

# **An Overview of the Regional Water Quality Protection Plan**

**Development of a Regional Water Quality Protection  
Plan for the Barton Springs Segment of the Edwards  
Aquifer and its Contributing Zone**

**The Next Wave – Onion Creek Senior Citizens Center – Buda, Texas  
April 26, 2013**

## **Lessons From History**

***“Good water quality is one of the things that contributes most to the health of the citizens of a city. There is nothing of more interest to magistrates than maintaining the healthfulness of the water that serves both men and animals and preventing accidents that can cause the water to become polluted, whether in springs, rivers, and streams where it flows or in places where diverted water is stored, or in the wells used as sources.”***

***(De Jussieu, Histoire de l'Academie royale des sciences [History of the Royal Academy of Science], 1733, p.331. From The Public Fountains of the City of Dijon by Henry Darcy, translated by Patricia Bobeck, Kendall/Hunt Publishing Co., 2004.)***

# PROJECT SPONSORS

- City of Dripping Springs
- City of Austin
- City of Buda
- City of Kyle
- City of Rollingwood
- City of Sunset Valley
- Village of Bee Cave
- Blanco County
- Hays County
- *Travis County*
- *Barton Springs/Edwards Aquifer Conservation District*
- *Hays Trinity Groundwater Conservation District*
- *Blanco-Pedernales Groundwater Conservation District*

# FUNDING

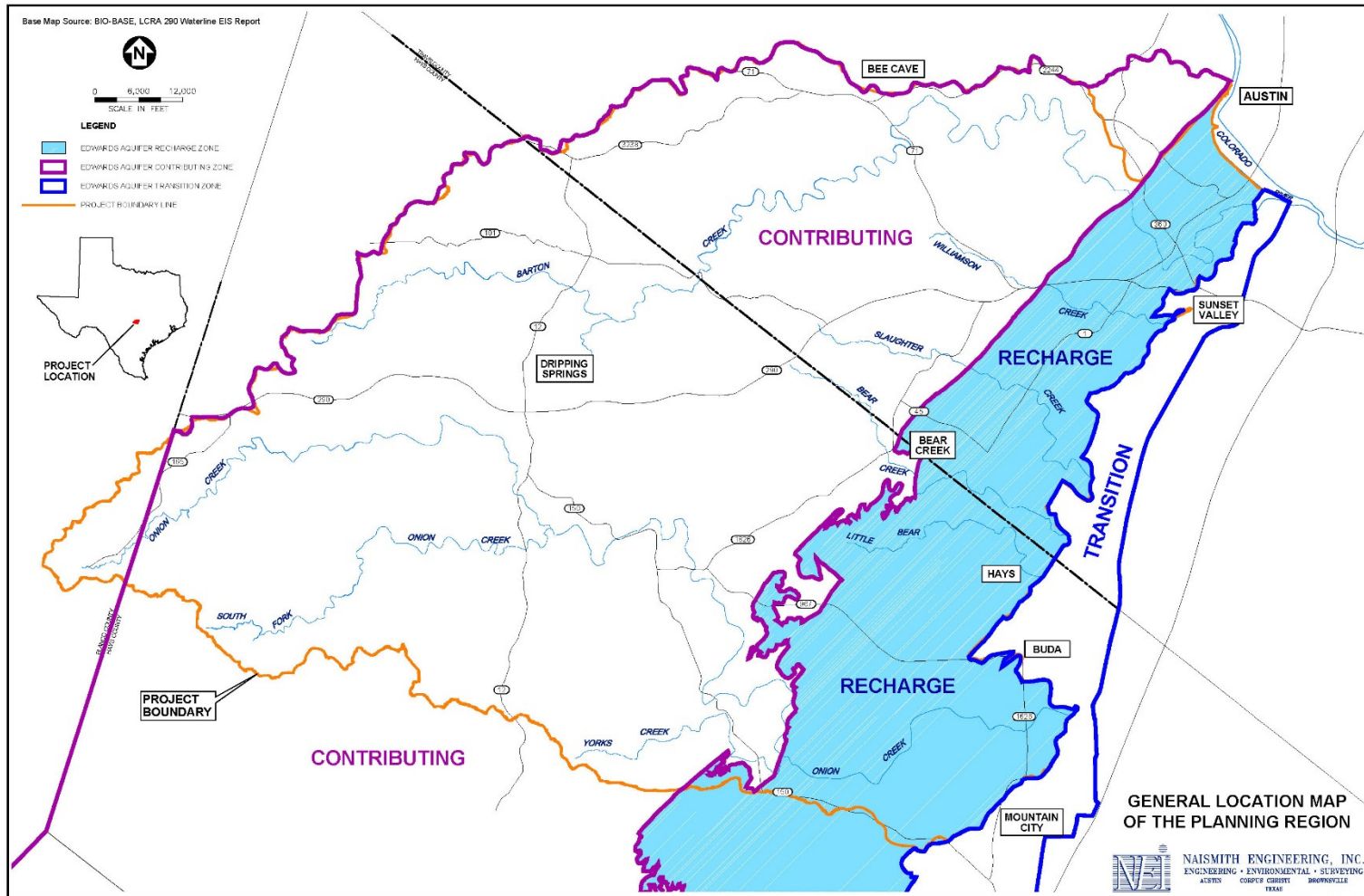
- Principal Funding – Grants from:
  - Texas Water Development Board - \$148,000
  - Lower Colorado River Authority - \$100,000
- Other Local Public Entities (Cash/In-kind)
  - City of Austin
  - Austin Community College
  - Barton Springs/Edwards Aquifer Conservation District
  - Village of Bee Cave
  - Blanco-Pedernales Groundwater Conservation District
  - City of Dripping Springs
  - Hays County
  - Hays Trinity Groundwater Conservation District
  - City of Kyle
  - Lower Colorado River Authority
  - City of Sunset Valley

