Texas Water Development Board

2016 Region M Water Plan

Appendix A: Chapter 5B - Alternative and Not Recommended Water Management Strategies

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List of Abbreviations

Acre-ft.	Acre-feet
Acre-ft./year	Acre-feet per year
AgriLife	Texas A&M AgriLife Research
AMI	Advanced Metering Infrastructure
ARS	Agricultural Research Service
ASR	Aquifer Storage and Recovery
BPUB	Brownsville Public Utilities Board
cfs	Cubic feet per second
DMI	Domestic, Municipal, or Industrial
ERHWSC	East Rio Hondo Water Supply Corporation
FM	Farm to Market
GP/GT	Geo Pressure / Geo Thermal
GPM	Gallons per Minute
HP	Horsepower
IBWC	International Boundary and Water Commission
kWh	Kilowatt per hour
LF	Linear Feet
MF	Microfiltration
MG	Million Gallons
Mg/L	Milligrams per Liter
MGD	Million Gallons per Day
MUD	Municipal Utility District
NAWSC	North Alamo Water Supply Corporation
O&M	Operations and Maintenance
PUB	Public Utilities Board
PVC	Polyvinyl Chloride
RGRWA	Rio Grande Regional Water Authority
RO	Reverse Osmosis
RWP	Regional Water Plan
SUD	Special Utility District

TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSS	Total Suspended Solids
TWDB	Texas Water Development Board
TX	Texas
TXDOT	Texas Department of Transportation
UCM	Unified Costing Model
UF	Ultrafiltration
USACOE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet
WAM	Water Availability Model
WMS	Water Management Strategy
WSC	Water Supply Corporation
WTP	Water Treatment Plant
WUG	Water User Group
WWP	Wholesale Water Provider
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

Chapter 5B. Alternative and Not Recommended Water Management Strategies

5B.1 Introduction

Section 5B includes all of the water management strategies (WMS) that are included as recommended alternatives and those that were not recommended. All potentially feasible strategies were evaluated based on the criteria discussed in Section 5.1. When higher-ranked strategies were able to meet the full need, remaining viable strategies were considered recommended alternatives, included here in 5B.2. When strategies either did not meet the criteria or definition of a WMS, or did not provide sufficient information for evaluation, they were considered Not Recommended, and are included in Section 5B.3.

5B.2 Alternative Strategies

5B.2.1 Regional Plans

Rio Grande Regional Water Authority Regional Facility Project

Project Source

This strategy was submitted to the RWPG by representatives of the Rio Grande Regional Water Authority (RGRWA).

Description

The RGRWA Lower Rio Grande Valley Regional Water Supply Project would provide a regional solution to supply additional water to the Lower Rio Grande Valley. The project would utilize four water sources to diversify the water supply to the region. The facilities that would be constructed as part of this project include: a seawater desalination plant on South Padre Island, two brackish groundwater wellfields and treatment plants –one each in Cameron and Hidalgo Counties, and a water treatment plant in Cameron County that would treat surface water as well as direct potable reuse, after it had gone through advanced treatment. Additionally, a trunk line running from eastern Cameron County to western Hidalgo County would be built, with turn outs to the cities, in order to connect the water from all of the facilities to all of the entities that are being supplied.

Available Supply

The initial phase of the project would be online in 2020 and be expanded each decade. Table 5B-1 shows the quantity of water that would be supplied by each facility and source in each decade.

Table 5B-1 Water Supplied by RGRWA Regional Facility Project, per Source (Acre-ft./year)

	2020	2030	2040	2050	2060	2070
Seawater Desal	5,470	5,470	5,470	21,950	51,500	79,500
Surface WTP	0	12,780	45,130	76,800	95,800	115,000
Surface Water	*0*	*12,780*	*28,003*	*38,431*	*48,132*	*57,607*
Cameron Reuse	*0*	*0*	*6,851*	*15,348*	*19,067*	*22,957*
Hidalgo Reuse	*0*	*0*	*10,276*	*23,021*	*28,601*	*34,436*

	2020	2030	2040	2050	2060	2070
Hidalgo BGD	0	9,000	9,000	9,000	9,000	9,000
Cameron BGD	20,000	28,500	28,500	28,500	28,500	28,500
Total	**25,470**	**55,750**	**88,100**	**136,250**	**184,800**	**232,000**

The project will serve 25 entities throughout Cameron and Hidalgo Counties. Table 5B-2 presents the amount of water that will be provided to each of these entities.

Table 5B-2 RGRWA Regional Facility Project Water Supplied to Entities (Acre-ft./year)

Entity	2020	2030	2040	2050	2060	2070
Agua SUD	0	700	700	2,900	4,600	6,350
Alamo	850	1,500	2,200	2,950	3,650	4,400
Brownsville	0	0	500	7,600	15,150	22,950
Donna	0	150	650	1,250	1,800	2,400
East Rio Hondo WSC	0	50	650	1,300	2,000	2,700
Edinburg	3,550	6,350	9,200	12,150	15,150	18,100
Harlingen	0	0	1,100	3,500	6,050	8,700
Hidalgo	400	800	1,200	1,600	2,050	2,450
Hidalgo County MUD1	300	450	550	650	800	950
La Feria	0	50	200	400	600	800
Laguna Vista	850	1,250	1,650	2,100	2,550	3,000
McAllen	4,350	12,800	21,500	30,350	39,350	48,150
Mercedes	250	700	1,150	1,600	2,100	2,550
Military Highway WSC	1,100	2,050	3,050	4,150	5,250	6,400
Mission	6,650	11,150	15,700	20,350	25,100	29,700
North Alamo WSC	0	1,750	3,100	8,750	12,350	16,950
Olmito WSC	0	0	0	100	250	400
Pharr	20	2,050	4,150	6,300	8,600	10,750
Port Isabel	450	650	850	1,100	1,300	1,550
Rancho Viejo	0	0	0	0	100	250
San Benito	0	0	0	0	600	1,250
San Juan	1,750	2,850	3,900	5,250	6,550	7,850
Sharyland WSC	1,050	4,300	7,700	11,200	15,700	17,850
South Padre Island	1,100	1,650	2,200	2,750	3,350	4,000
Weslaco	2,800	4,500	6,200	7,950	9,800	11,550
Total	**25,470**	**55,750**	**88,100**	**136,250**	**184,800**	**232,000**

Engineering and Costing

Preliminary engineering and costs for this strategy are based on draft design numbers from the Regional Facility Project Preliminary Engineering Report, however they may not be the same as the final Preliminary Engineering Report. The Unified Costing Model (UCM) was used to cost out the different portions of this strategy.

The Seawater Desalination Facility would include an intake pump station and pipeline sized for twice the amount of water produced, due to 50% predicted membrane recovery rate. A treatment plant, storage tank, and discharge pump station and pipeline are also included in the cost estimate. It was assumed that the intake would be located one mile into the Gulf of Mexico and that the concentrate discharge pipeline would discharge one mile away from the plant. For costing purposes, the full build out of the pump stations and pipeline are shown in 2020, but the

annual costs are only for the amount of water seen in each decade. The water treatment plant is costed to be expanded per decade. It is assumed that the construction period for this strategy is three years, with the initial phase built in 2020.

Table 5B-3 through Table 5B-6 outline the estimated project requirements and cost estimates for the Ocean Desalination Facility.

Table 5B-3 RGRWA Seawater Desalination Facility Phase I Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2020*	
Item	***Estimated Costs for Facilities***
Two Pump Stations (10.3 MGD / 5.1 MGD)	$19,470,000
Two Transmission Pipelines (84 in dia., 5280 feet / 54 in dia., 5290 feet)	$4,464,000
Storage Tank	$2,061,000
Water Treatment Plant (5 MGD)	$69,366,000
TOTAL COST OF FACILITIES	**$95,361,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$33,153,000
Environmental & Archaeology Studies and Mitigation	$101,000
Land Acquisition and Surveying (41 acres)	$135,000
Interest During Construction (4% for 3 years with a 1% ROI)	$13,519,000
TOTAL COST OF PROJECT	**$142,269,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$11,905,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$552,000
Water Treatment Plant (2.5% of Cost of Facilities)	$19,421,000
Pumping Energy Costs (1952253 kW-hr @ 0.09 $/kW-hr)	$176,000
TOTAL ANNUAL COST	**$32,054,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	5,470
Annual Cost of Water ($ per acft)	$5,860
Annual Cost of Water ($ per 1,000 gallons)	$17.98

Table 5B-4 RGRWA Seawater Desalination Facility Phase II Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2050*	
Item	***Estimated Costs for Facilities***
Storage Tank	$3,998,000
Water Treatment Plant Expansion (14.7 MGD)	$155,022,000
TOTAL COST OF FACILITIES	**$159,020,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$55,657,000
Environmental & Archaeology Studies and Mitigation	$50,000
Land Acquisition and Surveying (51 acres)	$55,000
Interest During Construction (4% for 3 years with a 1% ROI)	$22,553,000
TOTAL COST OF PROJECT	**$237,335,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$19,860,000

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2050*	
Item	***Estimated Costs for Facilities***
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$40,000
Water Treatment Plant (2.5% of Cost of Facilities)	$46,889,000
Pumping Energy Costs (7892666 kW-hr @ 0.09 $/kW-hr)	$710,000
TOTAL ANNUAL COST	**$67,499,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	21,950
Annual Cost of Water ($ per acft)	$3,075
Annual Cost of Water ($ per 1,000 gallons)	$9.44

Table 5-5 RGRWA Seawater Desalination Facility Phase III Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2060*	
Item	***Estimated Costs for Facilities***
Storage Tank	$7,996,000
Water Treatment Plant Expansion (26.4 MGD)	$249,256,000
TOTAL COST OF FACILITIES	**$257,252,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$90,038,000
Environmental & Archaeology Studies and Mitigation	$85,000
Land Acquisition and Surveying (63 acres)	$94,000
Interest During Construction (4% for 3 years with a 1% ROI)	$36,485,000
TOTAL COST OF PROJECT	**$383,954,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$32,129,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$80,000
Water Treatment Plant (2.5% of Cost of Facilities)	$75,528,000
Pumping Energy Costs (19091599 kW-hr @ 0.09 $/kW-hr)	$1,718,000
TOTAL ANNUAL COST	**$109,455,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	51,500
Annual Cost of Water ($ per acft)	$2,125
Annual Cost of Water ($ per 1,000 gallons)	$6.52

Table 5B-6 RGRWA Seawater Desalination Facility Phase IV Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2070*	
Item	***Estimated Costs for Facilities***
Storage Tanks	$7,996,000
Water Treatment Plant Expansion (25 MGD)	$237,980,000
TOTAL COST OF FACILITIES	**$245,976,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$86,092,000
Environmental & Archaeology Studies and Mitigation	$81,000

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Seawater Desalination - 2070*	
Item	***Estimated Costs for Facilities***
Land Acquisition and Surveying (61 acres)	$89,000
Interest During Construction (4% for 3 years with a 1% ROI)	$34,885,000
TOTAL COST OF PROJECT	**$367,123,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$30,721,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$80,000
Water Treatment Plant (2.5% of Cost of Facilities)	$72,101,000
Pumping Energy Costs (30848957 kW-hr @ 0.09 $/kW-hr)	$2,776,000
TOTAL ANNUAL COST	**$105,678,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	79,500
Annual Cost of Water ($ per acft)	$1,329
Annual Cost of Water ($ per 1,000 gallons)	$4.08

The Surface Water Treatment plant would treat surface water and potable reuse. An Aquifer Storage and Recovery Facility (ASR) would also be located near the plant to provide operational flexibility. Surface water would come through converted water rights from irrigation to municipal use as agricultural land is urbanized. The reuse water would be collected from major WWTPs in the region and an advanced treatment facility would be located upstream of the surface water treatment plant.

For costing purposes, two main transmission lines, one from a central area in Cameron and one from Hidalgo County, to collect the WWTP effluent were included in the cost estimate. In order to estimate the construction cost of advanced treatment for the potable reuse, a unit capital cost for Treatment Scheme 2 from the TWDB Direct Potable Reuse Resource Document[1] was multiplied by the advanced treatment capacity. The initial phase would be built in 2030, with just surface water, and it would be expanded in 2040 to include potable reuse and ASR. For costing purposes, the full build out of the pump stations and pipeline are shown in the first year they are used, but the annual costs are only for the amount of water seen in each decade. The water treatment plants are costed to be expanded per decade. It is assumed construction of each phase would take approximately two years.

Table 5B-7 through Table 5B-11 outline the estimated project requirements and cost estimates for the Surface Water Treatment Plant developed in UCM.

