

# 2011 Regional Water Plan

Prepared by:  
Region H Water Planning Group

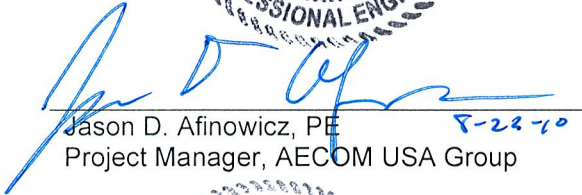
With assistance from:  
AECOM USA Group, Inc.  
TBPE Reg. No. F-3082

Kellogg Brown & Root Services, Inc.  
TBPE Reg. No. F-8649

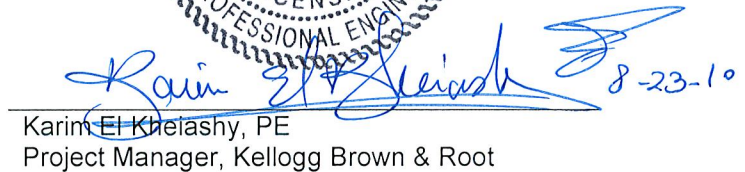
Leggette Brashears & Graham, Inc. DBA LBG-Guyton Associates  
TBPE Reg. No. F-4432  
TBPG Reg. No. 50111