## FUNDING (Continued)

### ➤ Other Entities & Individuals (Cash/In-kind)

- The Austin Waldorf School
- Carpenter and Langford, P.C.
- George Cofer
- The Oak Hill United Methodist Church
- John Orr
- The Save Barton Creek Association
- TechPeople, Inc.
- Terri Buchanan, M.P.H.
- Urban Design Group

# THE PLANNING REGION



# INITIAL CHARGES FROM THE EXECUTIVE AND CORE COMMITTEES

- We Want This to Be a Stakeholder Driven Process
- Make sure the Plan is Science-based
- Bring Back a Plan We Can Implement, without having to depend on others

# A Stakeholder Driven Process

- Stakeholder Categories
  - Property Owners
  - Concerned Citizens
  - Development Interests
  - Environmental Preservation & Good Governance Interests
  - Neighborhood Interests
  - Public Interest Organizations
  - Governmental Entities
  - Economic Interests
- Representatives from Each Category
- Identification and Prioritization of Issues
- Numerous Meetings & Opportunities for Input
- Technical Review Group of “Outside Experts”
- Educational Processes and Relationship Building
- “Give and Take” Exchanges
- Consensus on Most, But Not All, Issues



## **Stakeholder Committee Goal 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.”***

# Stakeholder Guiding Principles

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.

## **Stakeholder Guiding Principles (Cont'd)**

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.

## A Science-based Plan

- Data Compilation – Large Volume of Data
- Technical Review by Consulting Team Experts
- Coordination of Technical Issues with the Technical Review Group
- Coordination of Technical Issues by the Consulting Team with outside Technical Experts
- Approach for Areas of Uncertainty in the Science
  - Assess Potential Vulnerabilities
  - Tie to the “Best Available” Science
  - Where necessary, incorporate safety factors

# An Implement-able Plan

## ➤ Short Term

- Relies Only on Local Jurisdictions
- Existing Entities Under Existing Legal Authority
- New Entities, Created by Existing Entities Under Existing Legal Authority
- Built-in Funding Mechanisms
- Advantages: Doesn't Rely on Others, No Changes to Existing Legal Authority
- Disadvantages: Possible Non-Uniform Implementation and Political Influences

## ➤ Long Term – Possible Single Jurisdiction

# GOALS AND OBJECTIVES OF THE PLAN

- Protect Surface Water and Groundwater
- Address W.Q. in All Areas of the Planning Region (Not just Edwards or Barton Springs)
- Goal: “Maintain”
  - Mandatory applicability
  - No net increase in pollutant loadings
  - Applies to all future development activities
- Goal: “Enhance”
  - Primarily voluntary measures
  - Designed to improve existing water quality

# **ITEMS IN THE PLAN WITH LESS THAN CONSENSUS AGREEMENT**

- Min. Contributing Areas for Stream Buffer Zones
- Specific Widths for Stream BZs
- Recognized Treatment Capacity for Stream BZs/CEF Setbacks
- Wastewater/Stormwater Irrigation Design
- Inclusion of Wetlands in Plan
- Safety Factors/Design for Structural BMPs
- Funding Sources for O&M of BMPs
- Use of Development Agreements
- Details of the Impervious Cover Table and the Thresholds for Requiring TDRs

# **PROPOSED WATER QUALITY** **PROTECTION MEASURES**

- Natural Area and Open Space Conservation
- Transferable Development Rights (TDRs)
- Comprehensive Site Planning and Pre-Development Review
- Location of Development
- Intensity of Development
- Control of Hydrologic Regime
- Structural BMPs
- Local Enforcement of Construction Site Controls



# PROPOSED WATER QUALITY PROTECTION MEASURES (Cont'd)

- Wastewater Management
- Alternative Water Sources/Uses and Conservation
- Characteristics of Development
- Land Use Restrictions
- Restrictions on Use, Storage and Disposal of Potentially Harmful Materials
- Land Management
- Public Education/Outreach

## Location of Development

### ➤ Stream Buffers

Contributing Area (Ac.)	Width (ft. from C.L.)	Total
32 to 120	100	200
120 to 300	150	300
300 to 640	200	400
Greater than 640	300	600