Table 5B-7 RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2030

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2030*	
Item	***Estimated Costs for Facilities***
Dam and Reservoir (Conservation Pool 300 acft, 15 acres)	$3,674,000
Pump Stations (12 MGD)	$7,405,000

[1] Direct Potable Reuse Resource Document, Alan Plummer Assoc, Inc, April 2015for TWDB

Cost Estimate Summary Water Supply Project Option RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2030	
Item	***Estimated Costs for Facilities***
Transmission Pipeline (72 in dia., 1 miles)	$3,704,000
Water Treatment Plant (11.4 MGD)	$36,572,000
TOTAL COST OF FACILITIES	**$51,355,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$17,789,000
Environmental & Archaeology Studies and Mitigation	$61,000
Land Acquisition and Surveying (39 acres)	$81,000
Interest During Construction (4% for 2 years with a 1% ROI)	$4,851,000
TOTAL COST OF PROJECT	**$74,137,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$5,760,000
Reservoir Debt Service (5.5 percent, 40 years)	$331,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$222,000
Dam and Reservoir (1.5% of Cost of Facilities)	$55,000
Water Treatment Plant (2.5% of Cost of Facilities)	$3,657,000
Pumping Energy Costs (1584260 kW-hr @ 0.09 $/kW-hr)	$143,000
TOTAL ANNUAL COST	**$10,168,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.5	12,780
Annual Cost of Water ($ per acft)	$796
Annual Cost of Water ($ per 1,000 gallons)	$2.44

Table 5B-8 RGRWA Surface Water Treatment Plant Phase II Project Requirements and Cost

Cost Estimate Summary Water Supply Project Option RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2040	
Item	***Estimated Costs for Facilities***
Two Reuse Pump Stations (6.4 MGD / 9.6 MGD)	$22,485,000
Two Reuse Transmission Pipeline (30 in dia., 15 miles / 36 in dia., 28 miles)	$36,426,000
ASR Well Field (Wells, Pumps, and Piping)	$47,674,000
Two Water Treatment Plants (13.6 MGD and 15.3 MGD)	$93,750,000
TOTAL COST OF FACILITIES	**$200,335,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$68,296,000
Environmental & Archaeology Studies and Mitigation	$102,000
Land Acquisition and Surveying (606 acres)	$1,820,000
Interest During Construction (4% for 2 years with a 1% ROI)	$18,939,000
TOTAL COST OF PROJECT	**$289,492,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$24,225,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$1,403,000
Water Treatment Plant (2.5% of Cost of Facilities)	$8,469,000
Pumping Energy Costs (7974866 kW-hr @ 0.09 $/kW-hr)	$2,435,000
TOTAL ANNUAL COST	**$36,532,000**

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2040*	
Item	***Estimated Costs for Facilities***
Available Project Yield (acft/yr), based on a Peaking Factor of 1.5	45,130
Annual Cost of Water ($ per acft)	$809
Annual Cost of Water ($ per 1,000 gallons)	$2.48

Table 5B-9 RGRWA Surface Water Treatment Plant Phase III Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2050*	
Item	***Estimated Costs for Facilities***
Two Water Treatment Plant Expansions (9.3 MGD and 19 MGD)	$105,455,000
TOTAL COST OF FACILITIES	**$105,455,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$36,909,000
Environmental & Archaeology Studies and Mitigation	$42,000
Land Acquisition and Surveying (586 acres)	$1,755,000
Interest During Construction (4% for 2 years with a 1% ROI)	$10,092,000
TOTAL COST OF PROJECT	**$154,253,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$12,908,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$9,095,000
Pumping Energy Costs (24178648 kW-hr @ 0.09 $/kW-hr)	$2,176,000
TOTAL ANNUAL COST	**$24,179,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.5	76,800
Annual Cost of Water ($ per acft)	$315
Annual Cost of Water ($ per 1,000 gallons)	$0.97

Table 5B-10 RGRWA Surface Water Treatment Plant Phase IV Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2060*	
Item	***Estimated Costs for Facilities***
Two Water Treatment Plant Expansions (8.7 MGD and 8.3 MGD)	$55,001,000
TOTAL COST OF FACILITIES	**$55,001,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$19,250,000
Environmental & Archaeology Studies and Mitigation	$26,000
Land Acquisition and Surveying (580 acres)	$1,736,000
Interest During Construction (4% for 2 years with a 1% ROI)	$5,321,000
TOTAL COST OF PROJECT	**$81,334,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$6,806,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$5,437,000
Pumping Energy Costs (25595668 kW-hr @ 0.09 $/kW-hr)	$2,304,000

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2060*	
Item	***Estimated Costs for Facilities***
TOTAL ANNUAL COST	**$14,547,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.5	95,800
Annual Cost of Water ($ per acft)	$152
Annual Cost of Water ($ per 1,000 gallons)	$0.47

Table 5B-11 RGRWA Surface Water Treatment Plant Phase V Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Surface Water Treatment Plant, Reuse, and ASR - 2070*	
Item	***Estimated Costs for Facilities***
Two Water Treatment Plant Expansions (8.4 MGD and 8.7 MGD)	$56,396,000
TOTAL COST OF FACILITIES	**$56,396,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$19,738,000
Environmental & Archaeology Studies and Mitigation	$26,000
Land Acquisition and Surveying (580 acres)	$1,736,000
Interest During Construction (4% for 2 years with a 1% ROI)	$5,453,000
TOTAL COST OF PROJECT	**$83,349,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$6,975,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$5,562,000
Pumping Energy Costs (36019932 kW-hr @ 0.09 $/kW-hr)	$3,242,000
TOTAL ANNUAL COST	**$15,779,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1.5	115,000
Annual Cost of Water ($ per acft)	$137
Annual Cost of Water ($ per 1,000 gallons)	$0.42

The Cameron Brackish Groundwater Desalination (BGD) Plant would initially be constructed with 32 wells and a rated capacity of 20,000 acre-ft./year treated water in 2020. It would be expanded in 2030 with an additional 11 wells for a rated capacity of 30,000 acre-ft./year. The wellfield is sized to pump 125% of the produced water supply to account for treatment efficiency. Costs include groundwater well pumping, well field piping, land acquisition, and water treatment. The well depth is estimated at 1,000 ft. below ground surface and each well is sized for 620 gpm. A pump station and pipeline that would convey brine concentrate to for surface water discharge into the drainage system is also included. It is assumed that the construction period for each phase would be approximately one and a half years.

Table 5B-12 and Table 5B-13 outline the estimated project requirements and cost estimates for the Cameron BGD Plant developed in UCM.

Table 5B-12 RGRWA Cameron BGD Plant Phase I Project Requirements and Cost

Cost Estimate Summary
Water Supply Project Option
RGRWA - Cameron Brackish Water Desalination - 2020

Item	*Estimated Costs for Facilities*
Pump Station (6.3 MGD)	$2,825,000
Transmission Pipeline (20 in dia., 2 miles)	$808,000
Well Fields (Wells, Pumps, and Piping)	$40,085,000
Storage Tank	$7,996,000
Two Water Treatment Plant (17.9 MGD)	$93,144,000
TOTAL COST OF FACILITIES	**$144,858,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$50,660,000
Environmental & Archaeology Studies and Mitigation	$996,000
Land Acquisition and Surveying (64 acres)	$157,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$10,326,000
TOTAL COST OF PROJECT	**$206,997,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$17,321,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$560,000
Water Treatment Plant (2.5% of Cost of Facilities)	$13,024,000
Pumping Energy Costs (11273654 kW-hr @ 0.09 $/kW-hr)	$1,015,000
TOTAL ANNUAL COST	**$31,920,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	20,000
Annual Cost of Water ($ per acft)	$1,596
Annual Cost of Water ($ per 1,000 gallons)	$4.90

Table 5B-13 RGRWA Cameron BGD Plant Phase II Project Requirements and Cost

Cost Estimate Summary
Water Supply Project Option
RGRWA - Cameron Brackish Water Desalination - 2030

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$11,633,000
Storage Tank	$3,998,000
Water Treatment Plant Expansion (7.6 MGD)	$34,740,000
TOTAL COST OF FACILITIES	**$50,371,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$17,630,000
Environmental & Archaeology Studies and Mitigation	$331,000
Land Acquisition and Surveying (43 acres)	$105,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$3,593,000
TOTAL COST OF PROJECT	**$72,030,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$6,027,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$156,000
Water Treatment Plant (2.5% of Cost of Facilities)	$5,319,000
Pumping Energy Costs (6230348 kW-hr @ 0.09 $/kW-hr)	$561,000
TOTAL ANNUAL COST	**$12,063,000**

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Cameron Brackish Water Desalination - 2030*	
Item	***Estimated Costs for Facilities***
Available Project Yield (acft/yr), based on a Peaking Factor of 1	28,500
Annual Cost of Water ($ per acft)	$423
Annual Cost of Water ($ per 1,000 gallons)	$1.30

The Hidalgo BGD Plant would be constructed with 14 wells and a rated capacity of 9,000 acre-ft./year treated water in 2030. The wellfield is sized to pump 125% of the produced water supply to account for treatment efficiency. Costs include groundwater well pumping, well field piping, land acquisition, and water treatment. The well depth is estimated at 1,000 ft. below ground surface and each well is sized for 620 gpm. A pump station and pipeline that would convey brine concentrate to for surface water discharge into the drainage system is also included. It is assumed that the construction period would be approximately one and a half years. Table 5B-14 outlines the project requirements and cost estimate developed in UCM.

Table 5B-14 RGRWA Hidalgo BGD Plant Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Hidalgo Brackish Water Desalination - 2030*	
Item	***Estimated Costs for Facilities***
Pump Stations (2.8 MGD)	$2,160,000
Transmission Pipeline (12 in dia., 5 miles)	$884,000
Well Fields (Wells, Pumps, and Piping)	$16,335,000
Storage Tank	$3,195,000
Water Treatment Plant (8 MGD)	$47,544,000
TOTAL COST OF FACILITIES	**$70,118,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$24,497,000
Environmental & Archaeology Studies and Mitigation	$492,000
Land Acquisition and Surveying (79 acres)	$222,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$5,005,000
TOTAL COST OF PROJECT	**$100,334,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$8,396,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$258,000
Water Treatment Plant (2.5% of Cost of Facilities)	$6,690,000
Pumping Energy Costs (7824122 kW-hr @ 0.09 $/kW-hr)	$704,000
TOTAL ANNUAL COST	**$16,048,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	9,000
Annual Cost of Water ($ per acft)	$1,783
Annual Cost of Water ($ per 1,000 gallons)	$5.47

In order to connect all of the facilities and the entities that this strategy will serve, a pipeline system would be built with pump stations to convey the water. The pump stations would be expanded in each decade, as more water is transported, and some of the pipelines would be twinned in later decades.

Table 5B-15 through Table 5B-20 outline the estimated project requirements and cost estimates for the Pipeline System developed in UCM.

Table 5B-15 RGRWA Pipeline System Phase I Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA – Pipe System 2020*	
Item	***Estimated Costs for Facilities***
Transmission Pump Stations	$9,107,000
Transmission Pipelines (90.2 miles)	$117,424,231
TOTAL COST OF FACILITIES	**$126,531,231**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$38,415,000
Environmental & Archaeology Studies and Mitigation	$2,301,000
Land Acquisition and Surveying	$7,052,000
Interest During Construction (4% with a 1% ROI)	$9,151,000
TOTAL COST OF PROJECT	**$183,450,231**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$15,351,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$1,402,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$1,719,000
TOTAL ANNUAL COST	**$18,472,000**

Table 5B-16 RGRWA Pipeline System Phase II Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Pipe System 2030*	
Item	***Estimated Costs for Facilities***
Transmission Pump Stations	$6,143,000
TOTAL COST OF FACILITIES	**$6,143,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$6,208,000
Environmental & Archaeology Studies and Mitigation	$45,000
Land Acquisition and Surveying	$50,000
Interest During Construction (4% with a 1% ROI)	$1,263,000
TOTAL COST OF PROJECT	**$13,709,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$2,040,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$154,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$888,000
TOTAL ANNUAL COST	**$3,082,000**

Table 5B-17 RGRWA Pipeline System Phase III Project Requirements and Cost

Cost Estimate Summary
Water Supply Project Option
RGRWA - Pipe System 2040

Item	*Estimated Costs for Facilities*
Transmission Pump Stations	$6,833,000
TOTAL COST OF FACILITIES	**$6,833,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$6,421,000
Environmental & Archaeology Studies and Mitigation	$45,000
Land Acquisition and Surveying	$50,000
Interest During Construction (4% with a 1% ROI)	$1,306,000
TOTAL COST OF PROJECT	**$14,655,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$2,190,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$171,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$1,612,000
TOTAL ANNUAL COST	**$3,973,000**

Table 5B-18 RGRWA Pipeline System Phase IV Project Requirements and Cost

Cost Estimate Summary
Water Supply Project Option
RGRWA - Pipe System 2050

Item	*Estimated Costs for Facilities*
Transmission Pump Stations	$9,188,000
Transmission Pipeline (55.9 miles)	$93,637,524
TOTAL COST OF FACILITIES	**$102,825,524**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$36,126,000
Environmental & Archaeology Studies and Mitigation	$1,442,000
Land Acquisition and Surveying	$50,000
Interest During Construction (4% with a 1% ROI)	$8,097,000
TOTAL COST OF PROJECT	**$148,540,524**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$13,582,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$1,166,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$2,800,000
TOTAL ANNUAL COST	**$17,548,000**

Table 5B-19 RGRWA Pipeline System Phase V Project Requirements and Cost

Cost Estimate Summary
Water Supply Project Option
RGRWA - Pipe System 2060

Item	*Estimated Costs for Facilities*
Transmission Pump Stations	$11,690,000
Transmission Pipeline (1.5 miles)	$21,026,716
TOTAL COST OF FACILITIES	**$32,716,716**

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Pipe System 2060*	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$15,360,000
Environmental & Archaeology Studies and Mitigation	$83,000
Land Acquisition and Surveying	$50,000
Interest During Construction (4% with a 1% ROI)	$3,276,000
TOTAL COST OF PROJECT	**$51,485,716**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$5,494,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$503,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$4,389,000
TOTAL ANNUAL COST	**$10,386,000**

Table 5B-20 RGRWA Pipeline System Phase VI Project Requirements and Cost

Cost Estimate Summary *Water Supply Project Option* *RGRWA - Pipe System 2070*	
Item	***Estimated Costs for Facilities***
Transmission Pump Stations	$16,136,000
TOTAL COST OF FACILITIES	**$16,136,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$12,039,000
Environmental & Archaeology Studies and Mitigation	$45,000
Land Acquisition and Surveying	$50,000
Interest During Construction (4% with a 1% ROI)	$2,443,000
TOTAL COST OF PROJECT	**$30,713,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$4,098,000
Operation and Maintenance	
Wells, Pipelines, Pump Stations	$403,000
Transmission Pumping Energy Costs (0.09 $/kW-hr)	$14,573,000
TOTAL ANNUAL COST	**$19,074,000**

Because all of the facilities are connected by the pipeline system, all entities will share a single unit cost for any of the water provided through this strategy. Table 5B-21 presents the overall unit cost for this strategy.

Table 5B-21 RGRWA Regional Facility Project Unit Cost per Decade

Year	2020	2030	2040	2050	2060	2070
Unit Cost ($/acre-ft.)	$3,237	$2,172	$1,468	$1,430	$1,629	$1,652

Implementation Issues

Approval for additional concentrate disposal will be needed from TCEQ. Construction may also include purchase of land and a TXDOT right-of-way permit.