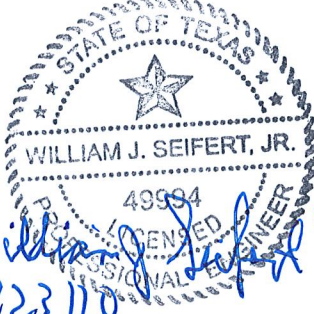
Ekistics Corporation

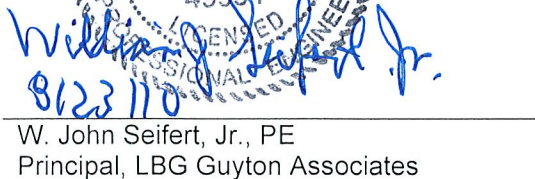


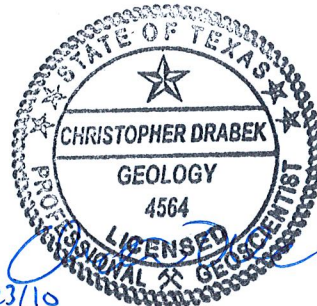
  
Jason D. Afinowicz, PE  
Project Manager, AECOM USA Group  
8-22-10

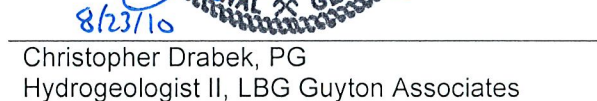


  
Karim T. El Kheishy, PE  
Project Manager, Kellogg Brown & Root  
8-23-10



  
W. John Seifert, Jr., PE  
Principal, LBG Guyton Associates  
8/23/10



  
Christopher Drabek, PG  
Hydrogeologist II, LBG Guyton Associates  
8/23/10

  
Glenda Callaway  
Principal, Ekistics Corporation

# Table of Contents

<b>ES - Executive Summary .....</b>	<b>ES-1</b>
ES.1 Introduction.....	ES-1
ES.2 Population and Water Demand .....	ES-3
ES.2.1 Population Projections .....	ES-3
ES.2.2 Water Demand Projections .....	ES-5
ES.3 Water Supplies .....	ES-6
ES.4 Water Needs and Management Strategies .....	ES-6
ES.4.1 Water Demand Versus Supplies .....	ES-6
ES.4.2 Water Management Strategies .....	ES-7
ES.4.3 Impacts of the 2007 State Water Plan on Galveston Bay Inflows .....	ES-11
ES.4.4 Socioeconomic Impact of Not Addressing Shortages.....	ES-11
ES.5 Impacts of Management Strategies on Water Quality and Agricultural Areas.....	ES-11
ES.6 Water Conservation and Drought Management Plans .....	ES-11
ES.7 Protection of Water Resources and Natural Resources .....	ES-12
ES.8 Recommendations to the Legislature.....	ES-12
ES.8.1 Unique Stream Segments .....	ES-12
ES.8.2 Unique Reservoir Sites .....	ES-13
ES.8.3 Regulatory, Administrative, and Legislative Recommendations.....	ES-14
ES.9 Water Infrastructure Financing Recommendations.....	ES-16
ES.10 Public Participation.....	ES-16
<b>Chapter 1 – Description of Region.....</b>	<b>1-1</b>
1.1 Regional Water Planning in Texas .....	1-1
1.2 Description of Region H .....	1-1
1.2.1 Governmental Authorities in Region H.....	1-5
1.2.2 General Economic Conditions .....	1-6
1.3 Population and Water Demand in Region H .....	1-7
1.3.1 Major Demand Centers .....	1-10
1.3.2 Water User Group (WUG) Updates .....	1-11
1.4 Region H Water Supply Sources and Providers .....	1-12
1.4.1 Groundwater Sources .....	1-12
1.4.2 Surface Water Sources .....	1-13
1.4.3 Trinity River Basin .....	1-18
1.4.4 San Jacinto River Basin .....	1-18

1.4.5	Brazos River Basin .....	1-18
1.4.6	San Jacinto - Brazos Coastal Basin .....	1-18
1.4.7	Use by Source .....	1-19
1.4.8	Major Water Providers .....	1-20
1.5	Water Quality and Natural Resources .....	1-21
1.5.1	Water Quality .....	1-21
1.5.2	Topography.....	1-24
1.5.3	Public Lands .....	1-24
1.5.4	Navigation.....	1-25
1.5.5	Threats to Agricultural and Natural Resources .....	1-25
1.6	Existing Water Planning.....	1-28
1.6.1	Existing Regional and Local Water Management Plans .....	1-28
1.6.2	Current Preparations for Drought .....	1-29
1.6.3	Region H Drought Management Study.....	1-29
1.6.4	Water Loss Audits.....	1-30
1.7	Recommendations Made in the 2006 Region H Water Plan.....	1-32
1.7.1	Water Management Strategies Recommended in the 2006 Regional Plan.....	1-32
1.7.2	Unique Streams Segments Recommended in the 2006 Regional Plan.....	1-34
1.7.3	Unique Reservoir Sites Recommended in the 2006 Regional Plan.....	1-35
1.8	Regulatory, Administrative and Legislative Recommendations .....	1-36
1.8.1	Regulatory and Administrative Recommendations from the 2006 Plan.....	1-36
1.8.2	Legislative Recommendations from the 2006 Regional Plan.....	1-38
1.8.3	Infrastructure Financing Recommendations.....	1-44
<b>Chapter 2 – Presentation of Population and Water Demands.....</b>		<b>2-1</b>
2.1	Introduction .....	2-1
2.1.1	Scope of Work .....	2-1
2.1.2	Background.....	2-1
2.2	Methodology .....	2-1
2.2.1	General .....	2-1
2.2.2	TWDB Guidelines for Revisions to Population and Water Demand Projections...	2-3
2.2.3	County Population Projections .....	2-6
2.2.4	Sub-County Population Projections.....	2-8
2.2.5	WUG Population and Demand Projections Survey .....	2-9
2.2.6	Municipal Water Demand Projection Methodology .....	2-11
2.2.7	Steam Electric Power Generation Water Demand Projection Methodology .....	2-11
2.2.8	Other Water Demand Projection Methodology.....	2-12
2.2.9	TWDB Approval of Revised Population and Demand Projections .....	2-14