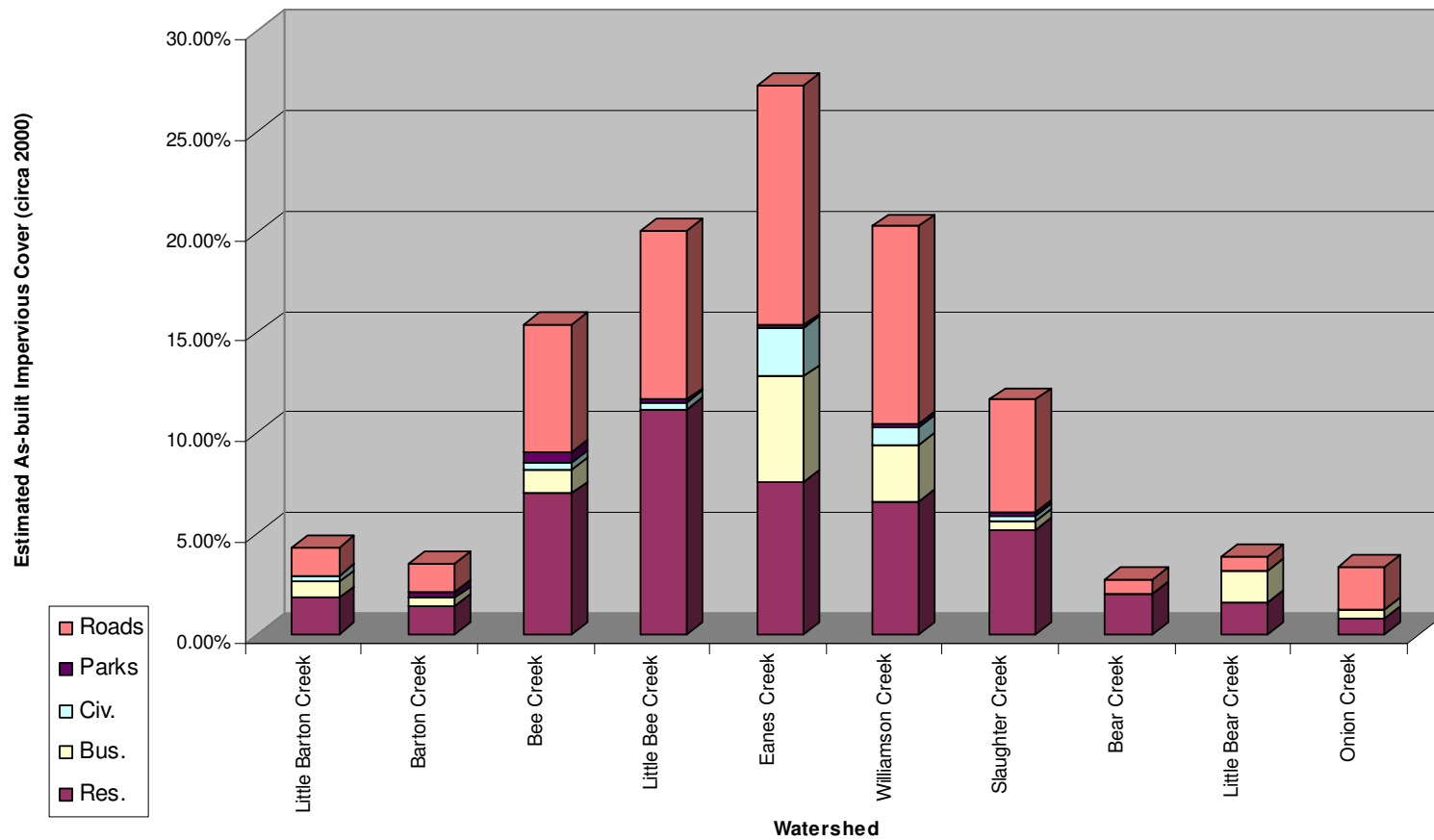
## Location of Development (Cont'd)

- Critical Environmental Features (CEFs)
  - Point Recharge Features
    - Upstream: Drainage divide up to 300', not less than 150'
    - Downstream: 150'
  - Indirect Recharge Features – 150'

## Impacts of Impervious Cover

- Data Sources
  - U.S. Geological Survey
  - City of Austin
  - LCRA
- Begin to see statistically significant impacts between 5-18%
- At 20%, Degradation Using TCEQ Criteria
- Protective Levels Established
  - 10% for Recharge Zone
  - 15% for Contributing Zone

# Estimated Impervious Cover in the Planning Region



# Recommended Impervious Cover Limitations (Consulting Team)

Location	Limited Review	Standard Review	Standard Review + TDRs
Recharge Zone	5	10	15
Contributing Zone (CZ), outside Preferred Growth Areas (PGAs)	7.5	15	25
CZ, s.f. residential, in PGA	7.5	15	30
CZ, high dens. Res., commercial, in PGA	7.5	25	45 or No Limit*

\*Requires rainwater harvesting from building roofs

# Explanatory Notes for I. C. Table

## ➤ Limited Review

- No connected blocks of IC > 20,000 sf.
- Off-site discharges to sheet flow
- No hard-lined drainage conveyance structures
- On-site survey for CEFs and streams
- Geometric review of site plan, no technical demonstration of performance required.

## ➤ Standard Methods

- Comp. Site Design + Calc. Demo. “no net increase”
- Where on-site IC exceed the established IC Limit:
  - O&M program includes site specific performance monitoring
  - Monitoring program by a public entity
  - Secured funding for O&M and monitoring

# Explanatory Notes for I. C. Table (Cont'd)

## ➤ TDRs

- Recharge Zone
  - TDRs Used in RZ must be obtained from RZ
  - Combined IC of all tracts must be 10% or lower
- Contributing Zone
  - TDRs used in the CZ may be obtained from RZ or CZ
  - TDRs from properties outside of PGAs
  - Combined IC of all tracts must be 15% or lower

## ➤ Preferred Growth Areas (PGAs)

- Defined by local govts. - Comprehensive Planning
- Within municipal boundaries
- Zoning – industrial/commercial or high-den. Res.