5B.2.2 Cameron County

BROWNSVILLE

Brownsville-Matamoros Weir and Reservoir

Project Source

This strategy was submitted by the City of Brownsville to the RWPG.

Description

This strategy is for the construction of a weir and on-channel reservoir to capture and store excess river flow for an additional water supply in the lower Rio Grande Valley. The weir and reservoir would be located about four miles southeast of Brownsville.

Available Supply

BPUB currently has authorization to divert up to 40,000 acre-ft./year of "excess flows" from the Rio Grande under TCEQ Permit No. 1838. Excess flows are defined as all U.S. waters passing the Brownsville gauging station above 25 cfs. Excess U.S. River flows will be impounded in the Brownsville Reservoir under BPUB's TCEQ water rights Permit No. 5259. According to hydrologic studies performed for the project sponsors, the proposed project would allow the diversion of the full 40,000 acre-ft./year authorized under the existing permit approximately 70 percent of the time. Based on the WAM Run 3, firm yield during the drought of record is as shown in Table 5B-22.

Environmental Issues

Environmental issues include impacts on water quality (i.e., increased salinity) within and downstream of the reservoir; impacts to aquatic and riparian habitat as a result of changes in downstream flow and salinity patterns; potential impacts to habitat from reservoir construction and inundation; potential adverse impacts to the Audubon Society's Sabal Palm Sanctuary; and increased risk of flooding. The project sponsors have indicated their intent to operate the proposed project so as to mitigate these concerns; resource advocates remain concerned about these issues.

A water right permit for the Brownsville Weir and Reservoir Project was issued by TCEQ in 2000. This permit authorizes the construction of the Brownsville Weir on the Rio Grande and impoundment of 6,000 acre-ft. of Rio Grande water in the Brownsville Reservoir. Special conditions included in this permit require the BPUB to: (1) pass a minimum flow of 25-cfs when water is being impounded; (2) pass sufficient water through the reservoir to satisfy demands of downstream water rights holders as directed by the Rio Grande Watermaster; (3) monitor salinity in the Rio Grande downstream of the weir near the riverine/estuarine interface (23.6 river miles upstream from the mouth of the river) and only impound water in the reservoir when the measured salinity is less than an established low salinity condition; and (4) consult with the TCEQ, Texas Parks and Wildlife Department (TPWD), U.S. Fish and Wildlife Service (USFWS), and other appropriate agencies to develop and implement an acceptable mitigation plan for the overall BWR Project.

The mitigation plan for the Project will be developed and finalized through the Section 404/10 process under the authority of the Galveston District of the Corps of Engineers. Environmental issues that have been raised will have to be satisfactorily addressed through the Section 404/10 Federal permitting process and through the IBWC project approval process in order for the Project to be authorized. The IBWC will be the lead agency for all discussions and dealings with Mexico, which depend on the Section 404/10 permit.

Engineering and Costing

Costs for this strategy from the UCM include an on-channel reservoir and land acquisition. It is assumed that the construction period for this strategy is one year. Table 5B-22 outlines the estimated project requirements and costs.

Table 5B-22 Brownsville-Matamoros Weir and Reservoir Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Brownsville Public Utility Board – Brownsville-Matamoros Weir and Reservoir	
Item	***Estimated Costs for Facilities***
Off-Channel Storage/Ring Dike (Conservation Pool 6,000 acft, 300 acres)	$13,331,000
TOTAL COST OF FACILITIES	**$13,331,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$4,666,000
Environmental & Archaeology Studies and Mitigation	$901,000
Land Acquisition and Surveying (300 acres)	$916,000
Interest During Construction (4% for 1 years with a 1% ROI)	$694,000
TOTAL COST OF PROJECT	**$20,508,000**
ANNUAL COST	
Reservoir Debt Service (5.5 percent, 40 years)	$1,278,000
Operation and Maintenance	
Dam and Reservoir (1.5% of Cost of Facilities)	$200,000
TOTAL ANNUAL COST	**$1,478,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	19,176
Annual Cost of Water ($ per acft)	$77
Annual Cost of Water ($ per 1,000 gallons)	$0.24

Implementation Issues

The project is on hold pending approval from Mexico.

COMBES

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a reverse osmosis water treatment plant to treat the raw water to potable drinking water standards. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Available Supply

Based on preliminary needs estimates for Combes, the BGD plant is sized for 125 acre-ft./year.

Engineering and Costing

Membrane treatment efficiency is assumed to be 80%, and the construction period is one and a half years. Table outlines the project requirements and cost estimate developed in UCM.

Table 5B-23 Combes BGD Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Combes - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$333,000
Water Treatment Plants (0.1 MGD)	$2,399,000
TOTAL COST OF FACILITIES	**$2,732,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$956,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$195,000
TOTAL COST OF PROJECT	**$3,891,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$326,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$3,000
Water Treatment Plant (2.5% of Cost of Facilities)	$333,000
Pumping Energy Costs (31362 kW-hr @ 0.09 $/kW-hr)	$3,000
TOTAL ANNUAL COST	**$665,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	125
Annual Cost of Water ($ per acft)	$5,320
Annual Cost of Water ($ per 1,000 gallons)	$16.32

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit.

EAST RIO HONDO WASTER SUPPLY CORPORATION

Surface Water Treatment Plant –Phase II

Project Source

This strategy was submitted by East Rio Hondo WSC to the RWPG.

Description

This strategy is to expand the new surface water treatment plant just west of Rio Hondo. The first phase of this project is included as a Recommended Water Management Strategy.

Available Supply

The treatment plant would expanded for an additional 2.2 MGD capacity, or 2,500 acre-ft/yr.

Engineering and Costing

Costs for Phase II of the strategy from the UCM include a pump station expansion, treatment plant expansion, and purchase of water rights. It is assumed that the construction period for this strategy is six months.

Table 5B-24 outlines the project requirements and cost estimate developed in UCM.

Table 5B-24 ERHWSC Surface Water Treatment Plant, Phase II Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option East Rio Hondo WSC – Surface Water Treatment Plant Phase II	
Item	***Estimated Costs for Facilities***
Pump Station	$1,018,000
Water Treatment Plant Expansion (2.2 MGD)	$6,672,000
TOTAL COST OF FACILITIES	**$10,580,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$3,703,000
Environmental & Archaeology Studies and Mitigation	$3,000
Land Acquisition and Surveying (66 acres)	$3,000
Interest During Construction (4% for 0.5 years with a 1% ROI)	$251,000
TOTAL COST OF PROJECT	**$14,540,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,217,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$25,000
Water Treatment Plant (2.5% of Cost of Facilities)	$667,000
Pumping Energy Costs (280787 kW-hr @ 0.09 $/kW-hr)	$25,000
TOTAL ANNUAL COST	**$1,934,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	2,500
Annual Cost of Water ($ per acft)	$774
Annual Cost of Water ($ per 1,000 gallons)	$2.37

Implementation Issues

The availability of surface water rights required to supply the treatment plant is a potential implementation issue.

HARLINGEN

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Available Supply

Based on preliminary needs estimates for Harlingen, the new brackish groundwater plant is sized for 1,000 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 1,250 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-25 outlines the project requirements and cost estimate developed in UCM.

Table 5B-25 Harlingen New BGD Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Harlingen - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$777,000
Water Treatment Plant (0.9 MGD)	$7,890,000
TOTAL COST OF FACILITIES	**$8,667,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$3,034,000
Environmental & Archaeology Studies and Mitigation	$8,000
Land Acquisition and Surveying (1 acres)	$3,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$615,000
TOTAL COST OF PROJECT	**$12,327,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,031,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$8,000
Water Treatment Plant (2.5% of Cost of Facilities)	$1,118,000

Cost Estimate Summary *Water Supply Project Option* *City of Harlingen - Brackish Water Desalination*	
Item	***Estimated Costs for Facilities***
Pumping Energy Costs (251298 kW-hr @ 0.09 $/kW-hr)	$23,000
TOTAL ANNUAL COST	**$2,180,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,000
Annual Cost of Water ($ per acft)	$2,180
Annual Cost of Water ($ per 1,000 gallons)	$6.69

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit.

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP.

Description

This direct non-potable reuse strategy is to use treated wastewater effluent for non-potable reuse. Harlingen currently uses 1.0 MGD of non-potable reuse and no specific customers were identified to use the non-potable reuse. Environmental Impacts typical of Direct Potable Reuse are discussed in Section 5.2.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5% of Harlingen's 2020 demand could be met by non-potable reuse. Therefore this strategy was sized to produce 677 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP, a pump station and pipeline to convey the reuse water into the city, storage, and land acquisition. It is assumed that the construction period for this strategy is one year.

Table 5B-26 outlines the project requirements and cost estimate developed in UCM.

Table 5B-26 Harlingen Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *City of Harlingen - Non-Potable Reuse*	
Item	***Estimated Costs for Facilities***
Pump Station (0.6 MGD)	$1,088,000
Transmission Pipeline (6 in dia., 3 miles)	$871,000
Storage Tanks (Other Than at Booster Pump Stations)	$412,000
Water Treatment Plant (0.6 MGD)	$2,462,000
TOTAL COST OF FACILITIES	**$4,833,000**

Cost Estimate Summary Water Supply Project Option City of Harlingen - Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,648,000
Environmental & Archaeology Studies and Mitigation	$71,000
Land Acquisition and Surveying (42 acres)	$112,000
Interest During Construction (4% for 1 years with a 1% ROI)	$234,000
TOTAL COST OF PROJECT	**$6,898,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$577,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$40,000
Water Treatment Plant (2.5% of Cost of Facilities)	$492,000
Pumping Energy Costs (301911 kW-hr @ 0.09 $/kW-hr)	$27,000
TOTAL ANNUAL COST	**$1,136,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	677
Annual Cost of Water ($ per acft)	$1,678
Annual Cost of Water ($ per 1,000 gallons)	$5.15

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental Impacts typical of Direct Potable Reuse are discussed in Section 5.2.

LA FERIA

Non-Potable Wastewater Effluent Reuse

Project Source

This strategy was submitted by the City of La Feria to the RWPG.

Description

The City of La Feria currently uses wastewater effluent to fill three small lakes in the City's Nature Park. This direct non-potable reuse strategy involves adding tertiary treatment to the wastewater treatment plant and using additional effluent to irrigate the native vegetation at the park.

Available Supply

The wastewater treatment plant has a rated capacity of 1.25 MGD and a 2013 daily average of 0.38 MGD. A portion of the wastewater treatment plant effluent is already conveyed to Nature Park so based on current flows an additional 0.155 MGD could be available.

Although a certain amount of water is available to use for irrigation, because the plants at Nature Park are native vegetation, no additional irrigation should be required for them. Therefore, this

management strategy is not recommended and is listed as an alternative as it does not necessarily displace any the demand shown for La Feria.

Engineering and Costing

In order to establish this management strategy, tertiary treatment would be added to the wastewater treatment plant and additional pumping and piping would be needed to convey the reclaimed water to the park. Stainless steel disk, cloth media filters would be installed to further treat the wastewater effluent. A ground storage tank would also be included to provide one day's worth of storage. It is assumed that the construction period would be 1.5 years.

Table 5B-27 outlines the project requirements and cost estimate developed using UCM. Treatment Level 2 was used on the UCM spreadsheet to estimate the costs for addition of the cloth media filters.

Table 5B-27 La Feria Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of La Feria - Non-Potable Wastewater Effluent Reuse	
Item	***Estimated Costs for Facilities***
Pump Station (0.2 MGD)	$464,000
Transmission Pipeline (6 in dia., 1 miles)	$69,000
Storage Tanks (Other Than at Booster Pump Stations)	$248,000
Water Treatment Plant (0.2 MGD)	$1,188,000
TOTAL COST OF FACILITIES	**$1,969,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$686,000
Environmental & Archaeology Studies and Mitigation	$13,000
Land Acquisition and Surveying (13 acres)	$20,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$142,000
TOTAL COST OF PROJECT	**$2,830,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$237,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$15,000
Water Treatment Plant (2.5% of Cost of Facilities)	$238,000
Pumping Energy Costs (20339 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$492,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	174
Annual Cost of Water ($ per acft)	$2,834
Annual Cost of Water ($ per 1,000 gallons)	$8.70

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental Impacts typical of Direct Potable Reuse are discussed in Section 5.2.

LAGUNA MADRE

New Seawater Desalination Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is to construct a new seawater desalination water treatment plant and intake pump station.

Available Supply

Based on preliminary needs estimates for Laguna Madre Water District, the new seawater desalination plant is sized for 1,120 acre-ft./year.

Engineering and Costing

It is assumed that the construction period for this strategy is one and a half years. Table 5B-28 outlines project requirements used to develop the cost estimate in the UCM.

Table 5B-28 Laguna Madre Water District Seawater Desalination Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Laguna Madre Water District - Seawater Desalination	
Item	***Estimated Costs for Facilities***
Pump Station (2 MGD)	$1,184,000
Transmission Pipeline (8 in dia., 1 miles)	$39,000
Water Treatment Plant (1 MGD)	$19,582,000
TOTAL COST OF FACILITIES	**$20,805,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$7,280,000
Environmental & Archaeology Studies and Mitigation	$21,000
Land Acquisition and Surveying (8 acres)	$26,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$1,477,000
TOTAL COST OF PROJECT	**$29,609,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$2,478,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$30,000
Water Treatment Plant (2.5% of Cost of Facilities)	$5,495,000
Pumping Energy Costs (367185 kW-hr @ 0.09 $/kW-hr)	$33,000
TOTAL ANNUAL COST	**$8,036,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,120
Annual Cost of Water ($ per acft)	$7,175
Annual Cost of Water ($ per 1,000 gallons)	$22.02

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new treatment plant and piping may also include purchase of land and a TXDOT right-of-way permit.

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is to use treated wastewater effluent for direct non-potable reuse. Laguna Madre Water District currently uses 0.36 MGD of non-potable reuse and no specific customers were identified to use the non-potable reuse.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5% of Laguna Madre's customers' 2020 demand could be met by non-potable reuse. Therefore this strategy was sized to produce 350 acre-ft./year. The effluent for reuse would come from the Port Isabel WWTP.