2.2.10	Region H Resolution on Fort Bend County .....	2-14
2.3	Regional Summary of Population and Water Demand Projections .....	2-15
2.3.1	Regional Summary of Projections by Category .....	2-17
2.3.2	County Summary of Projections .....	2-17
<b>Chapter 3</b>	<b>– Analysis of Current Water Supplies.....</b>	<b>3-1</b>
3.1	Introduction.....	3-1
3.2	Identification of Groundwater Sources .....	3-1
3.2.1	Groundwater Aquifers .....	3-1
3.2.2	Groundwater Use Overview .....	3-6
3.2.3	Aquifer Conditions .....	3-6
3.2.4	Subsidence Effects .....	3-9
3.2.5	Groundwater Availability in Fort Bend and Montgomery Counties .....	3-10
3.2.6	Public Supply Groundwater Usage .....	3-17
3.2.7	Industrial Groundwater Usage .....	3-17
3.2.8	Agricultural Groundwater Usage .....	3-17
3.2.9	Groundwater Drought Susceptibility .....	3-23
3.2.10	Groundwater Availability Summary .....	3-23
3.3	Identification of Surface Water Sources.....	3-23
3.3.1	Available Surface Water.....	3-24
3.3.2	Discussion of Modeling Results.....	3-32
3.3.3	Surface Water Drought Susceptibility .....	3-33
3.3.4	Surface Water Conveyance Systems .....	3-35
3.3.5	Previously Studied Potential Reservoir Sites.....	3-38
3.3.6	Legal and Regulatory Factors.....	3-38
3.3.7	Environmental Uses and Requirements .....	3-39
3.3.8	Navigational Uses .....	3-44
3.3.9	Recreational Uses.....	3-44
3.4	Total Water Supply.....	3-46
3.4.1	Water Supplies Available by City and Category .....	3-46
3.4.2	General Methodology for Assigning Resources to WUGs.....	3-49
3.4.3	Groundwater Allocation.....	3-49
3.4.4	Surface Water Allocation.....	3-52
3.4.5	Wholesale Water Providers.....	3-73
<b>Chapter 4</b>	<b>– Identification, Evaluation and Selection of Water Management Strategies</b>	
	<b>Based on Needs .....</b>	<b>4-1</b>
4.1	Introduction.....	4-1
4.2	Identification of Needs.....	4-1

4.3	Potential Water Management Strategies .....	4-5
4.3.1	Studies by the RHWPG and Others .....	4-5
4.3.2	Need for Interbasin Transfers .....	4-8
4.3.3	Drought Management .....	4-9
4.3.4	Interruptible Supplies .....	4-10
4.4	Strategy Evaluation and Selection .....	4-11
4.4.1	Evaluation of Water Management Strategies .....	4-15
4.4.2	Water Conservation .....	4-16
4.4.3	Selection of Water Management Strategies .....	4-17
4.4.4	Alternative Water Management Strategies .....	4-20
4.4.5	Alternative Strategies for Increased Fort Bend County Population .....	4-21
4.4.6	Conveyance and Contract Strategies .....	4-21
4.4.7	Future Water Management Strategies .....	4-22
4.5	Strategy Allocation .....	4-22
4.6	Impacts of the 2006 State Water Plan on Galveston Bay Inflows .....	4-23
4.7	Socio-Economic Impacts of Not Meeting Demands .....	4-23
<b>Chapter 5 – Impacts of Water Management Strategies on Key Parameters of Water Quality and Impacts of Moving Water from Rural and Agricultural Areas .....</b>		<b>5-1</b>
5.1	Scope of Work .....	5-1
5.2	Impacts of Water Management Strategies on Key Parameters of Water Quality .....	5-1
5.3	Evaluation of Third-Party Impacts of Reduced Levels in Water Supply Reservoirs .....	5-7
5.4	Impacts of Moving Water from Rural and Agricultural Areas .....	5-11
<b>Chapter 6 – Water Conservation and Drought Management Plans .....</b>		<b>6-1</b>
6.1	Water Conservation Plan .....	6-1
6.1.1	Municipal Uses by Public Water Suppliers .....	6-1
6.1.2	Industrial or Mining .....	6-3
6.1.3	Agriculture .....	6-4
6.1.4	Wholesale Water Providers .....	6-7
6.1.5	Additional Conservation Strategies .....	6-8
6.1.6	Other Water Uses .....	6-8
6.1.7	Water Conservation Evaluation .....	6-8
6.2	Drought Contingency Plan .....	6-11
6.2.1	Municipal Uses by Public Water Suppliers .....	6-11
6.2.2	Irrigation Uses .....	6-13
6.2.3	Wholesale Water Providers .....	6-14
6.2.4	Region H Drought Management Study .....	6-15