## ➤ “No Limit” - roof runoff rainwater harvesting



# Recommended Impervious Cover Limitations (Stakeholder Comments)

Location	Limited Review	Standard Review	Standard Review + TDRs
Recharge Zone	3-7.5	10-15	10-25
Contributing Zone (CZ), outside Preferred Growth Areas (PGAs)	3-10	10-25 +TDRs	15-30
CZ, s.f. residential, in PGA	3-20	15-30 +TDRs	30
CZ, high dens. Res., commercial, in PGA	5-20	20-40 +TDRs	30 to NL

## Structural BMPs

### ➤ Primary

- Retention/Irrigation
- Bioretention

### ➤ Secondary – Others recognized by TCEQ

### ➤ Limitations

- Limited Design Data – Base on Good Science
- Good for TSS, not so good for dissolved
- Need for redundancy
- Need for proper Operations & Maintenance

# Transferable Development Rights (TDRs)

- New Concept in Texas (New Currency)
- Voluntary System-Gives Value to All Land
  - Optional for Development – Plan Limits or TDRs
  - Requires Approval of “To” and “From” Jurisdictions
- Address Equity (Principle # 7)
- Based on Uniform Intensity Limits
  - 10% IC for Recharge Zone
  - 15% IC for Contributing Zone
- Restrictions/Limitations
  - Not intended to change tax status
  - No eminent domain/condemnation allowed

## IMPLEMENTATION

- Short Term – Existing Entities
- Long Term – Explore Regional Entity
- Primary Entities Affected (96%)
  - Unincorporated Hays County (30.6%)
  - City of Dripping Springs CL + ETJ (29.9%)
  - City of Austin CL + ETJ (28.8%)
  - Unincorporated Travis County (3.7%)
  - Village of Bee Cave CL + ETJ (2.8%)

## IMPLEMENTATION (Continued)

- Development Restrictions Implemented under Local Authority (Water Code Powers given to local entities)
- Other Regulatory Programs through Delegation (Water Code powers given to TCEQ, with delegation allowed)
- Cooperative (Inter-governmental) Agreements Encouraged
- Role for Regional Entities

# IMPLEMENTATION CHALLENGES

## ➤ Municipalities

- All powers in municipal boundaries
- No zoning and limited ability to regulate IC in ETJ

## ➤ Counties

- Prohibited from regulating (density) intensity or IC
- Can accomplish this through other entities (MUDs, WCIDs)

## ➤ Special Districts

- Specific Limitations in enabling legislation
- Can regulate various aspects depending on location

## WHO PAYS?

- Guiding Principle – Those Who Benefit Bear the Cost
- Capital Requirements – Included with Development
- Operations & Maintenance
  - Up-front funding
  - Public Entity Assumes Operations
  - Taxing Entity (MUD, WCID or PID) with Water Quality responsibilities

# ECONOMIC IMPLICATIONS

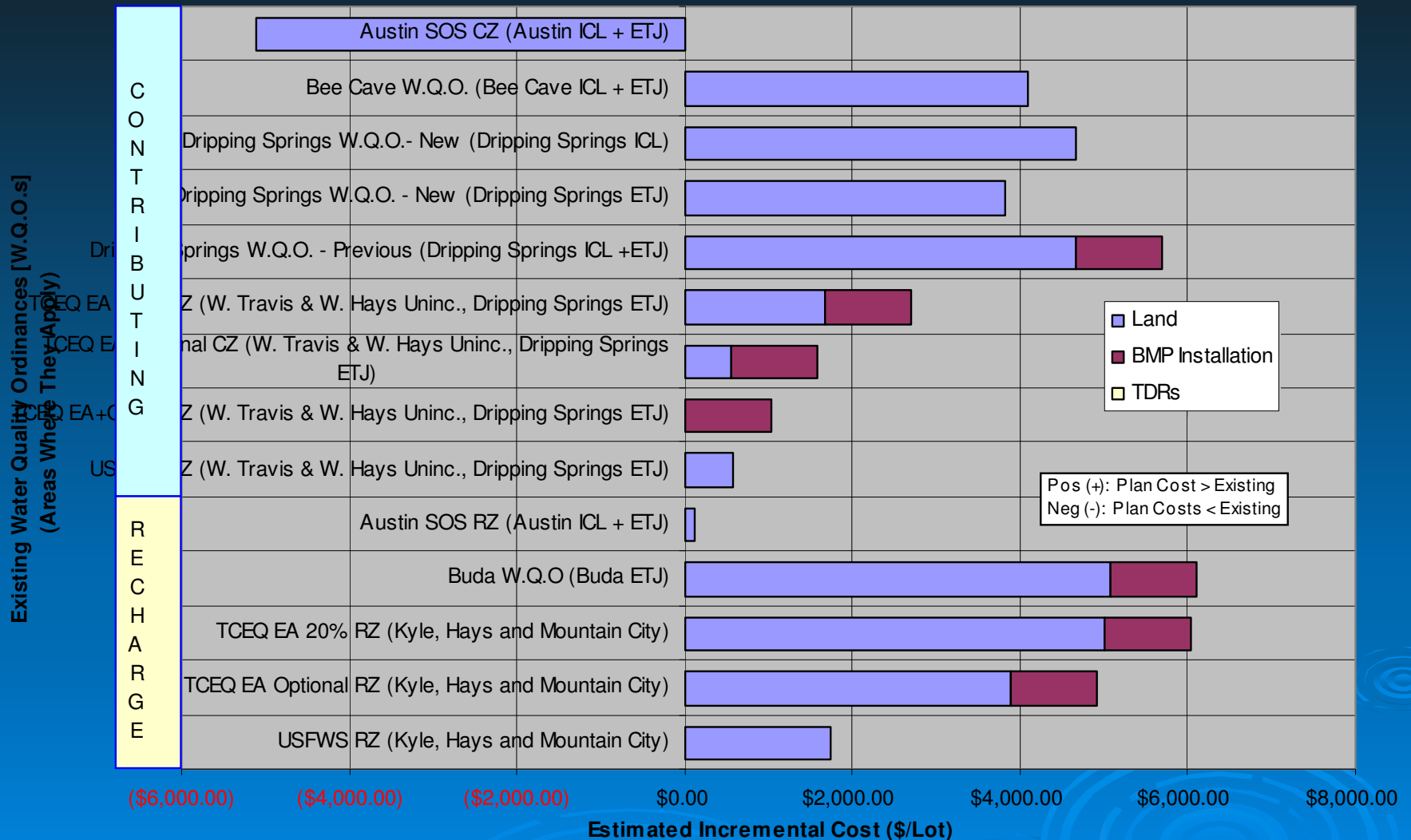
- Incremental Costs of Measures
  - Depends on starting point – Larger impact on areas with minimal current W.Q. measures
  - Depends on location - Lower impact on total cost for higher \$ areas
- Other Cost Savings/Benefits?