Engineering and Costing

In order to establish this management strategy, tertiary treatment would be added to the Port Isabel WWTP and additional pumping and piping would be needed to convey the reclaimed water to the Port Isabel. A ground storage tank would also be included to provide one day's worth of storage. It is assumed that the construction period would be 2 years. Table outlines the estimated costs and project requirements used to develop the cost estimate in the UCM. Treatment Level 2 was used in the UCM to estimate the costs for addition of the cloth media filters.

Table 5B-29 Laguna Madre Water District Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
Laguna Madre Water District - Laguna Madre Non-Potable Reuse

Item	*Estimated Costs for Facilities*
Pump Station (0.3 MGD)	$701,000
Transmission Pipeline (6 in dia., 1 miles)	$91,000
Storage Tanks (Other Than at Booster Pump Stations)	$302,000
Water Treatment Plant (0.3 MGD)	$1,603,000
TOTAL COST OF FACILITIES	**$2,697,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$940,000
Environmental & Archaeology Studies and Mitigation	$14,000
Land Acquisition and Surveying (14 acres)	$22,000
Interest During Construction (4% for 2 years with a 1% ROI)	$258,000
TOTAL COST OF PROJECT	**$3,931,000**
ANNUAL COST	

Cost Estimate Summary Water Supply Project Option Laguna Madre Water District - Laguna Madre Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Debt Service (5.5 percent, 20 years)	$329,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$21,000
Water Treatment Plant (2.5% of Cost of Facilities)	$321,000
Pumping Energy Costs (46187 kW-hr @ 0.09 $/kW-hr)	$4,000
TOTAL ANNUAL COST	**$675,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	350
Annual Cost of Water ($ per acft)	$1,929
Annual Cost of Water ($ per 1,000 gallons)	$5.92

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental Impacts typical of Direct Non-Potable Reuse are discussed in Section 5.2.

OLMITO WATER SUPPLY CORPORATION

New Brackish Groundwater Treatment Plant

Project Source

This strategy was identified by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Olmito WSC, the wellfield is designed to pump 700 acre-ft./year and the new supplies are estimated at 560 acre-ft./year assuming an 80% membrane recovery rate.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-30 outlines the estimated costs and project requirements used to develop the cost estimate in the UCM.

Table 5B-30 Olmito WSC New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Olmito WSC - Brackish Water Desalination*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$760,000
Water Treatment Plant (0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,905,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,067,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$419,000
TOTAL COST OF PROJECT	**$8,400,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$703,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$8,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000
Pumping Energy Costs (99887 kW-hr @ 0.09 $/kW-hr)	$9,000
TOTAL ANNUAL COST	**$1,446,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$2,582
Annual Cost of Water ($ per 1,000 gallons)	$7.92

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

SAN BENITO

Potable Reuse of Treated Effluent from City's Wastewater Treatment Plant

Project Source

This strategy was submitted by the City of San Benito to the RWPG.

Description

A modular water treatment plant would be built to provide additional treatment for the treated wastewater effluent in order to bring it to potable water standards. The direct potable reuse water would then serve potable water needs for the north portion of the City of San Benito.

Available Supply

The City of San Benito Wastewater Treatment Plant currently discharges 2.3 MGD of effluent into a minor stream. Initially, 1 MGD would be produced from the modular treatment plant. As the wastewater treatment plant effluent increases, the modular plant would be expanded and

eventually a total of 3 MGD would be produced, equating to an ultimate build-out capacity of 3,360 acre-ft./year.

Engineering and Costing

This project consists of a new modular water treatment plant, pump station, pipeline, and storage tank in order to bring the reuse water into the City's distribution system. It is assumed that the construction period would be 2 years per phase. Because the first phases would be constructed in 2020 and the second phase would not be implemented until 2070, it was costed for the pump station and pipeline to be replaced during construction of Phase II.

Table 5B-31 and Table 5B-32 outline the project requirements and cost estimate for both phases developed using the UCM spreadsheet.

Table 5B-31 San Benito Potable Reuse Phase I Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
City of San Benito – Potable Reuse of Treated Effluent from City's WWTP

Item	*Estimated Costs*
Intake Pump Stations (1 MGD)	$1,231,000
Transmission Pipeline (8 in dia., 3 miles)	$942,000
Storage Tanks (Other Than at Booster Pump Stations)	$699,000
Water Treatment Plant (1 MGD)	$4,844,000
TOTAL COST OF FACILITIES	**$7,716,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,654,000
Environmental & Archaeology Studies and Mitigation	$75,000
Land Acquisition and Surveying (44 acres)	$118,000
Interest During Construction (4% for 2 years with a 1% ROI)	$740,000
TOTAL COST OF PROJECT	**$11,303,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$946,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$47,000
Water Treatment Plant (2.5% of Cost of Facilities)	$484,000
Pumping Energy Costs (381067 kW-hr @ 0.09 $/kW-hr)	$34,000
TOTAL ANNUAL COST	**$1,511,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,120
Annual Cost of Water ($ per acft)	$1,349
Annual Cost of Water ($ per 1,000 gallons)	$4.14

Table 5B-32 San Benito Potable Reuse Phase II Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
City of San Benito – Potable Reuse of Treated Effluent from City's WWTP

Item	*Estimated Costs*
Intake Pump Stations (3 MGD)	$1,777,000
Transmission Pipeline (14 in dia., 3 miles)	$1,582,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,237,000
Water Treatment Plant (2 MGD)	$7,970,000
TOTAL COST OF FACILITIES	**$12,566,000**

Cost Estimate Summary Water Supply Project Option City of San Benito – Potable Reuse of Treated Effluent from City's WWTP	
Item	***Estimated Costs***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$4,319,000
Environmental & Archaeology Studies and Mitigation	$75,000
Interest During Construction (4% for 2 years with a 1% ROI)	$1,188,000
TOTAL COST OF PROJECT	**$18,148,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,519,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$73,000
Water Treatment Plant (2.5% of Cost of Facilities)	$797,000
Pumping Energy Costs (795984 kW-hr @ 0.09 $/kW-hr)	$72,000
TOTAL ANNUAL COST	**$2,461,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	3,360
Annual Cost of Water ($ per acft)	$732
Annual Cost of Water ($ per 1,000 gallons)	$2.25

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipelines may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts typical of potable reuse are discussed in Section 5.2.

Non-Potable Reuse of Treated Effluent from City's Wastewater Treatment Plant

Project Source

This strategy was submitted by the City of San Benito to the RWPG.

Description

This direct non-potable reuse strategy involves diverting a portion of WWTP effluent to a canal for irrigation use. A map depicting the approximate alignment of the reuse pipeline is shown in Figure 5B-1.

Available Supply

The City of San Benito Wastewater Treatment Plant currently discharges 2.3 MGD of effluent into a minor stream which feeds the Arroyo Colorado. 1,120 acre-ft./year, would be diverted and used to supplement the irrigation canal.

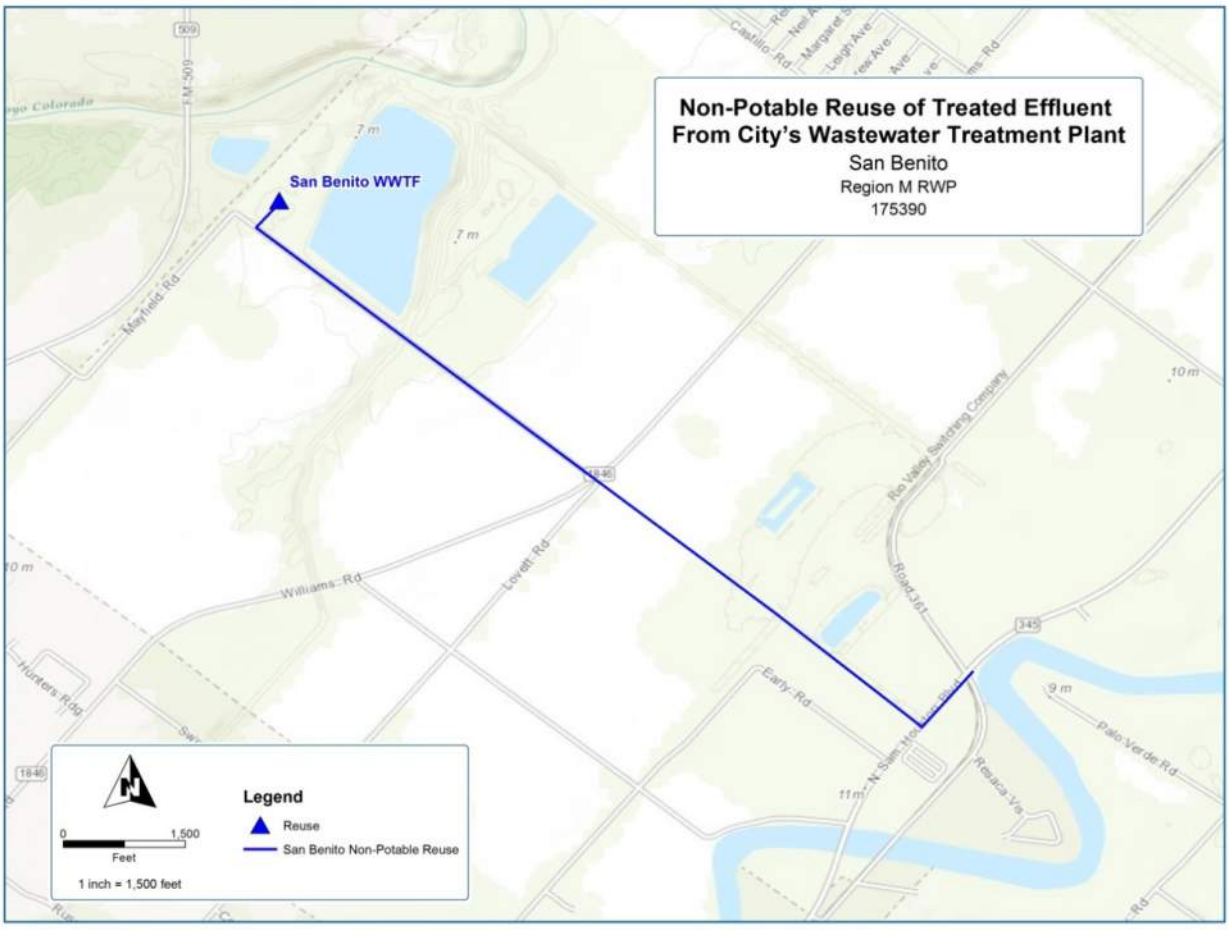

Figure 5B-1 San Benito Non-Potable Reuse Pipeline Location

Engineering and Costing

This project would require modifications to the wastewater treatment plant's effluent pump station and a new pipeline. It is assumed that the construction period would be 1 year. Table 5B-33 outlines the project requirements and cost estimated with UCM.

Table 5B-33 San Benito Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary ***Water Supply Project Option*** ***City of San Benito – Non-Potable Reuse of Treated Effluent From City's WWTP***	
Item	***Estimated Costs for Facilities***
Intake Pump Stations (1 MGD)	$795,000
Transmission Pipeline (8 in dia., 2 miles)	$494,000
TOTAL COST OF FACILITIES	**$1,289,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$426,000
Environmental & Archaeology Studies and Mitigation	$55,000
Land Acquisition and Surveying (32 acres)	$86,000
Interest During Construction (4% for 1 years with a 1% ROI)	$65,000
TOTAL COST OF PROJECT	**$1,921,000**

Cost Estimate Summary *Water Supply Project Option* *City of San Benito – Non-Potable Reuse of Treated Effluent From City's WWTP*	
Item	***Estimated Costs for Facilities***
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$161,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$25,000
Pumping Energy Costs (317771 kW-hr @ 0.09 $/kW-hr)	$29,000
TOTAL ANNUAL COST	**$215,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,120
Annual Cost of Water ($ per acft)	$192
Annual Cost of Water ($ per 1,000 gallons)	$0.59

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit.

Use of any irrigation district canals to convey recycled water (specifically Cameron County Irrigating District No. 2 listed here), would require a permit from the irrigation district. Environmental impacts typical of non-potable reuse are discussed in Section 5.2.

SANTA ROSA

New Brackish Groundwater Treatment Plant

Project Source

This strategy was identified by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Santa Rosa, the new brackish groundwater plant is sized for 560 acre-ft./year.

Engineering and Costing

Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 700 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years and that it would begin in 2030. Table 5B-34 outlines the project requirements used to develop the cost estimate.

Table 5B-34 Santa Rosa New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Santa Rosa - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Well Fields (Wells, Pumps, and Piping)	$670,000
Water Treatment Plant (0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,815,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,035,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$413,000
TOTAL COST OF PROJECT	**$8,272,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$692,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000
Pumping Energy Costs (90374 kW-hr @ 0.09 $/kW-hr)	$8,000
TOTAL ANNUAL COST	**$1,433,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$2,559
Annual Cost of Water ($ per 1,000 gallons)	$7.85

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

VALLEY MUNICIPAL UTILITY DISTRICT NO. 2

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Valley MUD #2, the new brackish groundwater plant is sized for 100 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 125 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years, beginning in 2060.

Table 5B-35 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-35 Valley MUD #2 New BGD Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Valley MUD #2 - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$311,000
Two Water Treatment Plants (0.1 MGD and 0.1 MGD)	$2,329,000
TOTAL COST OF FACILITIES	**$2,640,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$924,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$188,000
TOTAL COST OF PROJECT	**$3,760,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$315,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$3,000
Water Treatment Plant (2.5% of Cost of Facilities)	$323,000
Pumping Energy Costs (25130 kW-hr @ 0.09 $/kW-hr)	$2,000
TOTAL ANNUAL COST	**$643,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	100
Annual Cost of Water ($ per acft)	$6,430
Annual Cost of Water ($ per 1,000 gallons)	$19.73

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

5B.2.3 Hidalgo County

AGUA SPECIAL UTILITY DISTRICT

New Brackish Groundwater Treatment Plant

Project Source

This strategy was identified by the RWPG.