<b>Chapter 7 – Long-Term Protection of the State’s Water Resources, Agricultural Resources and Natural Resources .....</b>	<b>7-1</b>
7.1 Water Resources within Region H .....	7-1
7.1.1 Neches-Trinity Coastal Basin.....	7-1
7.1.2 Trinity River Basin .....	7-1
7.1.3 Trinity-San Jacinto Coastal Basin .....	7-2
7.1.4 San Jacinto River Basin .....	7-2
7.1.5 San Jacinto-Brazos Coastal Basin.....	7-3
7.1.6 Brazos River Basin.....	7-4
7.1.7 Brazos-Colorado Coastal Basin.....	7-5
7.2 Agricultural Resources within Region H.....	7-5
7.3 Natural Resources within Region H .....	7-6
7.3.1 Threatened and Endangered Species .....	7-6
7.3.2 Parks and Public Lands .....	7-7
7.3.3 Impacts of Water Management Strategies on Unique Stream Segments .....	7-7
7.3.4 Impacts of Water Management Strategies on Galveston Bay .....	7-7
7.3.5 Energy Reserves.....	7-8
<b>Chapter 8 – Ecologically Unique Stream Segments, Unique Reservoir Sites and Legislative Recommendations .....</b>	<b>8-1</b>
8.1 Introduction.....	8-1
8.2 Unique Stream Segments .....	8-1
8.2.1 Armand Bayou .....	8-5
8.2.2 Austin Bayou .....	8-6
8.2.3 Bastrop Bayou.....	8-6
8.2.4 Big Creek (Fort Bend) .....	8-7
8.2.5 Big Creek (San Jacinto) .....	8-7
8.2.6 Cedar Lake Creek .....	8-8
8.2.7 Menard Creek .....	8-8
8.2.8 Oyster Bayou .....	8-9
8.3 Unique Reservoir Sites.....	8-11
8.3.1 Allens Creek Reservoir .....	8-12
8.3.2 Little River Off-Channel Reservoir .....	8-12
8.3.3 Bédias Reservoir .....	8-13
8.3.4 Little River Reservoir.....	8-13
8.4 Regulatory, Administrative and Legislative Recommendations.....	8-15
8.4.1 Summary of Recommendations.....	8-15
8.4.2 Regulatory and Administrative Recommendations.....	8-17

8.4.3	Legislative Recommendations.....	8-19
8.4.4	Recommendations Specific to Infrastructure Financing.....	8-24
<b>Chapter 9 – Water Infrastructure Financing Recommendations.....</b>		<b>1</b>
9.1	Introduction .....	1
9.2	Capital Costs for the 2011 Region H Water Plan .....	1
9.3	Infrastructure Financing Survey.....	6
9.3.1	Summary of Survey Responses.....	7
9.3.2	Summary of Survey Results .....	25
<b>Chapter 10 – Public Participation in Developing the 2011 Region H Water Plan.....</b>		<b>1</b>
10.1	Introduction .....	1
10.1.1	Regional Water Planning Group as Stakeholder Representatives .....	1
10.1.2	Public Meetings during Plan Development.....	1
10.1.3	Targeted Meetings during Plan Development .....	2
10.1.4	Public Notices and Press Releases.....	2
10.1.5	Region H Water Website .....	2
10.1.6	Texas Water Development Board Website .....	2
10.2	Summary of Public Hearing, August 2, 2006.....	2
10.3	Summary of Public Hearing, May 28, 2008 .....	4
10.4	Summary of Public Meeting, May 6, 2009.....	5
10.5	Summary of Public Meeting, July 1, 2009 .....	7
10.6	Public Review and Comment on Initially Prepared Plan .....	9
10.6.1	Identification of Libraries.....	9
10.6.2	Public Notice and Press Releases .....	9
10.6.3	Distribution of Documents for Review and Comment.....	10
10.7	Summary of Public Hearings and Written Comments on the Initially Prepared Plan.....	12
10.7.1	Summary of Public Hearing, March 30, 2010.....	13
10.7.2	Summary of Public Hearing, April 1, 2010 .....	14
10.7.3	Summary of Public Hearing, April 7, 2010 .....	15