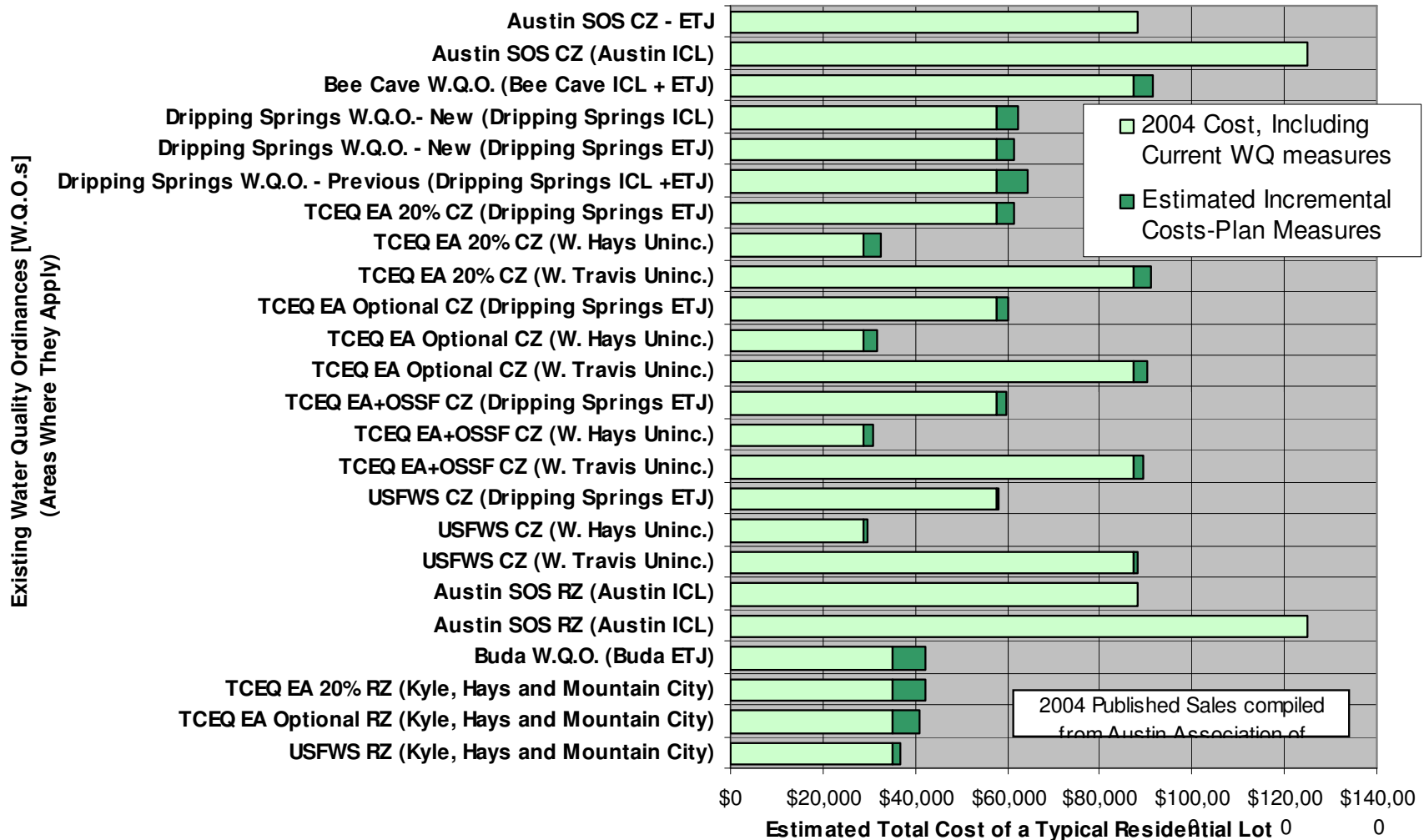
## Incremental Cost Scenarios

- Current City of Austin SOS Water Quality Ordinance (WQO)
- Current Village of Bee Cave WQQ
- Current City of Buda WQO
- Current/previous City of Drippings Springs WQOs
- TCEQ's Edwards Aquifer Protection Program (EAPP) optional measures to avoid take of the Barton Springs salamander, approved by USFWS, with IC at 20%
- TCEQ's EAPP measures, with IC at 20%
- TCEQ's EAPP measures, with lot size restricted by current county (Hays and Travis) OSSF ordinances.
- The USFWS measures from the Memorandum of Understanding with the LCRA for providing surface water