Description

This strategy is to drill a new brackish groundwater well in the Gulf Coast Aquifer located within the Rio Grande River Basin, and construct a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards. Based on the data gathered in the BRACS Report, the well depth was approximated at 800 ft. below ground surface.

Available Supply

Based on preliminary needs estimates for Agua SUD, the new brackish groundwater plant is sized to treat 1,680 acre-ft./year producing 1,344 acre-ft./year of new supply.

Environmental Issues

This project would require the disposal of 336 acre-ft./year. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is one and a half years. Table 5B-36 outlines the estimated project requirements and cost estimates.

Table 5B-36 New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Agua SUD - Brackish Groundwater Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$1,298,000
Two Water Treatment Plants (1.5 MGD and 1.5 MGD)	$11,450,000
TOTAL COST OF FACILITIES	**$12,748,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$4,462,000
Environmental & Archaeology Studies and Mitigation	$15,000
Land Acquisition and Surveying (3 acres)	$6,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$905,000
TOTAL COST OF PROJECT	**$18,136,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,518,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$13,000
Water Treatment Plant (2.5% of Cost of Facilities)	$1,623,000
Pumping Energy Costs (182298 kW-hr @ 0.09 $/kW-hr)	$16,000

Cost Estimate Summary *Water Supply Project Option* *Agua SUD - Brackish Groundwater Desalination*	
Item	***Estimated Costs for Facilities***
TOTAL ANNUAL COST	**$3,170,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,212
Annual Cost of Water ($ per acft)	$2,616
Annual Cost of Water ($ per 1,000 gallons)	$8.03

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include TXDOT right-of-way permit.

Non-Potable Reuse

Project Source

This strategy was submitted by Agua Special Utility District to the RWPG.

Description

The Agua Special Utility District (SUD) owns one wastewater treatment plant (West Agua WWTP) and is planning to build a second plant (East Agua WWTP). The West Agua WWTP is located in Sullivan City, Texas and the East Agua WWTP is located near Palmview, Texas. This direct non-potable reuse strategy is to provide Type II reclaimed water currently produced at the WWTP to individual customers with a need for reuse water.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5% of Agua SUD's 2020 WUG demand could be met by non-potable reuse. Therefore this strategy was sized to produce 280 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP and storage. The submitted strategy discussed having customers receive the reclaimed water at the WWTP, therefore no pumping or piping costs were included. This strategy could be implemented at either of Agua SUD's WWTPs. Table 5B-37 outlines the project requirements and cost estimate developed in UCM.

Table 5B-37 Agua SUD Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Agua Special Utility District - Non-Potable Reuse*	
Item	***Estimated Costs for Facilities***
Storage Tanks (Other Than at Booster Pump Stations)	$248,000
Water Treatment Plant (0.2 MGD)	$2,539,000
TOTAL COST OF FACILITIES	**$2,787,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$975,000

Cost Estimate Summary Water Supply Project Option Agua Special Utility District - Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Interest During Construction (4% for 2 years with a 1% ROI)	$264,000
TOTAL COST OF PROJECT	**$4,026,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$337,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$2,000
Water Treatment Plant (2.5% of Cost of Facilities)	$486,000
TOTAL ANNUAL COST	**$825,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	280
Annual Cost of Water ($ per acft)	$2,946
Annual Cost of Water ($ per 1,000 gallons)	$9.04

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts are typical of non-potable reuse projects, discussed in Section 5.2.

DONNA

Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Donna, the new brackish groundwater plant is sized for 700 acre-ft./year in 2020 and 1,000 acre-ft./year in 2050.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 875 acre-ft./year in Phase I and 1,250 acre-ft./year in Phase II. The well field piping was sized for build-out capacity in Phase I. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-38 and Table 5B-39 outline the project requirements and cost estimates developed in UCM.

Table 5B-38 Donna BGD Plant Phase 1 Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
City of Donna - Brackish Water Desalination Phase I

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$724,000
Two Water Treatment Plants (0.6 MGD and 0.6 MGD)	$5,912,000
TOTAL COST OF FACILITIES	**$6,636,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,323,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acres)	$3,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$471,000
TOTAL COST OF PROJECT	**$9,440,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$790,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$839,000
Pumping Energy Costs (87347 kW-hr @ 0.09 $/kW-hr)	$8,000
TOTAL ANNUAL COST	**$1,644,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	700
Annual Cost of Water ($ per acft)	$2,349
Annual Cost of Water ($ per 1,000 gallons)	$7.21

Table 5B-39 Donna BGD Plant Phase 2 Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
City of Donna - Brackish Water Desalination Phase II

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$472,000
Two Water Treatment Plants (0.3 MGD and 0.3 MGD)	$3,641,000
TOTAL COST OF FACILITIES	**$4,113,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,440,000
Environmental & Archaeology Studies and Mitigation	$2,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$292,000
TOTAL COST OF PROJECT	**$5,849,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$489,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$5,000
Water Treatment Plant (2.5% of Cost of Facilities)	$506,000
Pumping Energy Costs (75389 kW-hr @ 0.09 $/kW-hr)	$7,000
TOTAL ANNUAL COST	**$1,007,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	300
Annual Cost of Water ($ per acft)	$3,357
Annual Cost of Water ($ per 1,000 gallons)	$10.30

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

ELSA

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Elsa, the new brackish groundwater plant is sized for 560 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 700 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years. Table 5B-40 outlines the estimated project requirements and costs.

Table 5B-40 Elsa New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary ***Water Supply Project Option*** ***Elsa - New Brackish Groundwater Treatment Plant***	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$760,000
Water Treatment Plant (0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,905,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,067,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$419,000
TOTAL COST OF PROJECT	**$8,400,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$703,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$8,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000

Cost Estimate Summary Water Supply Project Option Elsa - New Brackish Groundwater Treatment Plant	
Item	***Estimated Costs for Facilities***
Pumping Energy Costs (164695 kW-hr @ 0.09 $/kW-hr)	$15,000
TOTAL ANNUAL COST	**$1,452,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$2,593
Annual Cost of Water ($ per 1,000 gallons)	$7.96

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

WTP Expansion and Interconnect to Engleman ID

Project Source

This strategy was submitted by the City of Elsa to the RWPG.

Description

This strategy is for an interconnect between the City of Elsa and Engleman ID. Hidalgo County ID No. 9 is currently the City's sole source for raw water. This strategy would provide the City of Elsa with a reliable second source of raw water in case of drought or when a supply is down for an extended period of time for repairs. It also includes an expansion of Elsa's WTP.

Available Supply

This strategy would supply the City of Elsa's WTP with 2,240 acre-ft./year in 2020.

Engineering and Costing

Costs for this strategy from the UCM include water treatment plant expansion, pipeline and pipeline right-of-way. It is assumed that the construction period for this strategy is one year.

Table 5B-41 outlines the project requirements and cost estimate developed using the UCM.

Table 5B-41 Elsa WTP Expansion and Interconnect Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Elsa - WTP Expansion and Interconnect to Engleman ID	
Item	***Estimated Costs for Facilities***
Transmission Pipeline (12 in dia., 2 miles)	$574,000
Water Treatment Plant (2 MGD)	$6,367,000
TOTAL COST OF FACILITIES	**$6,941,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,401,000
Environmental & Archaeology Studies and Mitigation	$63,000
Land Acquisition and Surveying (35 acres)	$98,000
Interest During Construction (4% for 1 years with a 1% ROI)	$333,000

Cost Estimate Summary *Water Supply Project Option* *City of Elsa - WTP Expansion and Interconnect to Engleman ID*	
Item	***Estimated Costs for Facilities***
TOTAL COST OF PROJECT	**$9,836,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$823,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$6,000
Water Treatment Plant (2.5% of Cost of Facilities)	$637,000
Pumping Energy Costs (422232 kW-hr @ 0.09 $/kW-hr)	$38,000
TOTAL ANNUAL COST	**$1,504,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	2,240
Annual Cost of Water ($ per acft)	$671
Annual Cost of Water ($ per 1,000 gallons)	$2.06

Implementation Issues

Typical environmental impacts are discussed in Section 5.2. No implementation issues have been identified at this time.

LA VILLA

New Brackish Groundwater Treatment Plant

Project Source

This strategy was identified by the RWPG.

Description

This strategy is for a new brackish groundwater well and BGD plant to treat the water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for La Villa, the new brackish groundwater plant is sized for 560 acre-ft./year.

Engineering and Costing

It is assumed that the construction period for this strategy is one and a half years. Table 5B-42 outlines the estimated project requirements and cost estimate.

Table 5B-42 La Villa New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *La Villa - Brackish Water Desalination*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$673,000
Two Water Treatment Plants (0.5 MGD and 0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,818,000**

Cost Estimate Summary Water Supply Project Option La Villa - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,036,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acre)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$413,000
TOTAL COST OF PROJECT	**$8,276,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$693,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000
Pumping Energy Costs (77418 kW-hr @ 0.09 $/kW-hr)	$7,000
TOTAL ANNUAL COST	**$1,433,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$2,559
Annual Cost of Water ($ per 1,000 gallons)	$7.85

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

MCALLEN

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is to provide additional supply to McAllen with the installation of additional fresh groundwater wells.

Available Supply

The proposed groundwater wells would provide 500 acre-ft./year in Phase I and a total of 1,500 acre-ft./year once Phase II is implemented.

Engineering and Costing

It is assumed that the construction period for this strategy is one and a half years. Table and Table 5B-44 outline the estimated project requirements and cost estimates for each phase developed in the UCM.

Table 5B-43 Expand Existing Groundwater Supply Phase I Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
McAllen - Expand Existing Groundwater Supply - Phase I

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$629,000
Water Treatment Plant (0.5 MGD)	$38,000
TOTAL COST OF FACILITIES	**$667,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$233,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1 years with a 1% ROI)	$32,000
TOTAL COST OF PROJECT	**$940,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$79,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$6,000
Water Treatment Plant (2.5% of Cost of Facilities)	$23,000
Pumping Energy Costs (100901 kW-hr @ 0.09 $/kW-hr)	$9,000
TOTAL ANNUAL COST	**$117,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	500
Annual Cost of Water ($ per acft)	$234
Annual Cost of Water ($ per 1,000 gallons)	$0.72

Table 5B-44 Expand Existing Groundwater Supply Phase II Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
McAllen - Expand Existing Groundwater Supply - Phase II

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$650,000
Water Treatment Plant (0.9 MGD)	$63,000
TOTAL COST OF FACILITIES	**$713,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$249,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1 years with a 1% ROI)	$34,000
TOTAL COST OF PROJECT	**$1,004,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$84,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$6,000
Water Treatment Plant (2.5% of Cost of Facilities)	$38,000
Pumping Energy Costs (201038 kW-hr @ 0.09 $/kW-hr)	$18,000
TOTAL ANNUAL COST	**$146,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,000
Annual Cost of Water ($ per acft)	$146
Annual Cost of Water ($ per 1,000 gallons)	$0.45

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of groundwater supply projects, discussed in Section 5.2.

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP.

Description

This direct non-potable reuse strategy is to use treated wastewater effluent for non-potable reuse. McAllen currently uses 2.0 MGD of non-potable reuse.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5% of McAllen's 2020 demand could be met by non-potable reuse. Therefore this strategy was sized to produce 1,950 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP, a pump station and pipeline to convey the reuse water into the city, storage, and land acquisition. It is assumed that the construction period for this strategy is one year. Table 5B-45 outlines the project requirements and cost estimate developed in UCM.

Table 5B-45 McAllen Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option McAllen - Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Pump Station (0.6 MGD)	$1,336,000
Transmission Pipeline (12 in dia., 3 miles)	$1,454,000
Storage Tanks (Other Than at Booster Pump Stations)	$968,000
Water Treatment Plant (1.7 MGD)	$4,810,000
TOTAL COST OF FACILITIES	**$8,568,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,926,000
Environmental & Archaeology Studies and Mitigation	$85,000
Land Acquisition and Surveying (49 acres)	$134,000
Interest During Construction (4% for 1 years with a 1% ROI)	$410,000
TOTAL COST OF PROJECT	**$12,123,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,014,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$58,000
Water Treatment Plant (2.5% of Cost of Facilities)	$962,000
Pumping Energy Costs (445832 kW-hr @ 0.09 $/kW-hr)	$40,000

Cost Estimate Summary *Water Supply Project Option* *McAllen - Non-Potable Reuse*	
Item	***Estimated Costs for Facilities***
TOTAL ANNUAL COST	**$2,074,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,950
Annual Cost of Water ($ per acft)	$1,064
Annual Cost of Water ($ per 1,000 gallons)	$3.26

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts are typical of non-potable reuse projects, discussed in Section 5.2.

MERCEDES

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is to provide additional supply to Mercedes with an additional groundwater well.

Available Supply

The proposed groundwater wells would provide 560 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM assumed that the construction period is one year. Table 5B-46 outlines the estimated project requirements and costs.

Table 5B-46 Mercedes Expand Existing Groundwater Supply Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Mercedes - Expand Existing Groundwater Supply*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$670,000
Water Treatment Plant (0.5 MGD)	$40,000
TOTAL COST OF FACILITIES	**$710,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$249,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1 years with a 1% ROI)	$34,000
TOTAL COST OF PROJECT	**$1,001,000**

Cost Estimate Summary *Water Supply Project Option* *Mercedes - Expand Existing Groundwater Supply*	
Item	***Estimated Costs for Facilities***
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$84,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$24,000
Pumping Energy Costs (114827 kW-hr @ 0.09 $/kW-hr)	$10,000
TOTAL ANNUAL COST	**$125,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$223
Annual Cost of Water ($ per 1,000 gallons)	$0.68

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of groundwater supply expansion projects, discussed in Section 5.2.

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Mercedes, the new brackish groundwater plant is sized for 435 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 544 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years. Table 5B-47 outlines the estimated project requirements and costs.