### List of Tables

Table ES-1	Stream Segments Recommended as Ecologically Unique
Table ES-2	Reservoir Sites Recommended as Unique
Table ES-3	Public Repositories of the Region H Regional Water Plan
Table ES-4	Region H Population Projections
Table ES-5	Region H Water Demand Projections (in ac-ft/yr)
Table ES-6	Summary of Water Supplies Available for Study Years 2000, 2030 and 2060
Table ES-7	Recommended Water Management Strategies
Table ES-8	Recommended Water Management Strategies by County (in ac-ft/yr)

---

Table ES-9	Overall Frequencies of Meeting Monthly Inflow Targets
Table 1-1	Member Information for the Region H Water Planning Group
Table 1-2	State Agencies with Oversight of Water Planning
Table 1-3	Cities with Populations Over 25,000
Table 1-4	County Population and Municipal Water Demand
Table 1-5	Reported 2006 Non-municipal Water Use (acre-feet per year)
Table 1-6	Major Municipal Demand Centers
Table 1-7	Major Manufacturing Demand Centers
Table 1-8	Major Irrigation Demand Centers
Table 1-9	County Water Use by Source
Table 1-10	Projected 2060 Supplies Available for Use in Region H
Table 1-11	Major Region H Water Rights
Table 1-12	Large Industrial Water Rights Holders
Table 1-13	Public Lands
Table 1-14	Threatened and Endangered Species
Table 1-15	Water Loss by Type (acre-feet per year)
Table 1-16	Recommended Unique Stream Segments
Table 1-17	Recommended Unique Reservoir Sites
Table 2-1	Projection Error
Table 2-2	New WUG Population Projections
Table 2-3	TWDB Alternative Population
Table 2-4	Population by City, Collective Reporting Unit, Individual Retail Public Utility, and Rural County
Table 2-5	Water Demand by City and Category
Table 2-6	Year 2010 Water Demand by Wholesale Water Provider of All Water Use Categories
Table 2-7	Comparison Between 2006 RWP and 2011 RWP
Table 3-1	Municipal Groundwater Demand From 2000 TWDB Data
Table 3-2	Industrial Groundwater Demand From 2000 TWDB Data
Table 3-3	Agricultural Groundwater Demand From 2000 TWDB Data
Table 3-4	Current Surface Water Supply Sources Available in Region H
Table 3-5	Water Supply Reservoir Capacities
Table 3-6	Ownership of Trinity River Basin Supplies
Table 3-7	Typical Drought Triggers for Region H Supplies
Table 3-8	Major Environmental Water Rights in Region H
Table 3-9	Environmental Water Needs for Galveston Bay
Table 3-10	Water Quality Rights in Region H
Table 3-11	Major Recreational Water Rights in Region H
Table 3-12	Summary of Water Supply Available for Region H for Study Years 2010, 2030, and 2060



Table 3-13	Available Supply by Wholesale Water Provider within Region H for Study Years 2010, 2030, and 2060
Table 3-14	Summary of Supplies Available to Region H Wholesale Water
Table 3-15	Surface Water Supply by Categories of Water Use in Each County and Basin
Table 3-16	Groundwater Supply by Categories of Water Use in Each County and Basin
Table 3-17	Reuse Supply by Categories of Water Use in Each County and Basin
Table 4-1	Projected Shortages by County and Category (ac-ft/yr)
Table 4-2	Initial and Net Shortages by County (ac-ft/yr)
Table 4-3	WMS Rating Criteria
Table 4-4	Recommended Water Management Strategies
Table 4-5	Alternative WMS Available to Region H
Table 4-6	Fort Bend County Population Projection MethodologyTable
Table 5-1	Recreational Activities Associated with Water in Region H
Table 5-2	Lake Level Percentile Tables
Table 7-1	Overall Frequencies of Meeting Monthly Inflow Targets
Table 8-1	Streams Considered for Recommendation as Unique
Table 8-2	Designated and Recommended Unique Stream Segments
Table 9-1	Recommended Water Supply and Transmission Strategies
Table 9-2	Total Supply and Transmission Cost
Table 9-3	Summary of Survey Results
Table 10-1	Attendance at Public Hearing, August 2, 2006
Table 10-2	Attendance at Public Hearing, May 28, 2008
Table 10-3	Attendance at Public Hearing, May 6, 2009
Table 10-4	Attendance at Public Hearing, July 1, 2009
Table 10-5	Public Libraries Holding Copies of the Region H Regional Water Plan
Table 10-6	Attendance at Public Hearing, March 30, 2010
Table 10-7	Attendance at Public Hearing, April 1, 2010
Table 10-8	Attendance at Public Hearing, April 7, 2010