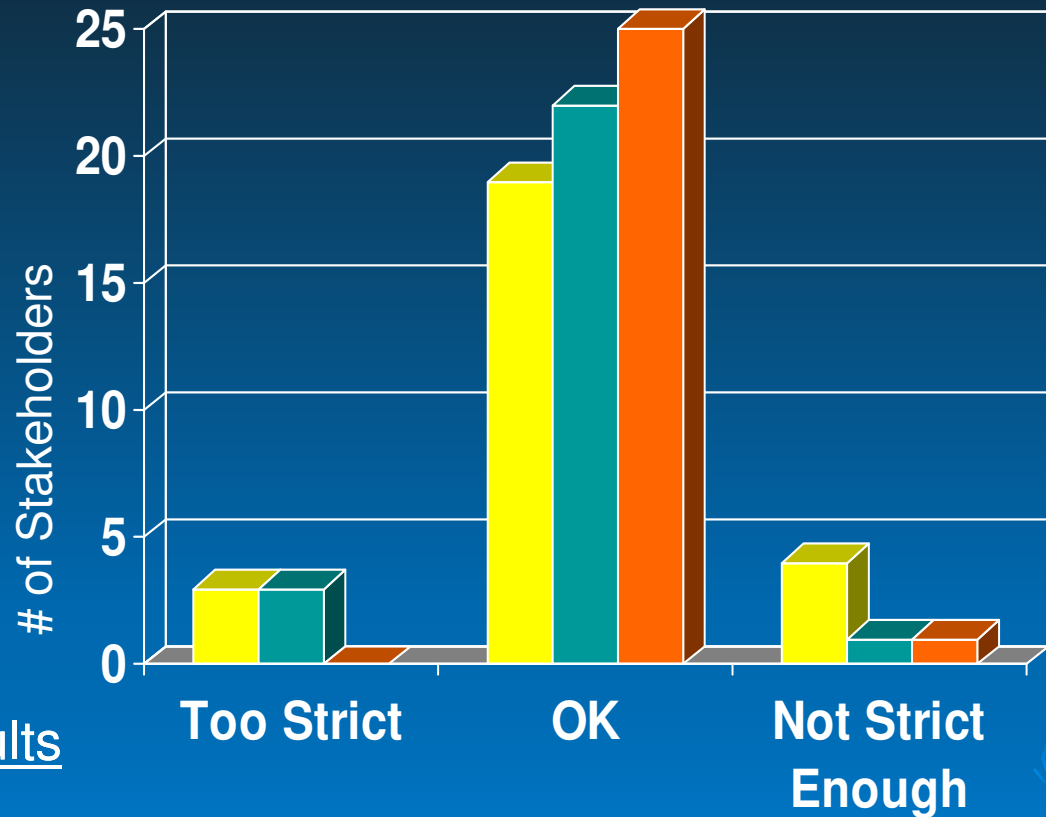
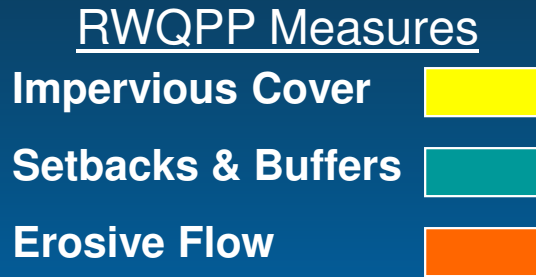
# Incremental Costs – Typical Lot



# Impact of Incremental Cost on Total Cost



# Stakeholder Committee Positions on Key RWQPP Measures



## Stakeholder Ballot Results

Support full adoption

17

Want to see changes before adoption

6

Regional Water Quality Planning Project  
Did not vote (but 3 submitted comments)

4

June 9, 2005

## ILLUSTRATIVE CASES

- Intended to Illustrate Effects of Measures on Realistic Properties
  - Rural Tract – mixed development
  - Suburban Tract – commercial development
- Easier to Grasp than 150+ Pages of Text
- Serve as Examples for Implementation