Table 5B-47 Mercedes New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Mercedes - New Brackish Groundwater Treatment Plant*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$591,000
Two Water Treatment Plants (0.9 MGD and 0.9 MGD)	$7,890,000
TOTAL COST OF FACILITIES	**$8,481,000**

Cost Estimate Summary Water Supply Project Option Mercedes - New Brackish Groundwater Treatment Plant	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,968,000
Environmental & Archaeology Studies and Mitigation	$8,000
Land Acquisition and Surveying (1 acres)	$3,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$602,000
TOTAL COST OF PROJECT	**$12,062,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,009,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$6,000
Water Treatment Plant (2.5% of Cost of Facilities)	$1,118,000
Pumping Energy Costs (109365 kW-hr @ 0.09 $/kW-hr)	$10,000
TOTAL ANNUAL COST	**$2,143,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	435
Annual Cost of Water ($ per acft)	$4,926
Annual Cost of Water ($ per 1,000 gallons)	$15.12

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

MILITARY HIGHWAY WATER SUPPLY CORPORATION

Expand Existing Groundwater Supply in Hidalgo County

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is to provide additional supply to Military Highway Water Supply Corporation in Hidalgo County with the installation of additional fresh groundwater wells.

Available Supply

The proposed groundwater wells would provide 250 acre-ft./year in 2020 during Phase I and a total of 625 acre-ft./year once Phase II is implemented in 2050.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water disinfection. It is assumed that the construction period for this strategy is one year per phase. Table 5B-48 and Table 5B-49 outline the estimated costs and project requirements for each phase.

Table 5B-48 MHWSC Expand Existing Groundwater Supply Phase I Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
Military Highway WSC - Expand Existing Groundwater Supply - Phase I

Item	*Estimated Costs for Facilities*
Well Fields (Wells, Pumps, and Piping)	$448,000
Water Treatment Plant (0.2 MGD)	$24,000
TOTAL COST OF FACILITIES	**$472,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$165,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1 years with a 1% ROI)	$23,000
TOTAL COST OF PROJECT	**$668,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$56,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$4,000
Water Treatment Plant (2.5% of Cost of Facilities)	$14,000
Pumping Energy Costs (50260 kW-hr @ 0.09 $/kW-hr)	$5,000
TOTAL ANNUAL COST	**$79,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	250
Annual Cost of Water ($ per acft)	$316
Annual Cost of Water ($ per 1,000 gallons)	$0.97

Table 5B-49 MHWSC Expand Existing Groundwater Supply Phase II Project Requirements and Costs

Cost Estimate Summary
Water Supply Project Option
Military Highway WSC - Expand Existing Groundwater Supply - Phase II

Item	*Estimated Costs for Facilities*
Well Fields Expansion (Wells, Pumps, and Piping)	$542,000
Water Treatment Plant Expansion (0.3 MGD)	$31,000
TOTAL COST OF FACILITIES	**$573,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$201,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1 years with a 1% ROI)	$28,000
TOTAL COST OF PROJECT	**$810,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$68,000
Operation and Maintenance	
Total Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$9,000
Total Water Treatment Plant (2.5% of Cost of Facilities)	$33,000
Total Pumping Energy Costs (75389 kW-hr @ 0.09 $/kW-hr)	$12,000
TOTAL ANNUAL COST	**$122,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	625
Annual Cost of Water ($ per acft)	$195
Annual Cost of Water ($ per 1,000 gallons)	$0.60

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of groundwater expansion projects, discussed in Section 5.2.

PHARR

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP.

Description

This direct non-potable reuse strategy is to use treated wastewater effluent for non-potable reuse. Pharr currently uses 5.0 MGD of non-potable reuse.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that 5% of Pharr's 2020 demand could be met by non-potable reuse. Therefore this strategy was sized to produce 500 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP, a pump station and pipeline to convey the reuse water into the city, storage, and land acquisition. It is assumed that the construction period for this strategy is one year. Table 5B-50 outlines the project requirements and cost estimate developed in UCM.

Table 5B-50 Pharr Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Pharr - Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Pump Station (0.6 MGD)	$834,000
Transmission Pipeline (6 in dia., 2 miles)	$495,000
Storage Tanks (Other Than at Booster Pump Stations)	$357,000
Water Treatment Plant (0.4 MGD)	$1,890,000
TOTAL COST OF FACILITIES	**$3,576,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,227,000
Environmental & Archaeology Studies and Mitigation	$55,000
Land Acquisition and Surveying (34 acres)	$86,000
Interest During Construction (4% for 1 years with a 1% ROI)	$174,000
TOTAL COST OF PROJECT	**$5,118,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$428,000
Operation and Maintenance	

Cost Estimate Summary *Water Supply Project Option* *Pharr - Non-Potable Reuse*	
Item	***Estimated Costs for Facilities***
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$29,000
Water Treatment Plant (2.5% of Cost of Facilities)	$378,000
Pumping Energy Costs (144880 kW-hr @ 0.09 $/kW-hr)	$13,000
TOTAL ANNUAL COST	**$848,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	500
Annual Cost of Water ($ per acft)	$1,696
Annual Cost of Water ($ per 1,000 gallons)	$5.20

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts are typical of non-potable reuse projects, discussed in Section 5.2.

WESLACO

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Weslaco, the new brackish groundwater plant is sized for 1,630 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. It is assumed that the construction period for this strategy is one and a half years. Table 5B-51 outlines the estimated project requirements and cost estimate.

Table 5B-51 New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Weslaco - Brackish Water Desalination*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$1,272,000
Two Water Treatment Plants (1.5 MGD and 1.5 MGD)	$11,172,000
TOTAL COST OF FACILITIES	**$12,444,000**

Cost Estimate Summary Water Supply Project Option Weslaco - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$4,355,000
Environmental & Archaeology Studies and Mitigation	$8,000
Land Acquisition and Surveying (2 acres)	$4,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$883,000
TOTAL COST OF PROJECT	**$17,694,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$1,481,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$13,000
Water Treatment Plant (2.5% of Cost of Facilities)	$1,583,000
Pumping Energy Costs (221031 kW-hr @ 0.09 $/kW-hr)	$20,000
TOTAL ANNUAL COST	**$3,097,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	1,630
Annual Cost of Water ($ per acft)	$1,900
Annual Cost of Water ($ per 1,000 gallons)	$5.83

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Scalping Plants

Project Source

This strategy was submitted by the City of Weslaco to the RWPG.

Description

This water management strategy involves the City of Weslaco building decentralized scalping plants off of their collection system to produce reclaimed water in order to irrigate city parks. The proposed scalping plant for City Park would pull raw wastewater from an existing manhole near the park and the one for Harlon Black Sports Complex will take from an existing force main.

Available Supply

The reclaimed water would replace the potable water demand for irrigation of the parks. Based on water meter records for a 12 month period, City Park uses an average of 30,730 gallons per year and Harlon Sports Complex averages 81,590 gallons per year.

This water management strategy will reduce the potable demand by approximately 0.003 MGD, less than 0.5 acre-ft./year, the total water usage to irrigate both parks.

Engineering and Costing

In order to implement this plan, treatment of the raw wastewater to reclaimed water standards will be required, as well as additional piping, pumping, and manhole. Table 5B-52 presents the cost and project requirements used in the UCM. The treatment capacity for each facility was estimated at 0.05 MGD in order to capture baseline costs associated with any facility.

Table 5B-52 Weslaco Scalping Plants Cost and Yield Projections

Cost Estimate Summary Water Supply Project Option Weslaco - Scalping Plants	
Item	***Estimated Costs for Facilities***
Two Water Treatment Plants (0.1 MGD and 0.1 MGD)	$938,000
TOTAL COST OF FACILITIES	**$938,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$328,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$6,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$68,000
TOTAL COST OF PROJECT	**$1,346,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$113,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$178,000
TOTAL ANNUAL COST	**$291,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	0.2
Annual Cost of Water ($ per acft)	$1,455,000
Annual Cost of Water ($ per 1,000 gallons)	$4,464.56

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipelines may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts are typical of reuse projects, discussed in Section 5.2.

5B.2.4 Maverick County

EAGLE PASS

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Eagle Pass, the new brackish groundwater plant is sized for 560 acre-ft./year and would be implemented in 2050.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 700 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-53 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-53 Eagle Pass New Brackish Groundwater Desalination Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Eagle Pass New Brackish Groundwater Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$670,000
Water Treatment Plant (0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,815,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,035,000
Environmental & Archaeology Studies and Mitigation	$7,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$413,000
TOTAL COST OF PROJECT	**$8,272,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$692,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000
Pumping Energy Costs (142130 kW-hr @ 0.09 $/kW-hr)	$13,000
TOTAL ANNUAL COST	**$1,438,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560

Cost Estimate Summary ***Water Supply Project Option*** ***Eagle Pass New Brackish Groundwater Desalination***	
Item	***Estimated Costs for Facilities***
Annual Cost of Water ($ per acft)	$2,568
Annual Cost of Water ($ per 1,000 gallons)	$7.88

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

5B.2.5 Starr County

RIO GRANDE CITY

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for the City of Rio Grande City, the new brackish groundwater plant is sized for 560 acre-ft./year.

Engineering and Costing

Costs for this strategy include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment recovery is assumed at 80%, so wellfield is designed to 700 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years. Table 5B-54 outlines the project requirements and cost estimate from the UCM.

Table 5B-54 Rio Grande City New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *Rio Grande City - Brackish Water Desalination*	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$677,000
Water Treatment Plant (0.5 MGD)	$5,145,000
TOTAL COST OF FACILITIES	**$5,822,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,038,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (1 acres)	$2,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$414,000
TOTAL COST OF PROJECT	**$8,282,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$693,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$7,000
Water Treatment Plant (2.5% of Cost of Facilities)	$726,000
Pumping Energy Costs (142130 kW-hr @ 0.09 $/kW-hr)	$13,000
TOTAL ANNUAL COST	**$1,439,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	560
Annual Cost of Water ($ per acft)	$2,570
Annual Cost of Water ($ per 1,000 gallons)	$7.88

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Acquisition of Water Rights through Urbanization

Project Source

This strategy was identified by the Regional Planning Group.

Project Description

In order to provide the City of Rio Grande City with sufficient water to meet its projected needs, the RWPG recommends that Rio Grande City purchase irrigation water rights from Hidalgo County Irrigation District No. 2 as they become available through urbanization and convert them to municipal water rights.

Available Supply

It has been estimated that enough water rights will become available to meets Rio Grande City's projected needs once Advanced Municipal Conservation strategies are implemented.

Engineering and Costing

A unit capital cost of $2,500 per acre-ft. has been estimated as the market value for water rights. However, under Subchapter O of Chapter 49 Texas Water Code, a municipal supplier can buy water rights to the net irrigable acres in a subdivision at 68% of the market value. Because this strategy calls for Rio Grande City to purchase water rights from a district that serves them, it is assumed that the urbanized land is within Rio Grande City's jurisdiction and this reduced rate would apply. Therefore, a unit capital cost of $1,700 per acre-ft. is used to estimate the capital costs. Any costs associated with the delivery of water rates and assumed to be insignificant and are not included. Table 5B-55 shows the cost and yield projections for this strategy.

Table 5B-55 Rio Grande City Acquisition of Water Rights through Urbanization Cost and Yield Projections

Year	2020	2030	2040	2050	2060	2070
Yield (acre-ft./year)	280	280	280	560	560	560
Capital Cost	$476,000	0	0	$476,000	0	0

Implementation Issues

No implementation issues have been identified. Environmental impacts associated with the conversion of water rights through urbanization are discussed in Section 5.2.

5B.2.6 Webb County

LAREDO

El Pico Water Treatment Plant - 1st Expansion

Project Source

This strategy was submitted by the City of Laredo to the RWPG.

Description

This strategy is for the expansion of El Pico Water Treatment Plant from 20 MGD to 45 MGD capacity. This expansion would occur in 2020.

Available Supply

Expanding the plant would supply an additional 16,800 acre-ft./year of drinking water with the WTP peaking factor of 1.67.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment. The City has already purchased the required land, so land acquisition was not included. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-56 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-56 Laredo El Pico Water Treatment Plant - 1st Expansion Project Requirements and Costs

Cost Estimate Summary *Water Supply Project Option* *City of Laredo - First Expansion of El Pico WTP*	
Item	***Estimated Costs for Facilities***
Water Treatment Plant Expansion (25 MGD)	$24,607,000
TOTAL COST OF FACILITIES	**$24,607,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$8,612,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$1,744,000
TOTAL COST OF PROJECT	**$34,963,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$2,926,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$2,461,000
TOTAL ANNUAL COST	**$5,387,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	16,800
Annual Cost of Water ($ per acft)	$321
Annual Cost of Water ($ per 1,000 gallons)	$0.98

Implementation Issues

Necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts are typical of WTP expansions, discussed in Section 5.2.

El Pico Water Treatment Plant - 2nd Expansion

Description

This strategy is to expand the El Pico Water Treatment Plant from 45 MGD to 70 MGD. This expansion would occur in 2030.

Available Supply

Expanding the plant would supply an additional 16,800 acre-ft./year of drinking water with the WTP peaking factor of 1.67.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-57 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-57 Laredo El Pico Water Treatment Plant – 2nd Expansion Project Requirements and Costs

Cost Estimate Summary ***Water Supply Project Option*** ***City of Laredo - Second Expansion of El Pico WTP***	
Item	***Estimated Costs for Facilities***
Water Treatment Plant Expansion (25 MGD)	$24,607,000
TOTAL COST OF FACILITIES	**$24,607,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$8,612,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$1,744,000
TOTAL COST OF PROJECT	**$34,963,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$5,852,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$4,922,000
TOTAL ANNUAL COST	**$10,774,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	33,600
Annual Cost of Water ($ per acft)	$321
Annual Cost of Water ($ per 1,000 gallons)	$0.98

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the

capacity of this expansion. Environmental impacts are typical of WTP expansions, discussed in Section 5.2.

El Pico Water Treatment Plant - 3rd Expansion

Description

This strategy is to expand the El Pico Water Treatment Plant from 70 MGD to 100 MGD. This expansion would occur in 2040.