### List of Figures

Figure ES-1	Region H Population Projections by County
Figure ES-2	Region H Water Demand Comparison
Figure ES-3	Region H Location Map
Figure 1-1	Region H Water Planning Area
Figure 1-2	Percentage of 2006 Total Water Demand by Use
Figure 1-3	Region H Major Groundwater Sources
Figure 1-4	Region H Minor Groundwater Sources
Figure 1-5	Region H Groundwater Conservation and Subsidence Districts
Figure 1-6	Region H Surface Water Sources
Figure 1-7	Region H Surface Water Quality

Figure 1-8	Public Lands within Region H
Figure 2-1	Steam Electric Demand Projection Comparison
Figure 2-2	Steam Electric Demand Projection Comparison by County
Figure 2-3	Comparison of Population Projections for Fort Bend County
Figure 2-4	Alternative Population Projections for Fort Bend County
Figure 2-5	Water Demand by Decade
Figure 2-6	Comparison of Water Demand Estimates
Figure 2-7	Comparison of County Water Demand Estimates
Figure 3-1	Major Groundwater Aquifers
Figure 3-2	Minor Groundwater Aquifers
Figure 3-3	Aquifer Outcrop Areas
Figure 3-4	East Fort Bend County – Static Water Levels in Wells
Figure 3-5	Southwest Fort Bend County – Static Water Levels in Wells
Figure 3-6	North Fort Bend County – Static Water Levels in Wells
Figure 3-7	Central Fort Bend County – Static Water Levels in Wells
Figure 3-8	Major Surface Water Sources
Figure 3-9	Raw Surface Water Conveyance Systems
Figure 3-10	Seasonal and Restrictive Waterways in Region H
Figure 4-1	Comparison of Demands and Shortages: 2006 and 2011 RWPs
Figure 4-2	Remaining Shortages after Conservation and Expanded Groundwater Use
Figure 4-3	Projected Income Impacts of Unmet Needs During Drought Conditions
Figure 4-4	Projected Tax Impacts of Unmet Needs During Drought Conditions
Figure 4-5	Projected Social Impacts of Unmet Needs During Drought Conditions Figure 5 1 Lake Conroe Surface Area and Capacity (2060 Conditions)
Figure 5-1	Lake Conroe Surface Area and Capacity (2060 Conditions)
Figure 5-2	Lake Houston Surface Area and Capacity (2060 Conditions)
Figure 5-3	Lake Livingston Surface Area and Capacity (2060 Conditions)
Figure 7-1	Estimated Municipal Return Flows and Reuse
Figure 8-1	Recommended Unique Stream Segments
Figure 8-2	Recommended Reservoir Sites
Figure 9-1	Costs by Decade and Category

### List of Appendices

Appendix 1A	Selected Bibliography by Topic
Appendix 2A	Sample WUG Survey Letter
Appendix 2B	Resolution by the Region H Regional Water Planning Group Regarding Population Projections for the 2011 Regional Water Planning Cycle
Appendix 3A	Current Water Supply Sources Available During Drought of Record Conditions
Appendix 3B	WRAP Input Files
Appendix 3C	Upper Basin Return Flow and Lake Livingston Firm Yield Analysis