# Illustrative Case #1 – Scenic, Texas

## ➤ Location

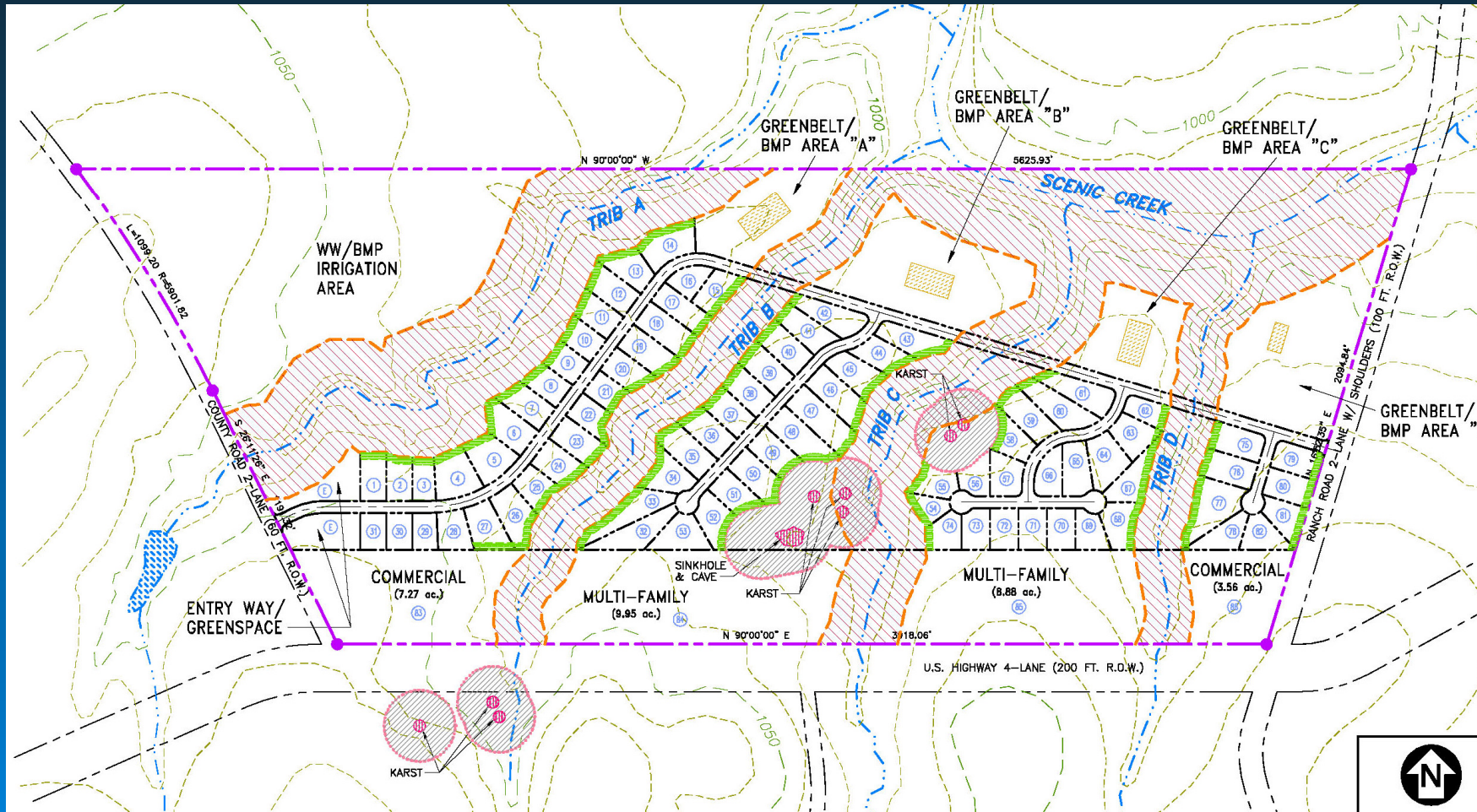
- Contributing Zone
- Rural – Outside Preferred Growth Areas

## ➤ Site Characteristics

- 218 Acres, undeveloped ranch land
- Boundaries: S – 4 lane US Highway, E – TX RR w/ paved shoulders, W – 2 lane CR, N – ranch land & Scenic Creek (>2,000 Ac drain.)
- Several on-site streams/karst features



# Post-Development - Illustrative Case #1





# IC Calculations – Illustrative Case #1

Land Use	Impervious Cover (Acres)	Basis
Single Family Residential	9.41	82 lots @ 5,000 sf IC per lot
Multi-Family Residential	7.53	18.83 Ac. @ 40% IC
Commercial	6.5	10.83 Ac. @ 60% IC
Roadways	5.40	Length x Width
Totals	28.84	$28.84 / 218 = 13.22\%$