Available Supply

Expanding the plant would supply an additional 20,160 acre-ft./year of drinking water with the WTP peaking factor of 1.67.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition. It is assumed that the construction period for this strategy is one and a half years. Table 5B-58 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-58 Laredo El Pico Water Treatment Plant 3rd Expansion Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Laredo - Third Expansion of El Pico WTP	
Item	***Estimated Costs for Facilities***
Water Treatment Plant Expansion (30 MGD)	$28,240,000
TOTAL COST OF FACILITIES	**$28,240,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$9,884,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$2,002,000
TOTAL COST OF PROJECT	**$40,126,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$6,284,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$7,746,000
TOTAL ANNUAL COST	**$14,030,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	53,760
Annual Cost of Water ($ per acft)	$261
Annual Cost of Water ($ per 1,000 gallons)	$0.80

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts are typical of WTP expansions, discussed in Section 5.2.

El Pico Water Treatment Plant- 4th Expansion

Description

This strategy is to expand the El Pico Water Treatment Plant from 100 MGD to 165 MGD. This expansion would occur in 2050.

Available Supply

Expanding the plant would supply an additional 43,200 acre-ft./year of drinking water with the WTP peaking factor of 1.67.

Engineering and Costing

Costs for this strategy from the UCM include only water treatment and land acquisition. It is assumed that the construction period for this strategy is one and a half years. Table 5B-59 outlines the estimated costs and project requirements used to develop the cost estimate.

Table 5B-59 Laredo El Pico Water Treatment Plant 4th Expansion Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Laredo - Fourth Expansion of El Pico WTP	
Item	***Estimated Costs for Facilities***
Water Treatment Plant Expansion (65 MGD)	$53,186,000
TOTAL COST OF FACILITIES	**$53,186,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$18,615,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$3,770,000
TOTAL COST OF PROJECT	**$75,571,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$9,682,000
Operation and Maintenance	
Water Treatment Plant (2.5% of Cost of Facilities)	$13,065,000
TOTAL ANNUAL COST	**$22,747,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	96,960
Annual Cost of Water ($ per acft)	$235
Annual Cost of Water ($ per 1,000 gallons)	$0.72

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin. Additionally, an available surface water supply would need to be assured for the capacity of this expansion. Environmental impacts are typical of WTP expansions, discussed in Section 5.2.

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP and updated by the RWPG.

Description

This strategy is for drilling four new brackish groundwater wells and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Available Supply

Based on preliminary needs estimates for Laredo, the new brackish groundwater plant is sized for 5,000 acre-ft./year and would be implemented in 2050.

Engineering and Costing

Costs for this strategy from the UCM include groundwater well pumping, well field piping, land acquisition, and water treatment. Membrane treatment efficiency is assumed to be 80%, so the wells and wellfield piping are designed to 6,250 acre-ft./year. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-60 outlines the estimated costs project requirements used to develop the cost estimate.

Table 5B-60 Laredo New Brackish Groundwater Treatment Plant Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option City of Laredo - Brackish Water Desalination	
Item	***Estimated Costs for Facilities***
Well Fields (Wells, Pumps, and Piping)	$3,400,000
Two Water Treatment Plants (4.5 MGD and 4.5 MGD)	$27,942,000
TOTAL COST OF FACILITIES	**$31,342,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$10,970,000
Environmental & Archaeology Studies and Mitigation	$28,000
Land Acquisition and Surveying (6 acres)	$10,000
Interest During Construction (4% for 1.5 years with a 1% ROI)	$2,224,000
TOTAL COST OF PROJECT	**$44,574,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$3,730,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$34,000
Water Treatment Plant (2.5% of Cost of Facilities)	$3,958,000
Pumping Energy Costs (1273838 kW-hr @ 0.09 $/kW-hr)	$115,000
TOTAL ANNUAL COST	**$7,837,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	5,000
Annual Cost of Water ($ per acft)	$1,567
Annual Cost of Water ($ per 1,000 gallons)	$4.81

Implementation Issues

No major implementation issues are expected for this strategy. Approval for additional concentrate disposal will be needed from TCEQ. Construction of the new groundwater well and piping may also include purchase of land and a TXDOT right-of-way permit. Environmental impacts are typical of BGD plants, discussed in Section 5.2.

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP.

Description

This direct non-potable reuse strategy is to use treated wastewater effluent for non-potable reuse. Laredo currently uses 0.7 MGD of non-potable reuse.

Available Supply

Because there were no specific customers or uses identified for the non-potable reuse, it was assumed that only 5% of Laredo's 2020 demand could be met by non-potable reuse. Therefore this strategy was sized to produce 2,100 acre-ft./year.

Engineering and Costing

Costs for this strategy from the UCM include tertiary treatment at the WWTP, a pump station and pipeline to convey the reuse water into the city, storage, and land acquisition. It is assumed that the construction period for this strategy is one year. Table 5B-61 outlines the project requirements and cost estimate developed in UCM.

Table 5B-61 Laredo Non-Potable Reuse Project Requirements and Costs

Cost Estimate Summary Water Supply Project Option Laredo – South Laredo WWTP Non-Potable Reuse	
Item	***Estimated Costs for Facilities***
Intake Pump Stations (5.4 MGD)	$1,242,000
Transmission Pipeline (18 in dia., 3 miles)	$559,000
Storage Tanks (Other Than at Booster Pump Stations)	$1,237,000
Water Treatment Plant (5.1 MGD)	$5,153,000
TOTAL COST OF FACILITIES	**$8,191,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$2,839,000
Environmental & Archaeology Studies and Mitigation	$27,000
Land Acquisition and Surveying (21 acres)	$43,000
Interest During Construction (4% for 2 years with a 1% ROI)	$778,000
TOTAL COST OF PROJECT	**$11,878,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$994,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$49,000
Water Treatment Plant (2.5% of Cost of Facilities)	$1,031,000
Pumping Energy Costs (403371 kW-hr @ 0.09 $/kW-hr)	$36,000
TOTAL ANNUAL COST	**$2,110,000**
Available Project Yield (acft/yr), based on a Peaking Factor of 1	2,100
Annual Cost of Water ($ per acft)	$1,005
Annual Cost of Water ($ per 1,000 gallons)	$3.08

Implementation Issues

Approval for a reclaimed water system is needed from TCEQ. Construction of the new pipeline may also include any of the following permits: USACOE Section 404 permit, TPWD Sand, Shell, Gravel and Marl permit, TPDES Storm Water Pollution Prevention Plan, TXDOT right-of-way permit. Environmental impacts are typical of non-potable reuse projects, discussed in Section 5.2.

5B.3 Strategies Evaluated not Recommended

5B.3.1 Cameron County

BROWNSVILLE

Southmost Regional Water Authority – Wellfield Upgrade and Microfiltration Addition

Project Source

This strategy was submitted by the City of Brownsville to the Regional Planning Group.

Project Description

Upgrade the Southmost Regional Water Authority Regional Brackish Groundwater Treatment Facility by evaluating the aquifer to optimize and expand the well field's yield, constructing a microfiltration pre-treatment facility to reduce iron and arsenic levels, and adding two additional reverse osmosis trains to increase production capacity to 11 MGD from 6 MGD.

This project is has already been constructed so the Regional Planning Group has included it as an existing supply.

EAST RIO HONDO WSC

FM 510 to SH 100 16-Inch Transmission Pipeline

Project Source

This strategy was submitted by East Rio Hondo WSC to the Regional Planning Group.

Project Description

Allow the transfer of water from existing FM 510 Water Treatment Plant and emergency interconnect with Harlingen Waterworks to an area of the Corporation's system that is predominantly supplied by Olmito Water Supply Corporation. This will provide the area with a reliable second source of water.

This strategy is not developed enough to allow the Regional Planning Group to further evaluate it or determine the cost or any specific environmental or implementation issues.

Other Distribution as Needed for New Sources of Water

Project Source

This strategy was submitted by East Rio Hondo WSC to the Regional Planning Group.

Project Description

This strategy is not developed enough to allow the Regional Planning Group to further evaluate it or determine the cost or any specific environmental or implementation issues.

Interconnect with Brownsville PUB, SRWA, or RGRQA

Project Source

This strategy was submitted by East Rio Hondo WSC to the Regional Planning Group.

Project Description

ERHWSC intends to utilize distribution extensions to acquire water from a regional supplier on the south end of the distribution system.

This strategy is not developed enough to allow the Regional Planning Group to further evaluate it or determine the cost or any specific environmental or implementation issues.

Partial AMI

Project Source

This strategy was submitted by East Rio Hondo WSC to the Regional Planning Group.

Project Description

Install advanced metering infrastructure in part of the system. This strategy is not developed enough to allow the Regional Planning Group to further evaluate it or determine the cost or any specific environmental or implementation issues.

EL JARDIN

Acquisition of Water Rights through Urbanization

Project Source

This strategy was identified by the Regional Planning Group.

Project Description

In order to provide El Jardin with sufficient water to meet its projected needs, the Regional Water Planning Group recommends that El Jardin purchase irrigation water rights from the market supply as they become available through urbanization and convert them to municipal water rights.

Available Supply

It has been estimated that enough water rights will become available to meets El Jardin's projected needs once other recommended strategies are implemented.

Environmental Issues

No environmental issues have been identified.

Engineering and Costing

A unit capital cost of $2,500 per acre-ft. has been estimated as the market value for water rights. Any costs associated with the delivery of water rates and assumed to be insignificant and are not included. Table 5B-62 shows the cost and yield projections for this strategy.

Table 5B-62 El Jardin Acquisition of Water Rights through Urbanization Cost and Yield Projections

Year	2020	2030	2040	2050	2060	2070
Yield (acre-ft./year)	0	0	84	258	418	563
Capital Cost	0	0	$210,000	$435,000	$400,000	$362,500

Implementation Issues

No implementation issues have been identified.

INDIAN LAKE

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

The strategy is for Indian Lake to build a brackish desalination plant with an almost insignificant yield. Because Indian Lake is not projected to have a large need over the next 50 years and it currently receives water from the Southmost Regional Brackish Desalination Plant, it is not practical for the city to construct another desalination plant.

LAGUNA VISTA

New Seawater Desalination Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to construct a new seawater desalination water treatment plant and intake pump station. Laguna Vista is served by Laguna Madre Water District which already has a strategy for a new seawater desalination plant so it is impractical for Laguna Vista to build and additional plant.

LOS FRESNOS

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Because Los Fresnos is not projected to have a significant need for the next 50 years, it is not practical for them to build a new brackish groundwater treatment plant.

NORTH ALAMO WSC

Waterline Extension, Phase I and II

Project Source

This strategy was submitted by North Alamo WSC to the RWPG.

Description

This strategy is to provide additional water to residents in Weslaco, Donna, and the Alamo areas by installing new potable water lines. This strategy would hydraulically interconnect the distribution system, allowing for utilization of other water districts in time of drought for push water.

The strategy is not developed enough to allow the RWPG to further evaluate it or determine an available yield, cost, or any specific environmental or implementation issues.

1 MG Water Tower – Edinburg/Pharr

Project Source

This strategy was submitted by North Alamo WSC to the Regional Planning Group.

Description

This strategy is to provide additional water storage and increase water pressure in the Edinburg and Pharr areas. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would provide 1 million gallons of storage, however it would not provide any additional supply.

Engineering and Costing

Table 5B-63 outlines the estimated project requirements and cost estimate.

Table 5B-63 1 MG Water Tower Edinburg/Pharr Project Requirements and Costs

Cost Estimate Summary ***Water Supply Project Option*** ***North Alamo WSC - Construction of 1 MG Water Tower - Edinburg/Pharr***	
Item	***Estimated Costs for Facilities***
Storage Tanks (Other Than at Booster Pump Stations)	$1,667,000
TOTAL COST OF FACILITIES	**$1,667,000**

Cost Estimate Summary ***Water Supply Project Option*** ***North Alamo WSC - Construction of 1 MG Water Tower - Edinburg/Pharr***	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$583,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (2 acres)	$7,000
Interest During Construction (4% for 1 years with a 1% ROI)	$80,000
TOTAL COST OF PROJECT	**$2,343,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$196,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$17,000
TOTAL ANNUAL COST	**$213,000**

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin.

1 MG Water Tower – Mid Valley

Project Source

This strategy was submitted by North Alamo WSC to the Regional Planning Group.

Description

This strategy is to provide additional water storage and increase water pressure in the Mid Valley area. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would provide 1 million gallons of storage, however it would provide any additional supply.

Engineering and Costing

Table 5B-64 outlines the estimated project requirements and cost estimate.

Table 5B-64 1 MG Water Tower Mid-Valley Project Requirements

Cost Estimate Summary ***Water Supply Project Option*** ***North Alamo WSC - Construction of 1 MG Water Tower***	
Item	***Estimated Costs for Facilities***
Storage Tanks (Other Than at Booster Pump Stations)	$1,667,000
TOTAL COST OF FACILITIES	**$1,667,000**
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$583,000
Environmental & Archaeology Studies and Mitigation	$6,000
Land Acquisition and Surveying (2 acres)	$7,000
Interest During Construction (4% for 1 years with a 1% ROI)	$80,000

Cost Estimate Summary *Water Supply Project Option* *North Alamo WSC - Construction of 1 MG Water Tower*	
Item	***Estimated Costs for Facilities***
TOTAL COST OF PROJECT	**$2,343,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$196,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$17,000
TOTAL ANNUAL COST	**$213,000**

Costs for this strategy from the UCM include an elevated storage tank and land acquisition. It is assumed that the construction period for this strategy is one year.

Implementation Issues

As with any project, necessary state and federal permits must be obtained before construction can begin.

Plant No. 5 - 16" Waterline Expansion

Project Source

This strategy was submitted by North Alamo WSC to the Regional Planning Group.

Description

This strategy is for a 16-inch waterline expansion from Water Treatment Plant No. 5 to provide additional water to the cities of Weslaco, Donna, and Alamo as well as other surrounding areas. This strategy would also hydraulically interconnect the NAWSC distribution system, allowing for utilization of other water districts in time of drought for push water.

Available Supply

This strategy would not provide any additional supply, therefore it is not recommended.

Engineering and Costing

Costs for this strategy from the UCM include a pump station and pipeline. It is assumed that the construction period for this strategy is one year.

Table 5B-65 outlines the estimated project requirements and cost estimate from UCM. The location and length of the pipeline was assumed based on the submitted description of the project.

