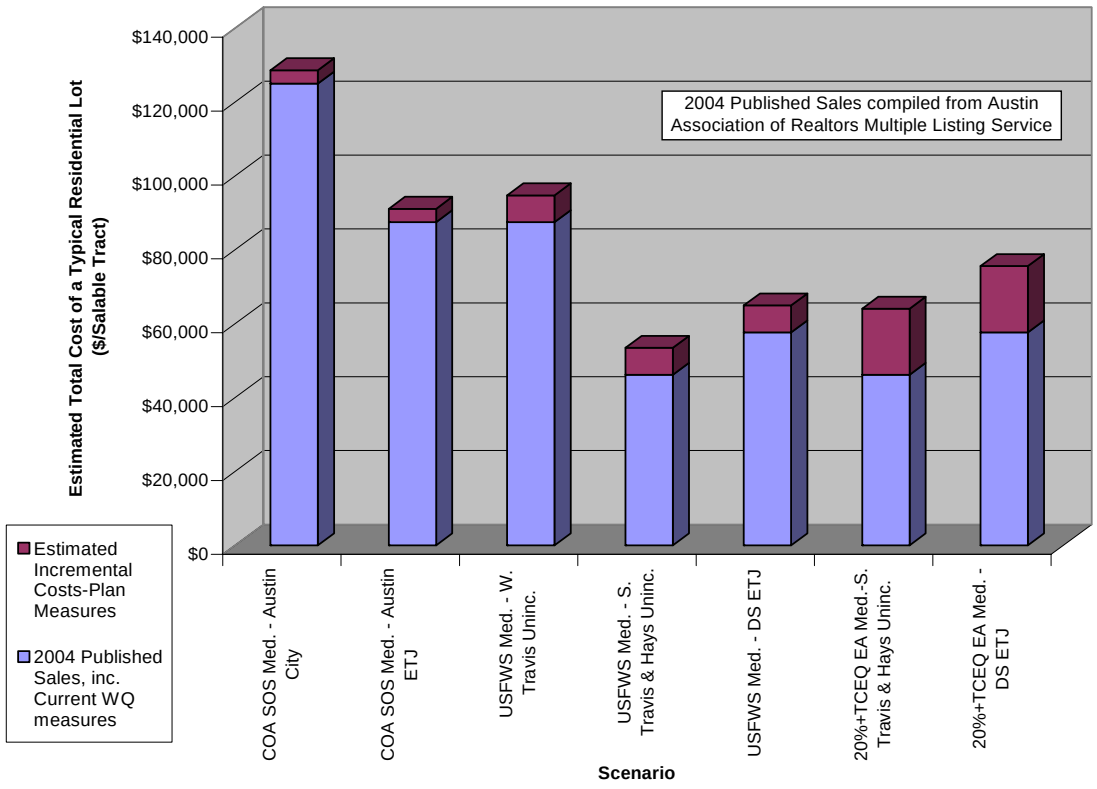

Figure ES-1 –Estimated Total Cost of a Typical Salable Residential Lot, Including the Plan Measures

While "costs" are often straightforward to quantify and assess, "value" is much more difficult to quantify. In the truest sense, the value of instituting water quality protection measures is determined in the court of public opinion. The relationship between water quality protection measures and public policy is discussed in more detail below. However, the value of these measures will be assessed based on whether or not public and private entities are willing to bear the costs required to protect the resources in the Planning Region.

Funding

One of the critical areas identified by the Stakeholder Committee as well as the political subdivisions is identifying sources of revenue to provide for the initial capital improvements as well as ongoing operations and maintenance. In all of these discussions one common factor is to identify an ongoing source of revenue that can be used to finance long term operations and maintenance. Recommendations are included for both initial implementation and on-going operations and maintenance.

Enforcement and Oversight

The strategy presented in this Plan will only achieve true protection of water quality if it is enforced, with proper oversight from the implementing jurisdictions. As discussed in the implementation section, coordinated and comprehensive implementation is essential to providing

this water quality protection. If the local jurisdictions are not coordinated in their implementation, future development will likely occur preferentially in areas with less stringent enforcement and oversight. It is important that each and every jurisdiction involved provide consistent levels of enforcement and oversight.

Interaction of Population Growth and Protection Measures

One of the implications of the water quality protection measures is their interaction with projected population growth. A number of these measures (e.g. stream offsets and impervious cover limits) directly impact the quantity of development that can take place on a tract of land. Combined with the transferable development rights concept presented in the Plan, these measures establish a direct relationship between the amount of land remaining to be developed within the Planning Region, and the amount of development that can occur on that land. In practice, the recommended water quality protection measures will impose certain limitations on the ultimate build-out of the land in the Planning Region.

Using current population projections, the projected growth rates would require the construction of approximately 1,386 residential dwelling units per year. At a uniform development intensity of 15% impervious cover, the Planning Region is approximately seventy five percent (75%) built out by 2060. At a uniform development intensity of 10%, the projected growth in the Planning Region requires more land area than what is available through 2060.

Interrelation with Public Policies

Water quality protection measures are inherently linked to broader public policies. Environmental protection is primarily a public policy issue in that the governmental powers of the public are focused on preventing and correcting those activities which might harm the environment. Public policies that encourage human and economic activities are also inherently linked to water quality. This fundamental understanding of the relationship between human and activity and environmental protection should be recognized in all public policy.

To help the proposed water quality protection measures succeed, the following actions are recommended to ensure that these measures are integrated into larger scale public policy, and should be included into the adoption of the measures:

- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all public actions.
- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all regulated private actions.
- Public entities should also encourage non-regulated private actions to integrate water quality protection measures.

These recommendations should accomplish one of the expected outcomes of this Plan, which is to have coordinated public policies that encourage the protection of water quality.