## Illustrative Case #2 – Mythic, Texas

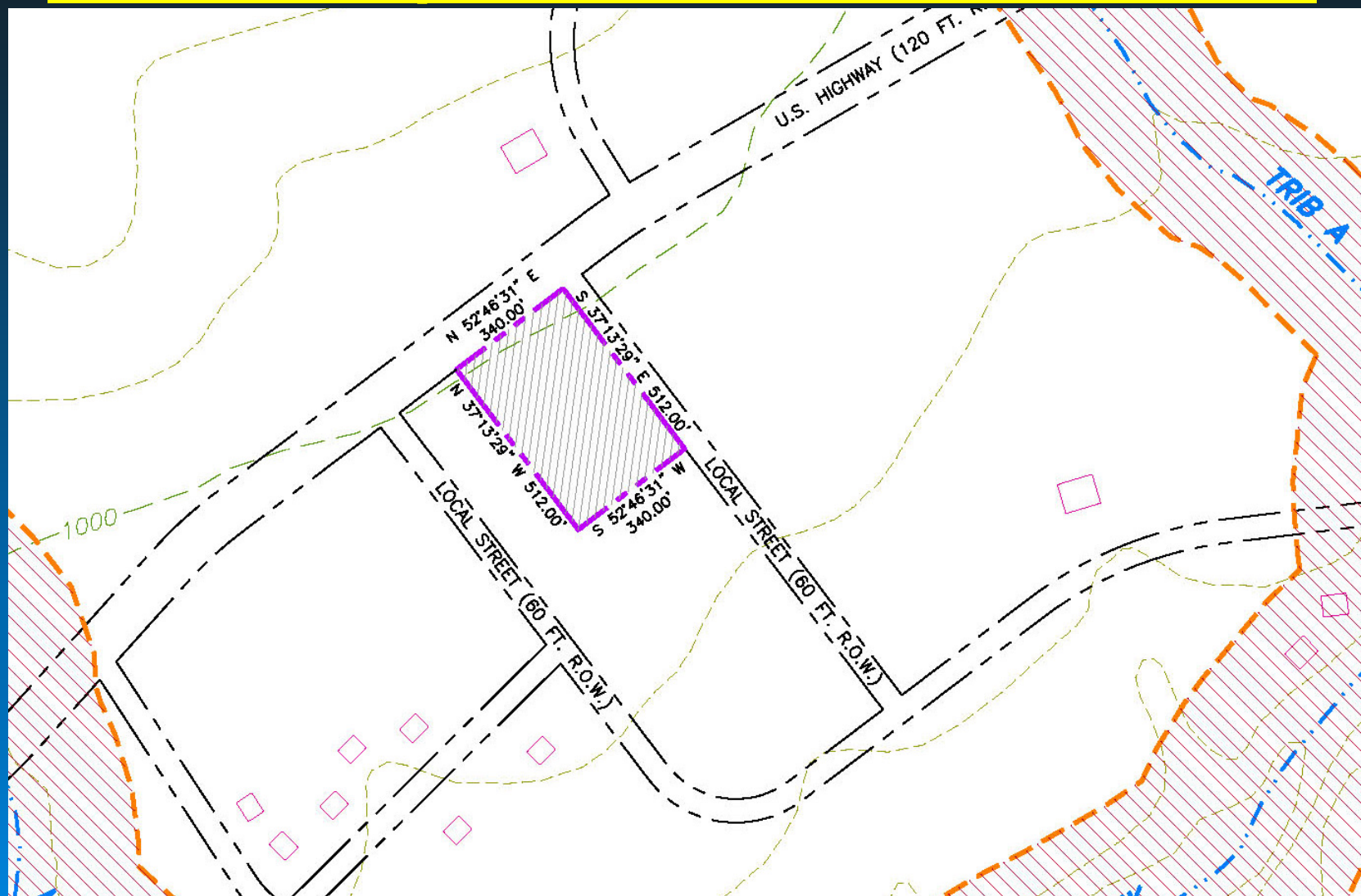
### ➤ Location

- Contributing Zone
- Urban – Inside Preferred Growth Areas

### ➤ Site Characteristics

- 4.0 Acres, undeveloped agricultural land
- Boundaries: S & W – Open field, NW - 4 lane US Highway, SE – paved city street
- Nearly flat, moderately deep soils

# Pre-Development - Illustrative Case #2



## Illustrative Case #2 – Mythic, Texas

### ➤ Development Objectives

- Retail Commercial
- Max. building, material laydown and parking

### ➤ Design Restrictions

- Ret./Irr. requires 1.0 Ac. of irrigation area
- Resulting: 3.0 Ac. Or 75% IC (Requires rainwater harvesting)

### ➤ TDRs

- On – site allows: 0.6 Ac. IC ( $4 \times 15\% = 0.6$ )
- Off-site req'd: 2.4 Ac. IC or approx. 16 Ac.

## What About the Future?

- Review, Adoption and Implementation by Local Jurisdictions
  - Integration into existing ordinances/rules
  - New ordinances/rules
  - Specific funding mechanisms
- Inter & Intra-jurisdictional Coordination
- Adaptive Management
  - Important to Identify What's working and Not
  - Accommodate new technologies and science
  - Helps facilitate coordination

# Challenges in Implementation

- Money
- Legal Authority
  - Counties
  - Cities in ETJ
  - Groundwater Conservation Districts
- Political Will
  - Agreement/Understanding of Effectiveness – “Is All Of This Really Necessary”
  - Inter-relationship to Property Rights

## Scientific/Regulatory Issues

- Management Approaches for Storm Water Runoff
  - Infiltration\*
  - Filtration
  - Detention/retention\*
  - Evaporation/Evapotranspiration\*
- Hydrologic Regime (Rate & Volume Control) & relationship to erosion
- Better understanding of “Non-structural” BMPs

## Additional Information on the Plan

- Website: [www.waterqualityplan.org](http://www.waterqualityplan.org)
- Email: [gjackson@naismith-engineering.com](mailto:gjackson@naismith-engineering.com)
- Phone: (512) 708-9322 or (800) 677-2831
- Mail: Naismith Engineering, Inc.  
600 West 8th Street, Suite 300  
Austin, Texas 78701



# Questions



Grant A. Jackson, P.E.  
Naismith Engineering, Inc.