Table 5B-65 NAWSC Plant 5 Waterline Expansion Project Requirements

Cost Estimate Summary *Water Supply Project Option* *North Alamo Water Supply Corporation - Plant No. 5 - 16" Waterline Expansion*	
Item	***Estimated Costs for Facilities***
CAPITAL COST	
Intake Pump Stations (4.2 MGD)	$2,066,000
Transmission Pipeline (16 in dia., 4 miles)	$2,242,000
TOTAL COST OF FACILITIES	**$4,308,000**

Cost Estimate Summary ***Water Supply Project Option*** ***North Alamo Water Supply Corporation - Plant No. 5 - 16" Waterline Expansion***	
Item	***Estimated Costs for Facilities***
Engineering and Feasibility Studies, Legal Assistance, Financing, Bond Counsel, and Contingencies (30% for pipes & 35% for all other facilities)	$1,396,000
Environmental & Archaeology Studies and Mitigation	$104,000
Interest During Construction (4% for 1 years with a 1% ROI)	$204,000
TOTAL COST OF PROJECT	**$6,012,000**
ANNUAL COST	
Debt Service (5.5 percent, 20 years)	$503,000
Operation and Maintenance	
Intake, Pipeline, Pump Station (1% of Cost of Facilities)	$74,000
Pumping Energy Costs (1095255 kW-hr @ 0.09 $/kW-hr)	$99,000
TOTAL ANNUAL COST	**$676,000**

Implementation Issues

No major implementation issues are anticipated for this strategy. The waterline would be installed within existing easements and right-of-ways. As with any project, necessary state and federal permits must be obtained before construction can begin.

CITY OF RIO HONDO

Water Loss Audit, Pipe and Meter Replacement

Project Source

This strategy was submitted by Rio Hondo to the RWPG.

Description

This strategy is to conduct a water audit and large-scale pipeline and meter replacement program. The information submitted to the RWPG was not sufficient to evaluate or determine an available yield, cost, or any specific environmental or implementation issues.

5B.3.2 Hidalgo County

ALAMO

Potable Water Reservoir

Project Source

This strategy was submitted by the City of Alamo to the RWPG.

Description

This strategy is for the construction of a second water reservoir in the City of Alamo. Neither the size of the reservoir nor the firm yield according to WAM Run 3 was provided. This strategy does not produce any additional water, therefore it is not recommended.

Table 5B-66 outlines the estimated project requirements used to develop the cost estimate.

Table 5B-66 Alamo Potable Water Reservoir Project Requirements

Facility	Description
Available Project Yield	0
Pump Station	21 HP
Land Acquisition	5 Acres
Pipeline	12-inch; 59,500 LF
Pipeline Right-of-Way	137 Acres

DONNA

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to provide additional supply to Donna with the installation of additional groundwater wells, however the city does not currently have any groundwater wells. This strategy is not recommended by the RWPG.

ELSA

Distribution System Improvements

Project Source

This strategy was submitted by the City of Elsa to the RWPG.

Description

This strategy is to provide the City of Elsa with improvements to its water distribution system by replacing deteriorated pipelines, fire hydrants, water meters, and valves that will eliminate water loss as well as improve efficiency of the system, conserving water and energy.

The City of Elsa's distribution system includes 26 miles of 2-inch to 12-inch water mains with valves and fire hydrants. It is unknown at this time what length and size of deteriorated pipeline needs to be replaced.

The strategy does not have a quantifiable amount of water that would be saved, therefore it is not recommended.

LA JOYA

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Because La Joya is not projected to have a significant need for the next 50 years, it is not practical for them to build a new brackish groundwater treatment plant.

MCALLEN

Geowater

Project Source

This strategy was submitted by the City of McAllen to the RWPG.

Description

This strategy is for the potential utilization of deep Geo Pressure/Geo Thermal (GP/GT) waters, both as a source of heat for the desalination of shallow brackish waters that underlie much of Hidalgo County, as well as for the resources that they contain. These resources include: dissolved natural gas entrained within the water, pressure that can be harnessed for electrical power production, heat than can be utilized for electrical power production and, considerable quantities of water that could constitute an alternate and independent water supply.

"Produced" water that is a byproduct of the oil and gas industry is currently considered a liability. While desalination processes have advanced such that this water can be usable for drinking water, the process requires energy. Rather than purchasing electricity from the power grid to run the desalination process, it is proposed to utilize the naturally high temperatures and pressures inherent under the Texas Gulf coast region, including Hidalgo, Willacy and Cameron Counties, as a renewable energy source to power the desalination and pumping activities. In

addition, any natural gas entrained in the produced water could be used for power generation purposes.

The strategy is not developed enough to allow the RWPG to further evaluate it or determine an available yield, cost, or any specific environmental or implementation issues.

MISSION

Use of Treated Sewer Effluent to Irrigate City Parks

Project Source

This strategy was submitted by the City of Mission to the RWPG.

Description

This strategy is for the City of Mission to use treated sewer effluent to irrigate the Bentsen City Park and public Shary Golf Course. Half of the wastewater treatment plant effluent would be diverted and pumped to the park and golf course for irrigation.

Available Supply

The wastewater treatment plant currently discharges approximately 7 MGD into a drainage district canal and the City estimates that 3.5 MGD of effluent could be used for irrigation.

The amount of water required to irrigate Bentsen City Park and Shary Golf Course was estimated using an equation for turf water requirement. The potential evaporation, turf coefficient, and quality factor that went into the water requirement equation were obtained from the Texas A&M AgriLife website. Areas of the park and golf course were estimated using Google Earth Pro. From this analysis it was determined that the total water requirement to irrigate both the park and golf course is 0.19 MGD, or 215 acre-ft./year. Although 3.5 MGD is available for use, the actual amount of water that would be saved from the potable water demand is much lower and therefore this plan is not practical.

Because only 0.19 MGD can be used for this strategy, the RWPG recommends using all of the available wastewater effluent for potable reuse. Therefore, this strategy is not recommended.

PHARR

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to provide additional supply to Pharr with the installation of additional groundwater wells, however the city does not currently have any groundwater wells.

SAN JUAN

Raw Water Reservoir Improvements

Project Source

This strategy was submitted by the City of San Juan to the RWPG.

Description

The existing raw water reservoir synthetic liner has failed and the mixture of ground and surface waters has made water treatment at the Water Treatment Plant No. 2 very difficult. Due to the failure of the liner, the City has had to dump untreatable raw waters into the adjacent ditch. More information needed to determine if the reservoir liner can be fixed or if the entire reservoir needs to be reconstructed.

The strategy is not developed enough to allow the RWPG to further evaluate it or determine an available yield, cost, or any specific environmental or implementation issues. Because no quantifiable yield could be determined, this strategy is not recommended.

SHARYLAND WSC

Sharyland Reservoir at Water Treatment Plant No. 1

Project Source

This strategy was submitted by Sharyland WSC to the RWPG.

Description

This strategy is for the construction of a new reservoir concurrent with the expansion of the Corporation's WTP No. 1.

Available Supply

The reservoir would store 10 million gallons of raw water, however the firm yield according to WAM Run 3 was not provided so no additional supply is taken into account as part of this strategy. Because no quantifiable yield could be determined, this strategy is not recommended.

WESLACO

Expand Use of Existing Supplies

Project Source

This strategy was submitted by the City of Weslaco to the RWPG.

Description

This strategy is for the expansion of the City's reservoir to provide additional water storage for emergency situations. The City's water treatment plant is currently being expanded and will need additional storage to account for the plant's increased capacity. Utilizing space next to the WTP for additional reservoir storage will also alleviate the need for constructing another water treatment plant.

The strategy is not developed enough to allow the RWPG to determine an available yield, cost, or any specific environmental or implementation issues. Because no quantifiable yield could be determined, this strategy is not recommended.

Water Conservation Practices

Project Source

This strategy was submitted by the City of Weslaco to the RWPG.

Description

This strategy involves the use of Advanced Metering Infrastructure (AMI). The City of Weslaco has many existing old mechanical water meters on residential accounts. Current testing from personnel has determined that these water meters are running approximately 12% slow on average. This strategy will replace the existing meters with new meters, significantly reducing consumption and conserving water.

The strategy is not developed enough to allow the RWPG to further evaluate it or determine an available yield, cost, or any specific environmental or implementation issues. Because no quantifiable yield could be determined, this strategy is not recommended individually, however meter replacement is a component of Advanced Municipal Conservation which is recommended for Weslaco.

Emergency Transfers of Surface Water or Interconnects Between Systems

Project Source

This strategy was submitted by the City of Weslaco to the Regional Planning Group.

Description

This strategy is to provide relief and possibly treatment assistance to City water infrastructure by interconnecting with an adjacent system in the northwest portion of the City. The City of Weslaco has an adjacent system with three entities, including the City of Mercedes, North Alamo WSC and Military Highway WSC. This strategy would physically connect the City of Weslaco and North Alamo WSC systems.

Because this strategy would only transfer water to Weslaco in emergencies, it cannot be considered as providing a reliable supply and therefore is not recommended.

5B.3.3 Starr County

LA GRULLA

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to provide additional supply to La Grulla with the installation of additional groundwater wells, however the city does not currently have any groundwater wells.

RIO GRANDE CITY

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to provide additional supply to the City of Rio Grande City with the installation of additional groundwater wells, however the city does not currently have any groundwater wells.

Non-potable Reuse

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is to use treated wastewater effluent for non-potable reuse. The strategy does not provide enough detail to determine feasibility or whether or not there are potential customers to reduce the potable water demand.

5B.3.4 Webb County

LAREDO

Low Water Weir

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy consists of a weir structure across the channel of the Rio Grande approximately 200 feet downstream of the existing La Bota site. Under normal operating conditions, the reservoir created by the proposed weir will have a maximum surface area of 4,956 acres and store approximately 66,007 acre-ft. of water.

The proposed weir would create higher water elevations for the Rio Grande River downstream as well as help Nuevo Laredo and City of Laredo future water treatment plants upstream of the weir. The production and sale of hydropower is also another component of the project and will help supply the new water treatment plants and the cities power.

Available Supply

The strategy would be used as flood control and would not provide any additional supply. Because no quantifiable yield could be determined, this strategy is not recommended.

Environmental Issues

Potential environmental issues include impacts on water quality (i.e., increased salinity) within and downstream of the reservoir; impacts to aquatic and riparian habitat as a result of changes in downstream flow; potential impacts to habitat from reservoir construction and inundation; and increased risk of flooding.

Engineering and Costing

The estimated capital cost for the weir project is $316,649,004 with an annual cost of $220,493.

Implementation Issues

Due to the construction of the weir across the United States – Mexico Border, collaboration among multiples agencies would be required to obtain the necessary permits and permissions. Project stakeholders would need to consult with relevant federal, state, and local agencies, and invite public comment to assure the project would comply with all pertinent federal, state and local requirements.

Expand Existing Groundwater Supply

Project Source

This strategy was recommended in the 2011 Regional Water Plan and updated by the Regional Water Planning Group.

Description

This strategy is to provide additional supply to Laredo with the installation of additional fresh groundwater wells. Laredo has multiple other recommended and alternative WMS and because this strategy provides a small yield, not until 2070, it is not recommended.

Available Yield

The proposed groundwater wells would provide 1,120 acre-ft./year in 2070.

Engineering and Costing

Costs for this strategy from the Unified Costing Model include groundwater well pumping, well field piping, land acquisition, and water disinfection. It is assumed that the construction period for this strategy is one and a half years.

Table 5B-67 outlines the estimated project requirements for each phase used to develop the cost estimate. The total costs for this option are presented in Table 5B-68.

Table 5B-67 Laredo Expand Existing Groundwater Wells Project Requirements

Facility	Description
Available Project Yield	1.0 MGD
No. of Wells	1
Well Pump	694 GPM
Well Field Piping	8-inch; 1,000 LF
Land Acquisition	0.9 Acres
Water Treatment	Level 0

Table 5B-68 Laredo Expand Existing Groundwater Wells Cost and Yield Projections

Year	2020	2030	2040	2050	2060	2070
Yield (acre-ft./year)	0	0	0	0	0	1,120
Capital Cost	0	0	0	0	0	$1,210,000
O&M Cost	0	0	0	0	0	$59,000
Total Annual Cost	0	0	0	0	0	$160,000
Unit Cost ($/acre-ft.)	0	0	0	0	0	$143

Implementation Issues

No major implementation issues are expected for this strategy. Construction of the new groundwater well and piping may also include a TCEQ well drilling permit, purchase of land and a TXDOT right-of-way permit.

5B.3.5 Willacy County

WILLACY COUNTY

Regional Brackish Groundwater Desalination

Description

This strategy is to develop projects utilizing desalination technology for brackish groundwater. Willacy County is currently in the planning phase of analyzing its water needs to determine proposed desalination projects. This strategy is not developed enough to determine a yield that it would produce or any associated costs.

Regional Seawater Desalination

Description

This strategy is to develop projects utilizing desalination technology for seawater. Willacy County is currently in the planning phase of analyzing its water needs to determine proposed desalination projects. This strategy is not developed enough to determine a yield that it would produce or any associated costs.

RAYMONDVILLE

New Brackish Water Treatment Plant

Project Source

This strategy was recommended in the 2011 Regional Water Plan and updated by the Regional Water Planning Group.

Project Description

This strategy is for drilling a new brackish groundwater well and constructing a new 2.0 MGD reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

This project is currently under construction, therefore it is included as a supply instead of a WMS.

Available Supply

This project will supply Raymondville with 2,240 acre-ft./year of water.

SAN PERLITA

New Brackish Groundwater Treatment Plant

Project Source

This strategy was recommended in the 2011 RWP.

Description

This strategy is for drilling a new brackish groundwater well and constructing a new reverse osmosis water treatment plant to treat the brackish water to potable drinking water standards.

Based on preliminary needs estimate for the 2011 RWP for San Perlita, the new brackish groundwater plant was sized for 100 acre-ft./year. However, after conservation WMS and supplies from other entity WMS, San Perlita does not have a need for this project so it is not recommended by the RWPG.