---

Appendix 3D	Region H Drought Contingency Plans
Appendix 3E	Potential Reservoir Sites
Appendix 3F	Water Quality Basin Maps
Appendix 3G	Region H Recreational Use Information
Appendix 3H	Current Water Supplies Available to Region H by City and Category
Appendix 3I	Current Water Supplies Available to Region H by Wholesale Water Provider
Appendix 3J	Current Surface Water Supplies by Category of Use by Basin by Wholesale Water Provider
Appendix 4A	Water Management Strategy Tables
Appendix 4B	Water Management Strategy Technical Memoranda
Appendix 4C	Cost Estimating Procedures
Appendix 4D	Galveston Bay Inflows Study
Appendix 4E	Environmental Flows Modeling for New WMS
Appendix 4F	TWDB Report: Socioeconomic Impacts of Unmet Water Demands in the Region H Water Planning Area
Appendix 5A	Texas Commission on Environmental Quality 303(d) List of Impaired Waters. Partial List on those Waterways in Region H and Tabular Summaries for Water Body Use Support by River Basin
Appendix 5B	Lake Level Graphs and Tables
Appendix 6A	Water Conservation Survey Letter
Appendix 6B	Water Conservation Survey Results
Appendix 7A	Agricultural Census Data, 1987 - 2007
Appendix 7B	Threatened and Endangered Species within Region H
Appendix 7C	Texas Parks and Wildlife Department Analysis of Water Management Strategies Recommended in the 2001 Region H Water Plan
Appendix 7D	Estimated Municipal Return Flows and Recommended Reuse
Appendix 9A	Tabulated Survey Results
Appendix 9B	Survey Questionnaires
Appendix A	Public Hearing Materials, August 2, 2006
Appendix B	Public Hearing Materials, May 28, 2008
Appendix C	Public Meeting Materials, May 6, 2009
Appendix D	Public Meeting Materials, July 1, 2009
Appendix E	Public Hearing Materials, March 30, 2010
Appendix F	Public Meeting Materials, April 1, 2010
Appendix G	Public Meeting Materials, April 7, 2010
Appendix H	Written Comments
Appendix I	Responses to Written Comments

**Abbreviations used in the Report**

Ac-ft/yr	Acre-feet per year
BRA	Brazos River Authority
CBWC	Chocolate Bayou Water Company
CHCRWA	Central Harris County Regional Water Authority
CLCND	Chambers-Liberty Counties Navigation District
COH	City of Houston
FBSD	Fort Bend Subsidence District
GBEP	Galveston Bay Estuary Program
GBF	Galveston Bay Foundation
GBFIG	Galveston Bay Freshwater Inflows Group
GCD	Groundwater Conservation District
GCWA	Gulf Coast Water Authority
HGCSA	Harris Galveston Coastal Subsidence District
MGD	Million gallons per day
MUD	Municipal Utility District
MWP	Major Water Provider (2001 Regional Plan Designation)
NFBWA	North Fort Bend Water Authority
NHCRWA	North Harris County Regional Water Authority
RWPG	Regional Water Planning Group
RHWPG	Region H Water Planning Group
SJRA	San Jacinto River Authority
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TRA	Trinity River Authority
TWDB	Texas Water Development Board
WUG	Water User Group
WWP	Wholesale Water Provider
WHCRWA	West Harris County Regional Water Authority

**Water Measurements**

Acre-foot (AF) = 43,560 cubic feet = 325,851 gallons

Acre-foot per year (ac-ft/yr) = 325,851 gallons per year = 893 gallons per day

Gallons per minute (gpm) = 1,440 gallons per day = 1.6 ac-ft/yr

Million gallons per day (mgd) = 1,000,000 gallons per day = 1120 ac-ft/yr

**County Codes used in the Tables**

8	Austin County
20	Brazoria County
36	Chambers County
79	Fort Bend County
84	Galveston County
101	Harris County
145	Leon County
146	Liberty County
157	Madison County
170	Montgomery County
187	Polk County
204	San Jacinto County
228	Trinity County
236	Walker County
237	Waller County

**Basin Codes used in the Tables**

6	Neches River Basin
7	Neches-Trinity Coastal Basin
8	Trinity River Basin
9	Trinity-San Jacinto Coastal Basin
10	San Jacinto River Basin
11	San Jacinto-Brazos Coastal Basin
12	Brazos River Basin
13	Brazos-Colorado Coastal Basin